Wild Earth

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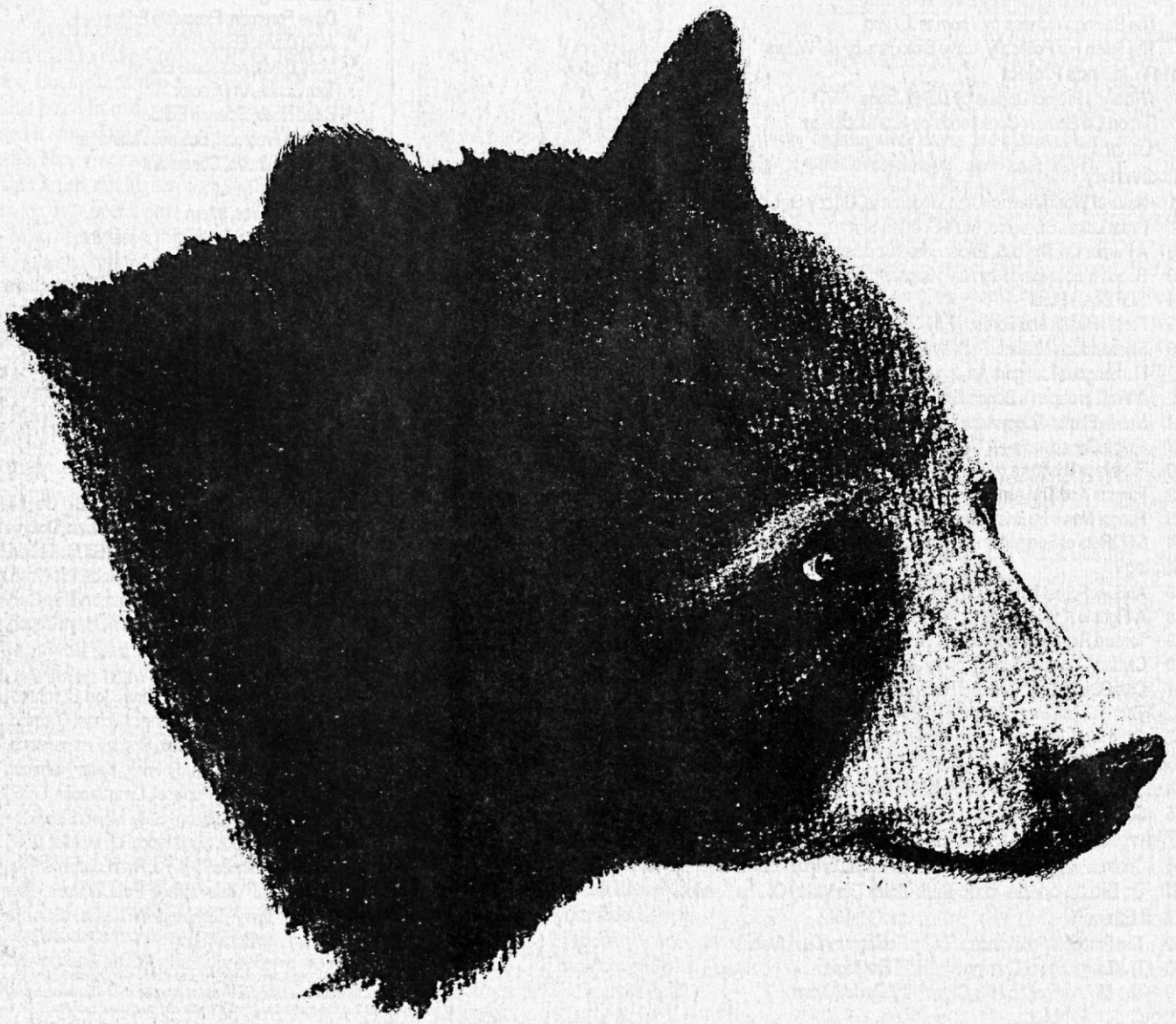

Writings by:

Dave Foreman
Thomas J. Lyon
DavidJohns
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Eric T. Freyfogle
Tony Povilitis
Ray Vaughn
Jim Nollman
...and others

$5.00

WILD EARTH

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On the Cover: A depiction of the American black bear, *Ursus americanus*, by Massachusetts artist Celeste Poulin.

Volume 2, Number 2

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Around The Campfire

Eighteen months ago I was sicker than a dog that had tried to eat a Colorado River Toad. My nephew Benny, then two years old, had brought hepatitis home from day care and generously distributed it around the family. Fortunately, neither my wife, Nancy, nor sister, Roxanne, got it but my bilirubin levels ran higher than the FBI's budget for undercover operations.

Now, hepatitis is a fine Zen master. It teaches you to relax, to surrender yourself to its flow. For one of the few times in my adult life, I had to discard "to do" lists and overcome my workaholism. I did little for two and a half months other than sit in my recliner chair and read a two-year's backlog of conservation magazines and newsletters.

John Davis flew to Tucson during that period and, for a week, he and I spent an hour a day ambling through the concept and plan of *Wild Earth* magazine. We both knew there was a need for such a publication; we hoped there would be a strong body of support for it within the conservation community.

This is the sixth issue of *Wild Earth*—one-and-a-half-year's worth. That alone confirms that there is a strong body of support for a magazine that combines conservation biology with grassroots activism. Our subscription numbers continue to rise, the praise for our publication continues to build, and our influence grows.

Nevertheless, we have to face the iron rod of magazine economics. Few new publications survive for more than a couple of years. Each member of our small, overworked staff receives pay based on a full-time rate of $500 a month. Even with the Reaganomics recession, that's chicken feed. Our writers and artists generally receive no pay other than a complimentary subscription. Slim finances limit our promotion efforts to reach more potential subscribers. (Right now our major source of new subscribers is the fliers I hand out at my speaking engagements.)

Wild Earth can certainly survive another eighteen months under our current circumstances. But I am not so sure it can last longer than that unless we increase our base subscriber level and raise additional money from other sources. Staff and writers can scratch in the dust only so long before they have to answer the call of their growling bellies and seek their truck in greener pastures.

There are three ways *Wild Earth* readers can put the magazine on more solid footing:

First, resubscribe promptly. Sending in your resubscription check soon after receiving your first resub reminder not only helps our cash flow, but it also saves us the money and effort of sending you additional reminders.

Second, rustle up new subscriptions for us. Give gift subscriptions to friends. Encourage others to subscribe by flashing your copy around. Distribute copies of our new subscription brochure at your local conservation group meetings (contact the Canton office for a supply). Encourage conservation-oriented bookstores and other businesses in your area to sell *Wild Earth* over the counter.

Third, contribute to the Wild Earth Research Fund. The publisher of *Wild Earth* is the Cenozoic Society, Inc. It is a 501(c)3 corporation under IRS regulations. This means that we are non-profit and that contributions to us are tax-deductible. Your check to the Wild Earth Research Fund counts as a deduction from your federal income tax, and it supports the quality, visionary writing you expect in *Wild Earth*. Our back cover for this issue explains the Research Fund in more detail.

Needless to say, *Wild Earth* wouldn't have made it this far without the support of our writers, artists, and readers. It also wouldn't have made it this far without the selfless work of all of the folks on our staff and board. Four of these people stand out. I do not believe that *Wild Earth* would exist without the special contribution of each.

First of course, is John Davis, the indefatigable editor of *Wild Earth*. John is not only the most unpleasant individual the FBI has ever had to tail (Special Agent Maxwell Smart reporting by shoe-telephone to headquarters: "Suspect Davis has just emerged from the dumpster behind the farmer's market. He is pedaling away." FBI headquarters back to Special Agent Smart: "Crawl into the dumpster to see if he left any messages, and then pedal after him on your FBI Schwinn."), but he is as good an editor as there is in the conservation movement. Make no mistake, *Wild Earth* is John's baby, and praise for its quality should flow in good measure to him.

The second indispensable person from the *Wild Earth* lineup is Mary Davis, Ph.D., and mother to the aforementioned John. For our first year of operation, Mary handled the books and the other business affairs. Without her hard work, *Wild Earth* would never have flown. Mary reminds me of a mother Bewick's Wren, always busy, always turning over leaves and pieces of bark, making sure that everything is taken care of. This magazine is the nestling that Mary hatched and fed.

Third is Reed Noss, our Science Editor. Without the credibility and ecological expertise that conservation biologist Noss brings *Wild Earth*, I am not sure we would be taken as seriously as we are. Reed maintains a rigorous scientific standard for our articles that deal with biology.

Fourth is a lawyer. Yes, we all love to hate lawyers, but there are several lawyers that I love. David Johns worked long volunteer hours on my legal case, and then moved into volunteer legal work for *Wild Earth*, working with Mary to incorporate the Cenozoic Society and gain our non-profit IRS status.

Now is the time to thank this fine Gang of Four. Together they have hatched a hell of a fine conservation magazine that is going to blaze the new trail for the conservation movement.

✣

During my two decades as a conservationist, I've lost several valued comrades. The latest is Bill Turk. Bill was a solar engineer and wilderness fanatic. He was also a misanthrope (yes, the Rendezvous late-night bullwhip cracker was Bill). This failing was not his; Mark Twain's damned human race did not measure up, and Bill was not hesitant in letting it know so. I first met Bill at Little Granite Creek in 1982 when Earth First! symbolically blockaded Getty Oil Company from invading the proposed Gros Ventre Wilderness. Bill was a gifted artist who created the infamous black Earth First! T-shirt with the hand holding the monkeywrench and the words "Defend the Wilderness." He also contributed a good bit of material under the *nom de guerre* "The Mad Engineer" to *Ecodefense*.

Bill Turk died this winter in a snow avalanche in the La Sal Mountains outside of Moab, Utah, where he had lived for the last few years. He left the Earth a better place than it would have been without his life. He died in the wilderness he loved. I'll miss him.

—Dave Foreman

The Saving Wildness

Guest Editorial

By Thomas J. Lyon

La Garita Wilderness, Colorado. August 4. I took off my pack, set it against a young Engelmann spruce, and had another look at the map: crossing Cochetopa Creek and then going steeply uphill through the green, gaining about fifteen hundred feet, I would come into a high, treeless alpine bowl, and above that cross an easy divide at around 13,000 feet.

It looked O.K. on paper, but the steep woods turned out to be barricaded with down trees, and despite the angle the footing was boggy much of the way. It was a struggle going up, longer than I'd thought — and, finally a great release, at the end of the woods, to step out onto firm ground. Now, moving in the easy, grass country above treeline, I looked across the canyon of Cochetopa to the broad, tilted uplands on Organ Mountain, and the triangular summit of San Luis Peak, and way out to the far, snowy peaks of the western San Juans — a huge view. The rising, jagged points of the earth glittered in the air. In high, open country like this, walking on the close-knit turf and jumping from rock to rock, the body takes on unexpected vitality, an energy that seems inexhaustible. You realize you're grinning. A wiggle of delight runs outward from an unknown source, involving every nerve. Who knows what makes the heart rise up? The joy of the body is the joy of the mind, too — feeling the mountains in your bones, their slope and bulk moving with you. They feel like your shoulders and knees somehow. "The blue mountains are constantly walking," said the Japanese philosopher Dogen.

On the broad divide the wind was blowing, as it always seems to in such bare terrain. Something made me walk even slower now, and notice better — see better. There was a big slanted rock, among the many, sticking out of the turf at just the right angle; I let the pack down again and lay back against the warm rock. Speckled all around were the low flower-cushions of the tundra, clamped to the ground, their blossoms barely nudged by the wind that moved the taller grasses: little myriad white crosses of alpine phlox, pink moss campion, and blue forget-me-nots. The whole broad saddle sparkled with color in the airy light. I took off boots and socks and put my bare feet on the wiry grass. After a time the usual midday clouds began to build up. A cloud would come, and the light would shut down suddenly, and then after a minute or two suddenly come back. My eyes and ears seemed to widen, become more alert, at each change.

✣

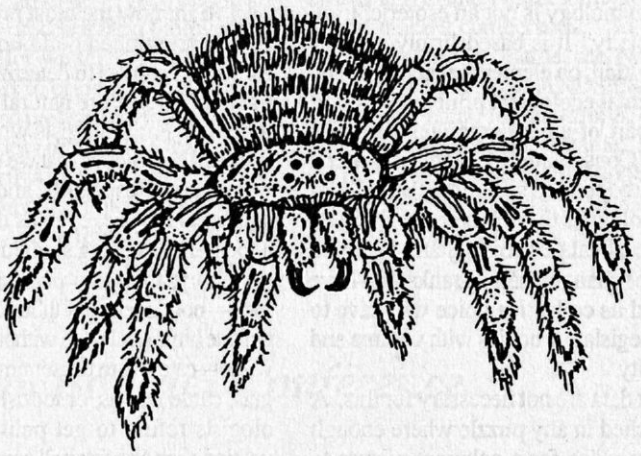
Logan, Utah. January 21. Now I'm at the office, typing on a word processor. A good soldier, I will go to a faculty meeting at 12:30. I am, of course, a working member of the civilization that is ruining the world. Why are we doing this? — so helplessly, so resistlessly? I have no great answer. But I wouldn't even ask the question, without the wilderness. I think back to that curving, soft-formed ridge, the look of it in the sliding shadow and light; the warm rocks, naked to the sky; the surge of plain good feeling, and under the feeling an inward awareness, a pure arc of knowing. The beauty of wilderness is the beauty of essence, of the whole. It is the source, where our life comes from, and the body knows this.

So it seems off the mark to argue for wilderness, as we do, on the basis of watershed protection, or recreation, or big game habitat, or to save a plant that might one day give a cure for cancer. Not wrong, exactly, because all these points are unarguable, or so I believe — but they're not the real point. And it seems weird, from a holistic point of view, that the wilderness, the most shiningly clear example of the world's overall integrity, is fragmented in our law into managed bits and pieces. The Wilderness Act of 1964 says that wilderness, "in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." This is politically and historically realistic, given our particular culture, but in the long run such dualism goes against the grain of things.

The new-age truism that "health," "whole," and "holy" are a word-family really is true. Their connateness represents an ancient understanding that nothing separate can be genuinely sound. Health is cooperative, a matter of good citizenship in a system. There is no separate, cocooned salvation. "What is the use of a house," Henry David Thoreau asked, "if you haven't got a tolerable planet to put it on?" We begin slowly to recognize the togetherness of all things that the etymology

of "heal" hints at. Aldo Leopold called the development of the ecological point of view the outstanding advance of the twentieth century. The real work, to borrow Gary Snyder's phrase, is to put that point of view into practice.

I think such a deep-seated revolution is possible, but only if it is felt to involve beauty, joy and delight. I don't believe we can make a future out of technological fixes — we have bandaids on top of bandaids even now — and I don't imagine that guilt or authority are workable, long-term motivations. What we crave, what's missing, is physical and emotional experience of the wild Earth, the contact that sparks our oldest delight back into life. Only from hints of joyfulness and health can



we be inspired at a deep enough level. Starting from anywhere else, we get merely consolation, or partial repair. The theme was sounded 130 years ago by Thoreau: "In Wildness is the preservation of the World."

At present, and it's well to acknowledge this, we all join the economy. Following the accepted strategy, we fill each day with things to do, ensuring that the small kind of consciousness will occupy the whole of waking existence. Every day, working together, we make more of the wild Earth our own — that is, break it into parts the ego can administer. As the managed world grows, the wild, mysterious sense of relation atrophies and our stock of metaphors, narrowed to our own creations, becomes pathetically self-referential. "A falcon is built for speed," says a special supplement to *Audubon* magazine, September, 1990. "Powerful but streamlined, a falcon can streak across the sky like a jet fighter, drop like a dive-bomber, turn on a dime."

This kind of thing forecasts death from solipsism, and shows why we now need wilderness so profoundly. When we walk for days in a natural area, and spend the nights there, the body begins to come alive in a way that is unmistakably different from what jogging or weight-lifting do. A certain competence and confidence begin to seem natural, as feet, working now in variable terrain, adjust themselves to rocks and ground. Hands start to feel wider and stronger. The body brings the mind along. The sense of place comes from the simple enjoyment of surroundings, meeting them, touching them and being touched. The redeeming wildness in us arises in practical response to actual landscapes. This is where natural equanimity lies—it is where we are not constitutionally needy.

Am I just thinking here about humans, and our own problem? I hope not, I think not. Our completion is now crucial for everything else in the world, because only by restoring our own health will we stop destroying the planet in the name of our so-called needs.

Must the setting for this redemption be wilderness? I believe so. If we stand in the tamed realm, all we see are signs and symbols of fragmentation. The managed part of the world corroborates reduced consciousness and the little, needy self: it shows us ourselves, again and again, like a hall of mirrors. In the wild, such constant reinforcement simply isn't there. We are surrounded and moved now by spontaneous life — a flashing stream; a path obscured by fallen trees; the deep, enveloping sound of wind coming through a forest at night. Such things retain an immense, archaic potency with us. They touch and awaken our own share of the oldest wisdom, the accumulated intelligence of the Earth.

The "Late Summer, 1990" issue of *Aperture* magazine, titled *Beyond Wilderness*, warns against focusing on wilderness so strongly that we neglect our other environmental responsibilities. What we ought to be doing, write Barry Lopez and Wes Jackson for example, is seeing wilderness as just one aspect of the whole span of relations between humanity and nature. We need to be doing better by all ecosystems and every place we touch, not just romantically setting apart a few pristine wild areas and then going on with business as usual. Lopez concludes, "Wild landscapes are necessary to our being. We require them as we require air and water. But we need, at the same time, to create a landscape in which wilderness makes deep and eminent sense as a part of the whole, a landscape in which wilderness is not an orphan." Such a wise statement is hard to take exception to. If we followed it, we would have a better world than we have now. But having said that, I recommend a different slant; I would prefer a thought like Robert Frost's, expressed in a 1934 poem, "Unharvested":

"May something go always unharvested!
May much stay out of our stated plan."

In our heart of hearts, wilderness isn't part of anything. It is the overarching reality that transcends all our plans and creations. We cannot go "beyond wilderness" — the universe is wild. We can only go beyond our paltry, dichotomized worldview and our management-mania. The wilderness that is left on this planet (one-third of the land area, according to the most hopeful estimate) is where we should look for our original reference and inspiration; it should not be considered just one of the many competing possibilities to which, in stewardship, we may parcel out the Earth. In the wilderness battle is involved the whole issue of how we conceive of ourselves and our powers. It is right, surely, to reintroduce peregrine falcons, try to breed perennial cereal crops, and make electricity by the sun. There is a tremendous lot we need to do, to be good citizens. But what we need most of all is a radical, inward change, a restoration of our perception and our joy in the world. What needs to come forth is our wildness, which is to say, our wholeness. Then we would have a standard that could give meaning and proportion to our amazing techniques.

Thomas J. Lyon teaches at Utah State University. He edited This Incomparable Land, *and* On Nature's Terms: New American Nature Writing, *the latter to be published by Texas A & M Univ. Press in Fall 1992.*

Editorial

The Need For Politically Active Biologists

by Bill Willers

There is a notion among many scientists that taking an advocacy role is a betrayal of objectivity. It is an ill-founded notion. Nobody who functions in one area of life as an objective scientist need feel compelled to play that role 24 hours a day. For one thing, nobody could be a well-rounded human being who would wear such a hat at all times; for another, the input of scientists is badly needed as our culture formulates values and ethical standards.

In the design of experiments and in gathering, analyzing, and presentation of data it is necessary, of course, to be disinterested. But when one departs the lab one is free to be parent, poet, lover, or anything else imaginable—including an advocate. Unfortunately, it is as advocates for nature that biologists have failed most miserably. The biological community, as a whole, has been remiss in fulfilling a great moral obligation.

Biology overlaps with many other disciplines, so it's hard to say how many in the country would qualify as professional biologists. But when one considers teachers and academicians, wildlife and fisheries biologists, researchers and naturalists, one is thinking in terms of tens of thousands. Then there are the medical people—doctors, veterinarians, dentists—all of whom have academic backgrounds in biological science. So we're looking at a veritable army that could and should be using its collective authority in defense of Earth and its processes.

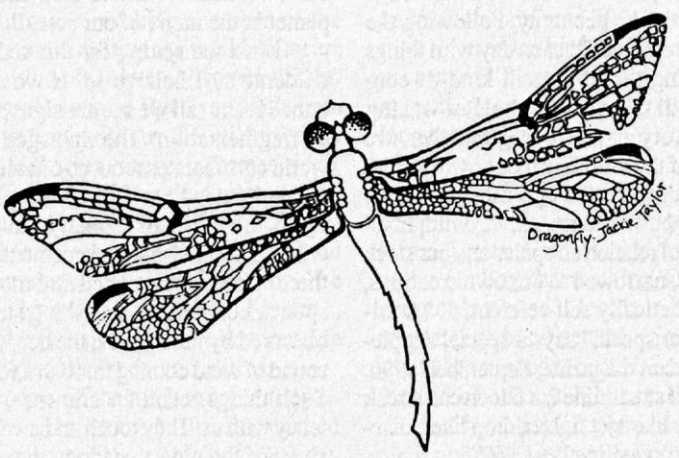
It's shameful, then, that grassroots activists are doing much more than biologists on behalf of the web of life. Even among the ranks of those who refer to themselves as "conservation biologists," there is talk of compromise and of allowing local interests to determine the fate of public lands. If biologists who should know better take such a stance, why should legislators push for more?

Albert Einstein once remarked that "in Faraday's day there did not yet exist the dull specialization that stares with self-conceit through horn-rimmed glasses and destroys poetry." Perhaps it's this specialization—which has become much more pronounced since Einstein's day—that has kept the vast majority of biologists from seeing the overall picture and from realizing their responsibility in stemming the destruction of the biosphere. Perhaps. It's a lame excuse, though, because conservation biology is not an esoteric, frontier subspecialty. It is based firmly on Darwinian evolution, on elementary genetics, and on fundamental ecological principles—all of which are part of an undergraduate major's education. Conservation biology is general biology geared toward salvation. But if conservation biology is to become more than just a new surge of data collection, and if it is to be a force for change, then its ranks will have to swell, and its collective voice will have to be heard in legislative bodies with volume and with authority.

Further data are not necessary for this. A point is reached in any puzzle where enough pieces are in place for a coherent picture to emerge. Though it may be true, for example, that one can't employ genetic principle to predict precisely *when* a very small population will become extinct, it is nevertheless possible to say at a certain point *that* genetic decline leading to extinction is assured. And even though nobody knows how many species there are on the planet, it is crystal clear that rich genetic diversity is a feature of the biosphere favoring stability and allowing for resilience in the face of change, and that reducing diversity, therefore, compromises the biosphere itself.

Right now the most pressing need is not for a more refined definition of "natural," or for further studies to determine just how small parks can be before natural process is lost altogether. For biologists who are fully awake it should be obvious that we don't have enough original landscape as is, and the remnants are disappearing fast, even as the process of disappearance is being studied to death. What is necessary, then, are politically active biologists—not dozens but thousands—who will articulate biological need without compromise and without catering to the sentiments of timber moguls, cattle barons, or tourist merchants. If biologists refuse to get political of their own volition, then activists will have to shake or shame them out of their torpor. And absolutely anything that works in that department would be fair.

Bill Willers is the author of Trout Biology *and editor of the new anthology* Learning to Listen to the Land. *He is a biology professor at the University of Wisconsin, Oshkosh.*



North American Wilderness Recovery Update

The Wildlands Project

With the craggy peaks to the west of Boulder, Colorado, standing watch, the North American Wilderness Recovery board met in between sessions of the Southern Rockies Wilderness Conference. (See related article this issue.) The Board gathered, with a number of regional activists sitting in, to discuss several efforts central to the project.

A continental conference on developing a model for evaluating reserves needed to protect ecological processes and biodiversity will be organized for winter 1993. The goal of the conference is to bring together conservation biologists and preservationists to review proposals for a model or template that can be utilized across North America for determining what is necessary to protect biodiversity at the genetic, species, ecosystem and landscape level. The conference will be the first of several to address this and related issues. A site for the conference will be chosen soon. *Wild Earth* will keep you posted.

When "North American Wilderness Recovery" was chosen as the name for developing a continental wilderness proposal, it was meant to be temporary. Many associated with the project have grown used to it but recognize that its length and irreducibility to a pithy acronym make it cumbersome. So, without legally changing our name, the NAWR board adopted "THE WILDLANDS PROJECT" as the popular name for our efforts. Henceforth you will see and hear this name. Both names are registered on the organization's behalf and can be used to reach us at POB 5365, Tucson, AZ 85703.

The Board was also expanded at Boulder to include Michael Soulé, prominent conservation biologist and one of the founders of the Society for Conservation Biology; George Wuerthner, author, grazing expert, and photographer; Roz McClellan, director of the Environmental Center, University of Colorado; and Jamie Sayen, founder of Preserve Appalachian Wilderness (PAW). They join John Davis, Dave Foreman, David Johns, Rod Mondt, Reed Noss and Roxanne Pacheco. The board was thus made more representative of regions and expertise, with the recognition we have more to do in that area.

The Wildlands Project has established a clearinghouse in Tucson and is laying the groundwork for various aspects of its work. These will include providing scientific support to regional activists, building a network of regional activists and scientists, and communicating with the movement and the public generally.

—David Johns, Oregon

Report on Boulder Conference

On April 25, more than 150 activists from the Southern Rocky Mountain region joined scientists such as Reed Noss and Michael Soulé to forge a new strategy for ecosystem protection in the Southern Rockies. The occasion was the Southern Rockies Ecosystem Conference, sponsored by the student-run University of Colorado Wilderness Study Group.

Hailing from as far north as Laramie, Wyoming and as far south as Albuquerque New Mexico, many who came were veteran activists, battered and beleaguered by years of jumping through Forest Service hoops. Their energy absorbed for so long reacting to agency moves, they were more than ready to seize their own agenda by staking out a vision of their own.

What evolved in the course of the conference was exactly that, a vision of a series of linked ecosystem reserves for the Southern Rockies, whose core, buffer, and corridor areas would reflect, not the needs of bureaucracy, but the needs of the land itself. Once mapped, the proposal would expose to view the patterns and functions of landscapes now buried beneath a tangle of jurisdictional boundaries. The proposal would provide a unifying framework for conservation efforts region-wide.

At the heart of the conference was the question : "How can the principles of conservation biology be applied, on the ground, to designing ecosystem reserves for a given region?"

How can local activists design a reserve that includes, as Reed Noss advocates, a full range of species and ecosystems across a natural range of variation? How can a reserve be created that provides scope for natural evolutionary forces to shape the landscape? How do you get wildlife across roads and other human barriers? And what about the dangers to forest interior species posed by meso predators, such as raccoons and skunks which are attracted to interior areas by roads and clearcuts?

After a brief introduction to such topics by Noss, Michael Soulé, and Peter Landres, conferees were handed markers and told to try sketching potential core areas, buffers, and corridors for regions they knew. In the three ensuing workshops, one to map the northern section of the Southern Rockies, one for the central, and one for the southern section, animated dialogue arose about such esoteric topics as wolverine range requirements, what to do about private lands, and roads. Conferees stood around large tables, their markers poised and swooping like falcons over acetate map overlays, while Soulé, Noss, and ecosystem pioneers Felice Pace, Mike Bader, and Rod Mondt stood by, cheering on and guiding. Typical of the discussions were the following snatches:

"Take the moral high ground"

"Be completely radical, this may take centuries"

"Shift the framework of values. Don't get caught in the current paradigm."

One of the key problems conferees were challenged to think about was how to design corridors that don't become wildlife "mortality sinks." Michael Soulé explained that if corridors are too narrow, too curved, or funnel-shaped, they may lead animals unwittingly to edges where they encounter predation, hunting, poison, and traps. Narrow corridors are also a liability if predators learn to hang out at road underpasses and tunnels to pick off prey coming through.

A recurring theme of the conference was the importance of natural cycles. Natural cycles are not necessarily neat, closed, and repetitive, said biologist Chris Maser. Rather they can incorporate a wide range of irregularity and disturbance such as fire and climate change. In a natural—as opposed to a human—regime, similar patterns, given enough time, will tend to recur, based on continual replenishment of soil, genetic diversity, and biological diversity.

Maser said humans are returning forests more and more to early successional stages, without providing the centuries needed to repeat the full cycle. In the process soil and diversity are lost. Soil is the foundation for forest cycles. Old, decaying trees are the foundation for soil. Remove the trees, remove the soil, remove the cycles, he said.

Relating ecology to human culture, Maser said that tribal people have cyclic cultures in which humans try to fit into the natural world. Linear ways of thought, on the other hand, lead people to change nature to fit human needs.

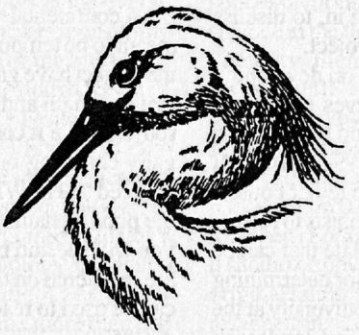
A burning question for many at the conference was how to design preserves so as to integrate ecology and economics. Tony Povilitis's proposal for a 25,000 square-mile San Juan Ecosystem Biosphere Reserve held some answers. The Reserve would protect habitat for scores of imperiled species in southern Colorado and northern New Mexico by establishing core wild areas. Outside core areas, low impact economic activities, such as producing solar and wind energies and outdoor equipment, recycling, wood processing, and sustainable forestry, would be allowed.

A high point of the conference was George Wuerthner's dynamic exposé of the preposterous maladaptation of the European-bred cow to Western rangelands. Wuerthner convincingly showed that characteristics making the cow ideally suited to moist European bottomlands—its anatomy, grazing habits, and poor mobility—are exactly what make it devastating to range habitat. As Wuerthner put it, "We are using the wrong animal in the wrong environment in the wrong way."

At the conference wrap-up, people stepped forward by the dozens to offer their skills in mapping, computers, and biology for the purpose of developing a Southern Rockies ecosystem proposal. The plan is to put together a roughly sketched-out proposal, based on easily available data, and have it field-checked by local activists. The initial proposal will be used to solicit input and further refinement from conservationists and scientists and, in the process, to win their support.

Altogether, the conference was a heady first step in envisioning a wildland reserve system for one mountainous chunk of the mosaic of North American bioregions. Tapes of the talks are available from the CU Environmental Center, "Attention Roz McClellan," UMC 331, Campus Box 207, U. of Colorado, Boulder, CO, 80309. Specify whether you want Tape 1, Dave Foreman's keynote speech, Tape 2, Michael Soulé's and Reed Noss's talks, or Tape 3, Chris Maser's talk. Send a check for $4 per tape. Make checks payable to: "University of Colorado."

—Roz McClellen, Colorado



STATEMENT OF PURPOSE

Wild Earth is a non-profit periodical serving the biocentric grassroots elements within the conservation movement, and advocating 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 aim to complete, and subsequently publish in book form, a comprehensive proposal for a North American Wilderness Recovery Strategy (The Wildlands Project).
- 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.*

Letters

FLAP TOGETHER

After reading the first few issues of *Wild Earth*, some people will wonder, "what's the big flap over the Sierra Club all about?" I have some ideas on this subject, based on my work with both the "Majors" and the grassroots. First, some words from a wise elder: "Always remember as you go through life, Michael," my Aunt Vera told me when I was 7, "that a bird has two wings and if they don't flap together the bird falls on its ass." I offer the following examples of what has happened when we all *flapped together.*

XINGU RIVER In the fall of 1988 a handful of relatively inexperienced grassroots activists learned that the Kaiapo' Indians of Brazil were sponsoring a gathering of indigenous peoples from Amazonia to help them celebrate their Corn Ceremony and to join them in opposing the construction of two dams on the Xingu River that, if built, would destroy pristine rainforest and the Indians' way of life. The Kaiapo' asked people from the U.S.A. for technical assistance. We began gathering information and soon realized that there was no steady communication link from Brazil to North America. So we talked to the organizers working directly with the Kaiapo', then started setting up a connection.

This led to working directly with some of the major environmental and human rights groups around the world. The majors were struggling with the World Bank, which was sending down $500 million for the dams. The Corn Ceremony was set for the end of February, 1989.

In the mass of files we had gathered we came across a page that identified a consortium of private banks planning to send another $4.7 billion once the World Bank's $500 million went down. We immediately traced the author, got more information, then called all the majors. We asked why no one was going after the private interests and never got a straight answer. We then called the banks, and low and behold it was true. Their plans were big and destructive and did not stop at the Xingu River.

With the majors' help, we compiled a mailing list of over 500 groups and put together an "action alert" that drew attention to the World Bank and to the private banks as well. We put the alert in the mail in mid February and then did follow up phone calls. The response was incredible. Phone calls flooded the banks, letters poured in, and demonstrations were put together from San Francisco to London, which all coincided with the Corn Ceremony in the last week of February.

Denials flew out from the banks. One of the major environmental groups asked for a meeting with the banks. They refused and issued a statement saying they had canceled the loans.

The bottom line here is that if the call for help had not come from Brazil, and if the grassroots had not answered, and if the majors had not helped in guiding us, the Xingu would probably no longer be flowing free to the Amazon.

BROWN BEARS In March 1990 an associate called me to say that the Alaska Department of Fish and Game (ADFG) was considering reopening a portion of upper Seymour Canal on Admiralty Island to Brown Bear hunting. The area included the drainages on either side of Pack Creek, a popular bear-viewing area made famous by the late Stan Price (the "Bear Man of Admiralty Island"). The Pack Cove drainage has been closed to hunting since the 1930s, and in 1984 the Swan Cove to the north and Windfall Harbor to the south were closed. ADFG was only accepting written comments and we only had 48 hours to get them in. When contacts in Alaska welcomed our "outside" help, off we went.

Our main tools for this action were telephones and fax machines, through which we summarized the situation for everyone. Once again the response to the call to action came not only from the majors but also the grassroots. On April 1, the ADFG issued a press release saying they would not open the areas to hunting, and that the issue had generated more written comments than any other at their meeting.

MOUNT GRAHAM There are many successes and failures in the grassroots to DC connection on this issue, but the following is a definite success. The issue is simple: the University of Arizona (U of A) wants to build a telescope city on southern Arizona's highest mountain; and to get permission from Congress, it had to spend over a million dollars circumventing the National Environmental Policy Act. In 1988 Congress granted that permission and everyone thought it was over—except the grassroots of Arizona. In the spring of 1989 they began a two-pronged approach to stop the destruction. The first approach was to take legal action, and the other was to go after the collaborators, one of which was the Smithsonian Institution (SI).

We went to doorsteps of the SI in DC with two key arguments. The first was that the information given to Congress was fraudulent (read Inner Voice, Winter 1991); the second was that Mt. Graham is a sacred mountain to many Apache Traditionals. The grassroots faced SI officials again in October 1989 when the SI was cosponsoring a symposium with the U of A in Tucson. The first day 3 EF!ers met scientists, U of A and Forest Service people and followed them around with cameras, video recorders, questions. The next day, 60 activists floated in and out of the symposium disrupting it at every turn. We said that until the scientists addressed what politics did to this unique range, we would continue to disrupt the meeting. Some of us got thrown out and some of us got arrested but we accomplished our goal. We exposed the heavy handedness of the U of A and started a discussion about the circumvention. We subsequently began a letter writing and phone calling campaign to the SI. In February 1990, a dozen of us arrived in DC to host a demo on the steps of the Museum of Natural History. We were joined by people from groups ranging from Greenpeace to the Audubon Society. Greenpeace canvassers distributed flyers about the SI involvement. Shortly after that, we learned that the SI was hosting a conference on environmental law; there we passed out 500 pieces of literature exposing the SI to the participants. These actions lead to us being contacted by people in the SI who wished not to be identified but told us what we needed to know.

The pressure continued into the summer by visiting the SI and teaching the people on the inside and out that Mt. Graham is not only a unique range vertically but horizontally as well. It is a keystone for an arc of sky island ecosystems that extends from Tucson, AZ, to Las Cruces, NM (see *Big Outside*, p. 288). The SI began to take notice.

This work was coupled with visits to politicians like Congressman Scheuer, the sponsor of a biodiversity bill that would put the SI in charge of a new national biodiversity center. When I visited Scheuer, I went with a highly respected conservation biologist who was a senior scientist for one of the majors. We explained to the Congressman that Mt. Graham is a prime example of what his bill should protect. I asked him to pull the SI from his bill because as long as they were involved in the Mt. Graham telescope project they did not deserve to be in charge of any biodiversity center.

The grassroots activists' visits inside the SI became more frequent; and the majors, following their funding, hit them when they could. In May 1991 the SI announced that they were leaving Mount Graham and going to Mauna Kea in Hawaii to place their telescope. They only touched on environmental concerns in their press release; and we aren't yet celebrating because the Max Planck Institute of Germany, and the Vatican and the Arcetri Observatory of Italy are still involved.

CONCLUSIONS We still need everything from direct action to legislation. You grassroots people need to take the DC chip off your shoulder and go to DC and make contact. Take with you a book on civics and leave your egos at home. Do not judge an entire organization by one or two field reps. There are some damn hard-working people back there who are juggling ten different issues and yours may be only one of them. Stir the stew when you have to.

On the other hand you DC people need to get off the goddamn cocktail circuit and quit compromising and stop worrying whether you are going to piss off somebody. Come out to the front lines and see the police drag people off as the chainsaws roar. Then maybe it will not be so hard to go back and say, "Sorry, Senator, but we are not budging one goddamn inch."

—Michael D'Amico, Tucson

DEAR JOHN DAVIS,

Many thanks for your kind review of my Whole Earth Ecolog in the Fall 91 *Wild Earth.* However, I must respectfully disagree with one of your remarks—the one that goes "For us Luddites, some of the tools are worthless or even downright objectionable: computer games and aerodynamic cars, for example."

Certain computer games, such as the ones I recommend, are one of the best ways to help people understand the complexities of making a sustainable society work. Sim City is particularly useful for educating kids away from the handy, but too simple view of how cities develop and run. The longer Sim City is on the market, the more real-life experience and user-experience is incorporated into it and the more accurately it can be used to make predictions, and so make good moves that will be accepted. All the good intent in the world won't get far if the ideas are not understood or accepted. And if it were not for computers, the Big Picture of what is happening to the entire world would be invisible (except in principle, of course—the usual academic or purely emotional talk-but-not-do gavotte) making well-aimed organized worldwide action impossible. The good work of World Game, for instance, is making a difference by informing the various eco-organizations of the real numbers involved in what is going on. Satellites are for the first time making it possible to see what's really what.

As for aerodynamic cars, good aerodynamics is one of the best and cheapest (shape is free) ways to reduce fuel consumption and consequent greenhouse gas emissions. Even better, a well-streamlined car requires a smaller engine (it can be MUCH smaller), and so is not only more economical, but lighter, which gives yet better economy. There is no need for a light car to be unsafe, by the way, and there is also no need for an economical car—100 + miles per gallon—to be tiny. That's all bunk foisted on us by anachronistic auto makers. In fact, using available technology it appears possible to make a car that uses less calories of fuel than does a person riding a bicycle! I will of course agree that cars in general are a big problem, but the problems are mostly from the necessity for commuting and shopping at distant malls and that sort of thing. Both of those uses are caused by the greedy activities of the developer/bank/lender conspiracy. Since the need for cars is not going to go away anytime soon, and the convenience of them is not likely to be surpassed by any public transport system, and we all use them, it seems to me that the best we can do at this time is to make the things as efficient and safe as possible.

—J. Baldwin, Whole Earth Review

COW CONSIDERATIONS

I have been the designated "Livestock Person" in my local environmental group for the last several years, and have spent a lot of time on the ground and in offices, gathering information from Forest Service personnel on range conditions and monitoring procedures in our nearby National Forest. I can't claim to know everything there is to know about public lands grazing, but I've learned to ask a lot of questions and to learn from my mistakes.

I was surprised and a little dismayed, therefore, to see the terms "Unsatisfactory," "Fair," and "Poor" used to describe range conditions in George Wuerthner's article "Some Ecological Costs of Livestock" (Spring '92). These terms, which are used by the Forest Service and BLM to evaluate something called "Range Condition and Trend," can be very misleading. In fact, using them improperly (which is very easy to do) can undermine an environmentalist's credibility. I must question Wuerthner's application of such terms in his article.

These labels have proven to be so misleading to the public that some Forest Service personnel would like to abolish them. One day, after I had used these terms (which I had found in Forest Service documents) to express my environmental outrage in a public meeting, a sympathetic range conservationist patiently explained what the terms actually meant: The designation of "Unsatisfactory" is given to lands that are indeed unsatisfactory, but only if you are looking to graze livestock. Similarly, "Poor" and "Fair" apply to the suitability of the land for cows and sheep. This may have nothing to do with the quality of the land as habitat for other (probably more suitable) creatures. Land that is poor for cows could be ideal for desert tortoises or spotted owls, for instance. Before we become alarmed about a designation like "Poor," we need to know about the specific piece of terrain we are labeling. Has it truly been hoovered by cows until it has *become* poor, or are there good reasons (succession and high elevation come to mind) for it to be poor rangeland? Some places should never be considered Good, in terms of Range Condition and Trend.

When a rancher claims that his land is "improving," he isn't talking biodiversity. He's talking about more and better grass for his cows. On one hand, this could mean that soil quality is no longer declining and riparian areas are recovering due to better management—fewer cows, a good rotation schedule, perhaps a rider moving the animals out of the drainages. But on the other hand, "improvement" could also mean irrigation ditches and water tanks, seeding with non-native grasses, a temporary drop in the number of head because of shaky finances, a wet year or two after a long dry spell. Buzzwords mean different things at different times, depending on who's using them. Maybe people who care about the land should avoid them altogether, and dig down for the details.

I applaud the informative articles in *WILD EARTH,* and I respect George Wuerthner's efforts to raise the level of consciousness about the depredation of the West by livestock. However, I believe that environmentalists have a responsibility to be as clear and as accurate as possible. Indeed, that responsibility is greater for us than it is for others, because no one really wants to believe us in the first place. Kind of like Anita Hill's situation. This isn't fair, of course, but I've always found that adversity is the best incentive for creative growth. Being better informed than the opposition never hurts.

If I am off the mark in taking issue with Mr. Wuerthner's word choice, I look forward to hearing his explanation. Thank you for the opportunity to comment.

—Sue Thornton, Wyoming

In the article "Get Along Little Doggies" (*Wild Earth,* Spring 1992) Dave Foreman ex-

pressed an empathy with the Western cattle culture. Having spent years rodeoing and working on ranches I have similar sympathies. For myself, few pleasures surpass the spring sight of a green pasture filled with healthy cows with contented calves. My master's thesis was on the Crow Valley section of the Pawnee National Grassland in northern Colorado. I found the Crow Valley ranchers to be honest, sensitive to the conditions of their ranges, and appreciative of federal grazing privileges. The Crow Valley stockwomen and men do not fit the, only occasionally accurate, stereotype of the wealthy welfare rancher who looks on public land as an extension of his or her personal fiefdom.

Despite my admiration of the ranching lifestyle, I understand that federal grazing policies must be changed. Current federal policies have resulted in environmental damage and unnecessary public expense. However, the "Cattle Free in 93" position ignores a legitimate argument put forward by ranchers; on some federal land ecosystems cattle grazing fills at least part of the position once occupied by buffalo. Because of this argument, I was encouraged by the fact that Dave Foreman expressed a willingness to pull back from a position calling for the total elimination of public land grazing. Dave listed twelve prerequisites, or preconditions, that must be agreed upon by ranchers before conservationists (the real ones not the drugstore wise-users) would be willing to pull back from "Cattle Free in 93."

To these twelve preconditions I would suggest adding four more: 1) Grazing of domestic sheep and goats should be prohibited on federal land except for short term, non-chemical weed control in small, high traffic areas. 2) Grazing should be permitted only in areas where buffalo were once historically present during the last two centuries. 3) When feasible, wild buffalo should replace domestic cattle. Feasibility requirements should include enough contiguous public land to maintain a genetically viable bison population with enough winter forage to make supplemental feeding unnecessary. Additionally buffalo herds should not pose an unmanageable threat to fences, hay meadows, and hay stacks on the private properties adjacent to federal lands. 4) Grazing fees should be sufficient to cover the expenses of administering federal grazing privileges.

It is doubtful that there will be a herd of ranchers stampeding to Canton, NY, or Washington DC, to express acceptance of Dave's twelve prerequisites, and they would be even less likely to agree to the additional four I suggested. Still, these sixteen preconditions for grazing on federal lands are reasonable and environmentally sound. Even without the blessings of the National Cattlegrowers Association these sixteen prerequisites can be used as guidelines in forming a more logical and fair public lands grazing policy.

Most *Wild Earth* readers would agree that the total elimination of grazing on federal lands is preferable to the current condition of subsidized overgrazing and destruction of riparian areas. But is "Cattle Free in 93" really the most obtainable position politically or the optimum solution ecologically?

—Michael Foltmer, Colorado

INSTEAD OF "ISLAND CIVILIZATION" WE NEED A PALEOLITHIC COUNTER-REVOLUTION

Of all the anthropocentric, new-age ideas expressed in Roderick Nash's "Island Civilization," I want to tackle only the most blatant since I have already dealt with many of the other misconceptions in my book, *Sacred Land.* These ideas have to do with energy and technology. Nash writes: "I hope for full development of the human intellectual and technological potential." He thinks "that humans. . .have unlimited technological potentials," but this must mean technological in an energy consumptive manner. How else are his "habitat cities" to function when they have three million people and could be a mile high "both above and below ground. . ." and could "exist anywhere on the planet. . ." Nash adds the usual phrase of technological futurists: "it is not necessary to go back to the Pleistocene for a model of low-impact living."

During more than twenty years of studying uses of energy in "primitive" technology versus modern, I had never found a better explanation than that of Roy Rappaport, an anthropologist at the University of Michigan. In his book *Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People*, Rappaport showed how the people's rituals, which seemed nonsensical to the Western mind, were actually allocating scarce protein without destroying fragile tropical soil.

The material I quote below is from a later article by Rappaport titled "Energy and the Structure of Adaptation." (*The CoEvolution Quarterly*, spring 1974)

We may dispose of the matter of thermodynamic efficiency quickly. . . Hannon (1973) has recently estimated the slash and burn horticulture of the Maring of New Guinea, in which the only sources of energy are the gardeners themselves, to be forty times as efficient as "modern food delivery systems." Whereas he estimates that the Maring produce ten units of food energy for every unit of energy input (my own estimate is closer to 20:1 Rappaport: 1968) he claims, following Herendeen (1973) that in ***modern agricultural and food processing 45 units of fossil fuel is used to deliver 10 units to the supermarket. . .*** *A more general index of decreasing thermodynamic efficiency of contemporary industrial societies is implicit in the first part of "White's Law" itself. . .South African bushmen and Australian aborigines are able to support a person on 1/75 to 1/100 of what it takes to support an American. That is, from the standpoint of the ratio of energy flux per unit of standing biomass,* ***hunters and gatherers are 75 to 100 times more efficient than we are.*** *We are, on a per capita basis,* ***entropizing the world 75 to 100 times*** *faster than they are.*

That inefficiency will only increase with more high-tech fantasies. Now, there's finally another work on primitive technology which goes even deeper into the matter. *The Wilderness Condition*, just off the press from Sierra Club Books, has a brilliant essay by Paul Shepard, "A Post-Historic Primitivism," which demolishes the usual delusions of the superiority of modern technology. Writing of the so-called primitives, Shepard says: "They are all engaged in a game of chance amid heterogeneous exemplary powers rather than in collective strategies of accumulation and control. . .Their mood is assent. Their lives are committed to the understanding of a vast semiosis, presented to them on every hand, in which they are not only readers but participants. The hunt becomes a kind of search gestalt. The lifelong test and theme is learning to 'give away' what

was a gift received in the first place."

I have not enough space here to do more than quote a few sentences at random to provide some insight into the importance of this essay. Shepard points out that our culture thinks wildness "is to be experienced on a reservation called wilderness, where I can externalize it and look at it. Instead my wildness should be experienced in the growing of a self that incorporates my identity in places. . .The Australian outback is not a great two dimensional space, not a landscape, but a pattern of connections, lived out by **walking**, ritually linking the individual in critical passages to sacred places and occasions, so that they become part of an old story."

"Primitivism does not mean a simplified or more thoughtless way of life but a reciprocity with origins, a recovery misconstrued as inaccessible by the ideology of History. . .From the ahistoric perspective you cannot 'go back' to recover 'lost' realities nor can you completely lose them. . .so long as there is a green earth and other species our wild genome can make and find its place. . ." What is needed is a "way in which the sensuous apprehension is linked to the conceptual world, the establishment early in life of a mode by which experience and ideas interact." So much for Nash's idea of huge cities where children must be nearly 20 before they are sent out to the wilderness.

In his final sentence, Shepard gives us some possible names for this "future primitive" mode: "archetypal ecology, a paraprimitive solution, a Paleolithic counterrevolution. . .whatever it may be called, our best guides, when we learn to acknowledge them, will be the living tribal peoples themselves."

—Dolores LaChapelle

You can get Rappaport's article "Energy and the Structure of Adaptation" for $2.50 postpaid from Dolores LaChapelle's Way of the Mountain Center, Box 542, Silverton CO 81433. Shepard's essay is in The Wilderness Condition: Essays on Environment and Civilization *edited by Max Oelschlaeger, just published by Sierra Club Books. It includes essays by George Sessions, Gary Snyder, Dolores, and other "leading-edge thinkers."*

STOP OFF ROAD VEHICLES

"NO ATV'S, NO ORV'S, NO MECHANIZED BUCKING BRONCOS. These machines, appealing to human laziness and to a false sense of male power, contribute nothing to the natural environment of the forest...they rudely intrude on the peace and quiet beauty of the forest and directly deprecate the human, floral and faunal values."

"With 2,400 miles of public roads, state and federal, available on the million-acre George Washington National Forest plus some 1,800 miles of forest development roads much of which are open seasonally and some even at all times, anyone who wishes to ride about in the forest has abundant opportunity to do so. There is no need, much less any obligation, on the part of the Forest Service to provide special facilities for special motor vehicles for able-bodied persons to motor thru the forest."

Considering the articles in *Wild Earth*, Spring 1992 reporting the abuses inflicted on the Earth by operation of ORVs, perhaps the editors might find a niche in the next *Wild Earth* for the above paragraphs on the same subject. These cover the response of the undersigned to the December 1991 Draft Management Plan for the George Washington National Forest in Virginia dealing with the Forest Service's provisions for their legal operation, as submitted prior to the response deadline of April 17, 1992.

—Ernie Dickerman, Swoope VA

ed. note: *The writer is one of the most accomplished and venerable wildland advocates alive. Ernie is renowned for his efforts on behalf of the Central and Southern Appalachians.—JD*

HELP WALDEN FOREVER

Cindy Hill and Kathleen Degnan's article "Walden: Symbol of Wilderness" (Spring, 1992) was excellent for its review of the critical litigation filed by Walden Forever Wild, Inc. against the State of Massachusetts.

As a member of WFW, I was disappointed, however, that you did not include WFW's address. They urgently need donations to help cover court costs in the litigation. If your readers really want to help save "the Walden of Thoreau and Emerson," they should send tax-deductible contributions to: Walden Forever Wild, Inc., POB 275, Concord, MA 01742.

—Harold W. Wood, Jr.

RESISTANCE NOT SYNONYMOUS WITH RESILIENCE

Reed Noss' statement that the tropical rain forests are unstable is misleading. They are stable climax forests, but their stability is of the resistant type. They have no resilience after being destroyed by man, but they have resisted all *natural* disturbances for many millions of years. Their lack of resilience is due to two factors: the great size and age of their dominant trees, and their poor soil. The soil is poor due to rapid decomposition of litter because of the constant high temperature and humidity. The nutrients are immediately absorbed by the vegetation, leaving the soil impoverished.

—Glynn Webb (retired biology professor), POB 584, Elizabeth, WV 26143

Science Editor responds: *Dr. Webb is entirely correct that rainforests are relatively stable in the sense of being resistant to environmental change on ecological time scales, but they do not bounce back after massive destruction by humans. That, in fact, was my point, but I thank Dr. Webb for providing more explanation.*

—Reed Noss

DEAR Y'ALL:

Here it is, Cinco de Mayo again. Just run thru another bottle of Rebel Yell with my ole friend, Rip Crenshaw. We was celebratin our favorite Mexcan holyday in high spirits!

But did I tell ya why I done wrote? Musta forgot. Its becuz of Wild Erf's last cover. You know, the one with that weird lookin insect on the front. Me and Rip bout busted a gut over that thing. What in Hell Fire IS that bug anyway? One of them indangerd species?

Whatever you folks in New York call it, that thing's as cute as Loretta McDaniels ever dreamed of bein.

Ain't it bout time we started appreciatin critters like bugs? Nothin agin bars and wolves! But nobudy round here even gives a hoot bout bugs. But ain't bugs important as bars? Why shore they is. Same's true for plants.

Anyhow. I luved that there cover and congradulate y'all for lettin us see it. More of the same stile would be pleasin.

Gotta go now. Got work to get done, hogs to feed, legs to scratch.

—Pete Jones

[note: Pete Jones ran, unsuccessfully alas, for Governor of Alabama in 1991. He was defeated by a Baptist preacher who doubles as an Amway salesman.]

Art Director responds: *Mr. Jones's kind words are much appreciated. A number of* Wild Earth *readers have complained, however, that the spring issue's cover art, a depiction of the bigheaded grasshopper, resembled George Bush. For the record, I state that any similarity to Presidents living or dead was coincidental and that absolutely no disrespect was intended toward* Aulocara elliotti.

—TB

UTAH WILDERNESS: DON'T HOLD YOUR BREATH

"Wilderness is worth waiting for." If Utah wilderness advocates adopted a slogan, this would be it. Here in the Beehive State, the process that began in the 1970s drags on with no perceptible end. Both sides in the fray concede that a resolution is probably years away.

This mutual dallying works both for and against wilderness protection. It gives groups like Southern Utah Wilderness Alliance time to alert more people to the issue, especially out-of-state residents. Enough SUWA members have written their representatives to persuade over 100 House members to co-sponsor Utah Representative Wayne Owens's 5.4 million acre wilderness bill.

However, it gives wilderness foes a chance to wreak havoc on the land proposed in Owens's bill. The BLM's 1990 EIS, drawing from a rather sketchy inventory, proposed only 1.975 million acres for wilderness study. These study areas have received interim protection—in the loosest sense of the word.

Utah is hardly a fertile field for wilderness protection. BLM employees in the state are notoriously anxious to help clients wring every last dollar from the land. Local hiring practices which favor ranching scions perpetuate "wise use" doctrine. Outsiders who express themselves too freely can expect reprisals, ranging from obscene phone calls to quick transfers. BLM-sanctioned outrages against WSAs include a rash of new roads, a proposed "Lake Powell" jetport, oil, gas, and mining development, stock water installation, and commercial filming.

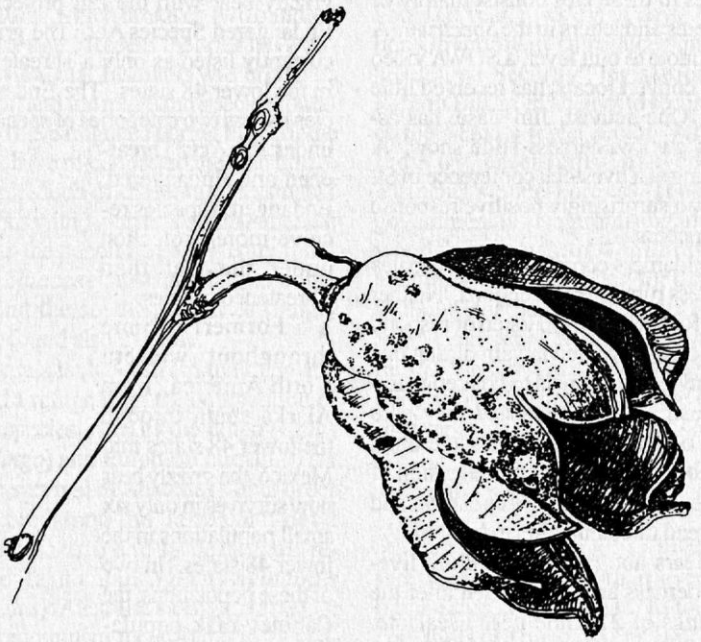
Utah has always been a popular destination for get-rich-quick schemers (I ended up here because my dad dreamed of striking it rich as a uranium prospector). With the bugaboo of wilderness protection looming, now or never fever infects every two-bit hustler who sees dollar signs under any rock left unturned.

Another significant problem of the waiting game is the battle to win local hearts and minds. The assault on would-be wilderness has received scant attention from most Utah news organs, which can't seem to shake the conviction that only zanies care; this despite several polls revealing a high margin of support for land protection.

A recent survey of 758 residents yielded typical results of past wilderness polls. Of respondents, 59 percent said they'd prefer a candidate who supported several million acres of wilderness over one who favored little or no wilderness. Only 25 percent said they wouldn't vote for such a candidate.

News reports also parrot the fable that no one in Utah's hinterlands wants a single acre of wilderness. There was a time when only a small hard core of local ranchers, loggers and miners held such notions. Now, the fable may be coming true. In southern Utah, where most of the Utah Wilderness Coalition's 5.7 million acre proposal is located, the silence of wilderness groups has been deadly.

Placing their faith in a national agenda, groups like SUWA have done little to sway undecided locals in favor of wilderness. Last December, SUWA abandoned its Cedar City headquarters and expanded the Salt Lake office. Henceforth, the group's only presence south of the Wasatch Front will be a branch office in the more liberal town of Moab.



In the absence of meaningful opposition, land profiteers have had a field day. Southern Utah's newspaper, the *Spectrum*, has been a particularly bloody battlefield for wilderness advocates. One typical letter to the editor starts out "I'm writing to express my growing concern about a big American problem—environmentalists." The final sentence tells environmentalists to go back to their cities and clean them up.

This exhortation illustrates a common rural fallacy. Cities are crowded and polluted; ergo, the people who live in them have screwed up. The countryside is roomy and clean, so rural folks do everything right. Not everyone in southern Utah has such lapses in logic, but enough do to make the local activist's job a headache.

One especially hard-nosed wilderness enemy is an old redneck named Met Johnson. A local cowman and livestock auction owner, Johnson recently started pressuring customers to donate money from each animal sold to anti-wilderness lobbyists. He also publishes the *Buffalo News*, possibly the Earth raper's most trenchant answer to *Wild Earth* and the *Earth First! Journal*.

Buffalo News reads like a devil's Who's Who of environmental and animal rights activism. The September 1991 issue bashes over 40 groups in its 15 articles, ranging from such big boys as Sierra Club and Audubon to small fry like Grand Canyon Trust and Animal Liberation Front. Most pages display ads from the extractive industries.

Some features amuse, like the wanted poster depicting the Hole in the Head Gang—congressional grazing reformers Mike Synar, Chester Atkins, and George Darden. An article describing toxic waste, acid rain, and global warming as "manufactured disasters" makes less laughable reading.

Buffalo News also teaches readers that the Wilderness Act is a tool designed to tear down the way of life that started our nation and nurtured its success. The October issue unveiled the Natural Resources Roundtable, an alliance of groups like Mountain States Legal Foundation, American Motorcyclists Association, Putting People First, and National Cattlemen's Association. Judging by its member list, Natural Resources Trough would be a better name.

Stacks of this printed bombast lurk in southern Utah businesses, waiting to pitch the unwary off their fences. Bolstering the *Buffalo News* propaganda are the *Spectrum*'s reactionary articles. Predator control and desert tortoise protection are the latest hot topics. Dissent has its risks. A Kanab activist found a skinned coyote on her doorstep after writing a letter criticizing government trappers.

Met Johnson's influence also extends to Southern Utah University's convocation program, directed by a family member. The result has been a glaring lack of environmental speakers.

Ripostes to these jabs consist mainly of sporadic quotes and letters in the *Spectrum*. A potential antidote to bull fever, a SUWA video produced to convert locals, has received little circulation. One activist, Jim Case, has assembled his own wilderness slide show. A recent showing at a livestock conference in St. George drew a surprisingly positive response from 200 ranchers.

Utah wilderness conferences and debates seldom address rural misconceptions. Neither side at such forums seems to listen or respond much to the other. I waited in vain during one debate for environmentalists to challenge extractive industrialists' claims that they take perfect care of wildlands. At the same time, wilderness foes showed no comprehension of advocate fears that a growing population and corporate greed threaten wild lands.

Local fears about radicals killing livestock in wilderness areas ballooned after the 1990 shootings of 21 cattle near Escalante. The ensuing uproar culminated in a $50,000 reward for the guilty "eco-terrorist." Rumor now has it that no one collected the reward because the culprit turned out to be a scarlet-necked teenaged homeboy.

As the mainstream environmental groups pursue their national agenda, the opponents focus on local opinion. The single point of agreement in the Utah wilderness debate seems to be on continuing the waiting game. Both sides are convinced that their faction stands to gain the most from postponing the final showdown.

This year's elections may inflict another casualty of the waiting game. Representative Owens is taking the fearful gamble of running for Jake Garn's vacant Senate seat. If Owens loses, his wilderness bill loses too. His election in right-wing Utah was a fluke in the first place, and it's unlikely his successor will carry on his crusade. Whatever the outcome, Utah wilderness could teeter between preservationists' good intentions and profiteer avarice for years to come.

If you haven't written your congressperson in support of HR 1500, the Utah Wilderness bill, now would be a good time to do so. Write him or her at the House of Representatives, Washington DC 20515.

— Leslie Lyon

LEGAL ACTION THREATENED OVER AGENCY FAILURE TO PROTECT GRIZZLY

A broad coalition of environmental groups in May formally notified the U.S. Fish and Wildlife Service (FWS) of their intention to sue the agency for failing to provide the grizzly bear with the full protections of the Endangered Species Act. The grizzly bear is currently listed as only a Threatened species in the lower 48 states. The Endangered Species list has two categories of species protected under the Act: Threatened and Endangered. Endangered species receive more protection under the Act than Threatened species.

Formerly found throughout western North America, from Alaska south through the lower 48 states into Mexico, the grizzly bear now survives in only six small populations in the lower 48 states. In two of these populations, the Cabinet/Yaak population in northwest Montana and the Selkirk population in northwestern Idaho and eastern Washington, only a handful of bears remain. Biologists estimate that fewer than 50 grizzlies remain in the Cabinet/Yaak Ecosystem and only 12 grizzlies remain in the U.S. portion of the Selkirks—numbers far too small to prevent those grizzly populations from going extinct.

D.C. "Jasper" Carlton petitioned the Fish and Wildlife Service in January and February of 1991 to reclassify the Cabinet/Yaak and Selkirk bears from Threatened to Endangered under the Endangered Species Act. On 20 April 1992, FWS found that the petition presented substantial evidence that the grizzlies in these two areas should be reclassified as Endangered.

The Endangered Species Act requires the Fish and Wildlife Service to make a decision on the petitions within one year of their receipt—a decision the agency has failed to make. On May 11, a coalition of environmental groups formally notified the agency that they will file suit to protect the grizzly bear as Endangered unless the agency acts. The Sierra Club Legal Defense Fund (SCLDF) (which is separate from the Sierra Club) filed the notice of intent to sue on behalf of American Wildlands, Montana Ecosystems Defense Council, D.C. "Jasper" Carlton, The Wilderness Society, Alliance for the Wild Rockies, Selkirk-Priest Basin Association, Jarilen Preston, and Sierra Club.

—Sierra Club Legal Defense Fund, Inc., 1631 Glenarm Place, Suite 300, Denver, CO 80202 (303-623-9466)

Jay Tatara

STOP THE TRANS-APPALACHIAN POWER LINE!

In the Central Appalachians the blue-green ridges of Peters and Pots Mountains look much as they did before they became part of the Jefferson National Forest. However, now they are under dire threat of defilement by a proposal of the Appalachian Power Company (APCO). APCO would build a 765,000 volt line across the Forest from their Wyoming substation in West Virginia to Roanoke, Virginia. This line would entail right-of-way clearing, continual application of herbicides, and fragmentation of the forest. Its biologic implications in this area of numerous rare and endangered species and great diversity are likely to be taken seriously neither by proponents of the line nor by those required to issue permits. It would also cross the Appalachian Trail, illustrating that nothing is sacrosanct these days.

APCO sees the line as a way of disposing of excess power generated in the Midwest. It has been and continues to be opposed by citizen landowners in Virginia and West Virginia who are concerned about microwave emissions from this line as well as its effect on property values. They resent the involvement of "experts" from local universities such as Virginia Tech who are ever-ready to foist megaprojects on these mountains in the name of growth. Such experts are only too aware of the cash spin-offs from such projects.

Equally galling is the engagement by the joint Federal agencies (US Forest Service and National Park Service) of the land-raping consultant firm of the Woodward Clyde group of companies. These consultants represent reductionist science at its worst and are engaged solely to give a patina of scientific credibility on the almost inevitable permits issued by the feds.

However all is not lost yet. We have the power to influence the combined Federal Environmental Impact Statement being prepared. Virginians for Wilderness have a lot at stake here since we are in the process of proposing a Wilderness/Corridor system for the Jefferson similar to those already proposed for the National Forests in North Carolina and Tennessee by SouthPAW. The Jefferson is an important link, as is the Appalachian Trail, in the PAW concept. Virginians for Wilderness are asking that the Federal agencies engage a panel of internationally prominent conservation biologists to examine this proposal. We urge everyone to provide their input to Joy Berg, Supervisor, Jefferson National Forest, 210 Franklin Road SW, Caller Service 2900, Roanoke, VA 24001. Ask her to put you on the mailing list for this disastrous project.

—Bob Mueller, Virginians for Wilderness

THE GREAT WESTERN TIERS, TASMANIA: WILDERNESS OR WOODCHIPS?

Australia is not often associated with extensive forest ecosystems; indeed, the images seen abroad are of endless outback landscapes populated by kangaroos, sheep, crocodiles and the occasional gnarled gum tree. While the continent is over 70% arid and has undergone drastic species loss since European conquest, this is not the whole picture. Although only 4% of Australia is forested, these areas have the country's most diverse fauna and flora, from the sloth-like tree-dwelling kangaroos of the tropical and sub-tropical zones to the *Nothofagus*-dominated temperate rainforests of the south.

Tasmania's Forests

The island state of Tasmania, like the rest of Australia, is part of the ancient super-continent Gondwana, which broke up two hundred million years ago. Recent theories have advanced the view that Tasmania was once part of Antarctica, and the mainland species found on the island have migrated during the periodic ice ages that have re-connected the land bridge to Australia. Much of the flora of Tasmania has affiliations with North and South America: trees such as the pencil and King Billy pines (family *Taxodiaceae*), distant relatives of the redwood; and the southern beeches (family *Fagaceae*), found also in Chile.

Tasmania's isolation from the mainland also created a refuge from the competition of introduced species, such as the dingo (*Canis familaris dingo*) and European human. This allowed the survival of Australia's high order marsupial predators, the Tasmanian devil (*Sarcophilus harisii*) and [at least until recently] the Tasmanian tiger (*Thylacinus coenocephalus*): Australia's "Big Cats."

The predominant forest-types in Tasmania are the wet and dry schlerophyll forests, consisting of *Eucalypt* species, often with a rainforest understory. Extensive areas of climax temperate rainforest also remain, especially in the Tarkine Wilderness of the North West—Australia's largest rainforest. Tasmania is also home to the tallest flowering trees in the world, *Eucalyptus regnans*, which reach to heights of over ninety metres.

Tasmania's Forest Industry

Tasmania, like the rest of the temperate zones, has suffered extensively at the hands of the multinationals. Once over 80% forested, the island has lost almost half of its forest cover in the past two hundred years. Until the 1970s sawlogging and domestic paper production were the major forest industries. Then came the woodchippers. Extensive areas of Eucalypts and rainforest were clearfelled for pulp and woodchips. An island of less than 70,000 square kilometres, Tasmania now exports 3 million tonnes a year of air-dried woodchips to Japan. This represents over one-half of Australia's annual export and is equivalent to over one-third of the US's woodchip exports.

Tasmania's forest industry is maintained at the expense of the taxpayer. The Forestry Commission Tasmania operates at a deficit. Logging roads have been the chief expense of the Forestry Commission. The multinationals continue to make money with very little expense. Despite an increase in forest production of 30% in the past decade, jobs in the sector have declined by one-half.

Most of Tasmania's State Forests now belong to the woodchippers, companies such as Australia's multinational North Broken Hill. Late last year, in its dying days, the State Labor Government introduced its iniquitous "Resource Security" legislation, or Forest Reform Bill, in an attempt to secure the support of the island's forest sector. As a result the industry essentially has control over Tasmania's State Forests. The new Liberal government is also promising to raise export woodchip quotas to 4 million tonnes per annum, and is canvassing for three new pulp mills. Canadian multinational Noranda is again expressing interest in investing in a new mill at Wesley Vale, having been driven off once as a result of the entrance of the Green Independents into the political scene.

The Great Western Tiers

Many beautiful areas in Tasmania are threatened now more than ever. Huge log trains drive 200-300 year old forest giants to chip mills of Triabunna and Bell Bay. I could write about the Tall Forests of Picton and the blockades happening there now, or the continued destruction of the island's North West, but when you witness your own back-yard wilderness converted into a "Permanent Wood Production Zone," you get really mad.

I live in the small valley (10,000 hectares) of Jackeys Marsh, nestling under the edge of the Great Western Tiers. I can see the Tiers rearing up 1000 metres, forested from top to bottom. At the top of this huge escarpment, is Tasmania's Central Plateau. This is alpine country, with carpets of multi-coloured Richea Scoparia heath; ancient forests of King Billy and pencil pine; and weather-beaten bonsai Eucalypts.

The Great Western Tiers forms the ecotone between escarpment forest and alpine heathland. Its wide range of forest habitats and their broad spread of ages has created an environment that is home to all of the island's mammalian species. The Tasmanian tiger, thought to have become extinct in 1930, has been sighted on the Tiers on two occasions over the last decade, although it is generally admitted that this species, if existent, survives in numbers too small to be a viable population. The last arson attack against the residents of Jackeys Marsh in 1986 destroyed an area where this marsupial "tiger," the Thylacine, had been previously seen.

With the advent of woodchipping, the Tiers, like many other areas, were turned into Concession Areas. One of the first areas to suffer was the Huntsman Valley. This place once looked like Jackeys Marsh. Now it is logged-over bush, plantations of exotic mainland eucalypt, escaped regeneration burns, steep-country landslides, and catchment siltation. At this time of year the smoke from burning drifts into "The Marsh."

The fate of the Huntsman inspired a number of locals to push for a national park of 27,800 hectares that joins the Tiers to the Central Plateau World Heritage Area. We continue to pursue this goal, while we are labeled by the Forces of Darkness as a "self-interested minority." Where logging is the only major industry for your average local, conflict gets personal. That's one reason why we've never spiked the trees: they'd know who did it. The last redneck arson attack against the Marsh was never solved, but when the local sawmiller's son blew up the Jackey's Marsh bridge to stop us voting on election day, he was caught in twenty minutes.

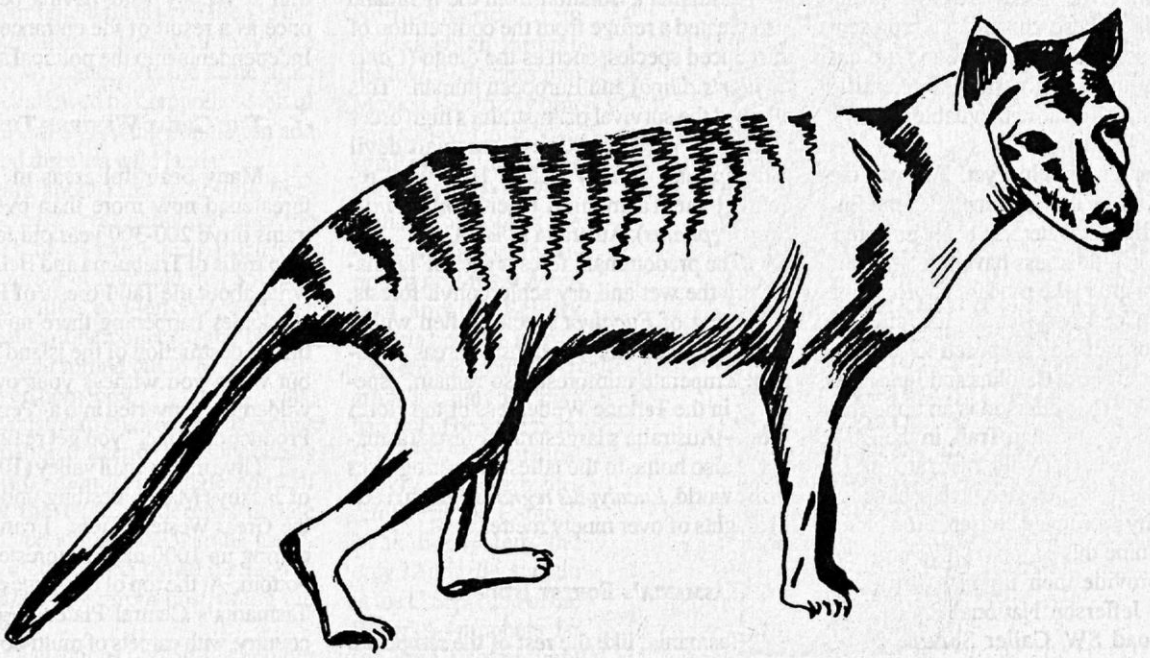
There are bright sides to the struggle to save wilderness, however. Every January, Jackeys Marsh holds a forest festival that attracts hundreds of visitors, and we Marshians have attracted such notoriety for our no-compromise stand that although the area has been scheduled for logging for over a decade, the sound of the chainsaws is still over the hill. Just.

—Tim Cadman

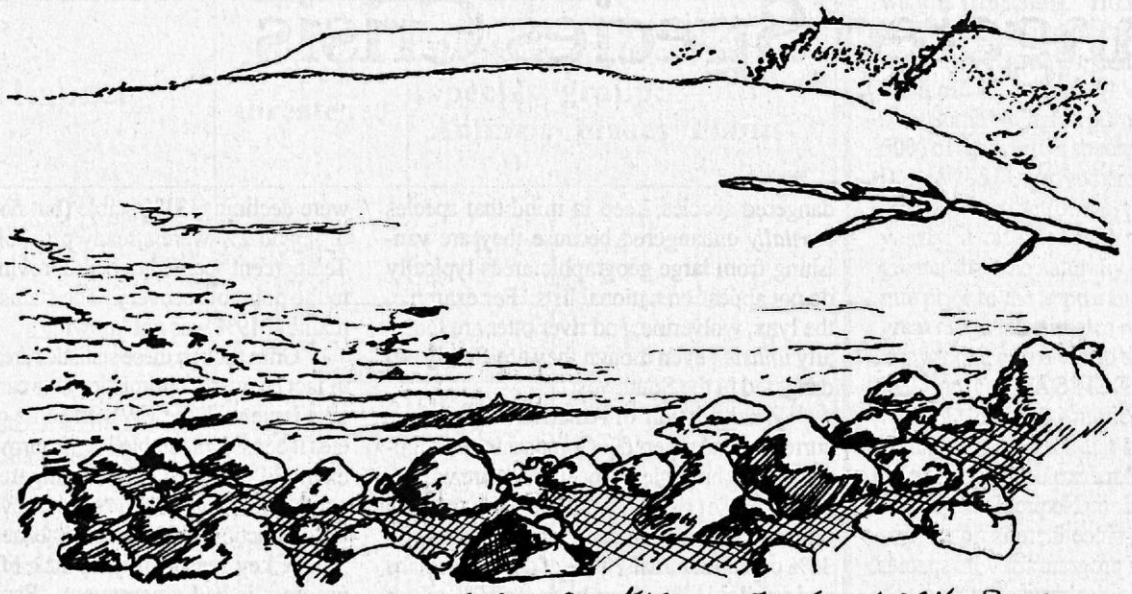
Tim Cadman works for the Native Forest Network, which seeks to join together activists and conservation biologists throughout the temperate zones to deal with the dual plagues of woodchipping and sawlogging. Any inquiries concerning The Great Western Tiers or The Native Forest Network should be directed to the Native Forest Network.

About the Native Forest Network

NFN is a recently-formed collection of forest activists living in the world's temperate ecosystems. It is currently involved with wood pulp, paper and sawlog issues, and is planning a Forest Council in Tasmania, 20-30 November 1992, theme: "Towards a Temperate Forest Action Plan." The multinational forest exploitation corporations must be stopped. The conference will bring together as many people from affected countries as possible to work out how it can be done—as well as to see Tasmania's forests, mountains and, unfortunately, clearfells. There will be some costs, but if you feel you should be there anyway, please tell us: NFN, PO Meander, Tasmania 7304. E-mail: peg:cadwood.



Tasmanian Tiger *Thylacinus cynocephalus*



-TATARA 92- VIEW OF THE GRAND SABLE DUNES-

REGARDING THE POTENTIAL FOR WILDERNESS RESTORATION IN THE UPPER GREAT LAKES BIOREGION

Few regions in the lower 48 states offer greater possibilities for grand scale wilderness restoration than the area encompassing the northern reaches of Minnesota, Wisconsin, and Michigan. One finds there seven National Forests strung out in a huge east-west chain, along with vast stretches of state and county forest. Within this meshwork is immense potential for core areas of wilderness, for buffer zones and corridors, for the reintroduction of extirpated species, and for the reestablishment of presettlement predator-prey relationships.

The potential, though, diminishes with each passing year. The monocultural practices of the U.S. Forest Service, well documented in the Pacific Northwest and in the Rockies, are carried on in the National Forests of the Great Lakes states with very little media attention. And the off-road vehicle lobby seems intent on turning that whole part of the world into one gigantic highway.

I want to put together a network of biologists and environmentalists in MN, WI, and MI who will work together on a wilderness feasibility study in the Upper Great Lakes Bioregion. Input is sought from biologists of all sorts—botanists, zoologists, and ecologists; people who deal with invertebrates or vertebrates, with terrestrial environments or aquatic. When I have an estimate of how many are interested in being involved with such a project I'll seek funding to coordinate the study and to compile findings.

Before ecosystems can be protected, ecosystems must be identified. Initial tasks, therefore, would involve defining the outlines of major ecosystems, surveying the floral and faunal compositions of communities, and mapping the ecosystems. If interested, contact Bill Willers, Department of Biology, University of Wisconsin at Oshkosh, Oshkosh, WI 54901.

—Bill Willers

MULTIPLE-SPECIES SUIT FILED

In a complaint filed in federal district court today, a coalition of animal protection organizations, environmentalists, and wildlife biologists charged Secretary of Interior Manuel Lujan with illegally delaying the protection of hundreds of imperiled animal and plant species. The plaintiffs claim that Secretary Lujan has violated listing obligations under the Endangered Species Act, and has unlawfully withheld agency action in violation of the Administrative Procedures Act.

The suit, filed in the United States District Court for the District of Columbia, is brought by Jasper Carlton, Director of the Biodiversity Legal Foundation, The Fund for Animals, a national animal protection organization of 200,000 members; and Defenders of Wildlife. Also joining the lawsuit as co-plaintiffs are grassroots activists who have monitored ESA species listing delays in their respective bioregions.

Examples of species whose protection has been illegally delayed include: the Fluvial Arctic Grayling in Montana; the Southwestern Willow Flycatcher in the Southwest; the Gopher Frog, St. Andrews Beach Mouse, Florida Black Bear, and Sherman's Fox Squirrel in Florida; the Flat-tailed Horned Lizard in California; the Spotted Frog in the Great Basin of Utah and Nevada; the Steller's and Spectacled Eiders in Alaska; and dozens of plants in Hawaii and California.

Eric Glitzenstein, the plaintiffs' attorney, pointed out, "During the past decade, more than 30 animals and plants went extinct without ever being afforded the critical protection of the Endangered Species Act. That is the national tragedy we are trying to halt through this lawsuit." (For information on the bases of this suit, see "Biodiversity Proponents Prepare Multiple-Species Suit," *Wild Earth*, winter 1991-92, pp. 49-50.)

—Biodiversity Legal Foundation

A Primer On The U.S. Endangered Species Crisis

by Tony Povilitis

HOW MANY SPECIES ARE ENDANGERED?

Thousands of America's animal and plant species face extinction. No precise figure can be given, however, since there is no comprehensive monitoring program for wild species. (Barring a full biological inventory, we only make rough estimates of the *total* number of species extant.) An "educated guess" is that 4000-12,000 species of plants and animals are biologically endangered or threatened in the U.S. and its territories.

The federal Endangered species and "candidate" lists, which are maintained by the US Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) include about 4500 species. Some 600 of these species appear on the "official" US Endangered Species Act (ESA) list, meaning that, theoretically, they receive protection under federal law. Another 900 or more species at risk have not yet even been listed as candidates. An additional 3000 or so species are considered possibly endangered.

The federal lists are especially weak in endangered plants and invertebrates (insects, spiders, mollusks, etc.) For example, a state species monitoring program for Arizona recognizes about 122 federally *unlisted* species to be imperiled or vulnerable to extinction not only in Arizona but wherever they occur (Nongame Data System, AZ Game and Fish Dept., 1991). Over 90% of these are plants. Likewise, state programs elsewhere (often called natural heritage or natural areas programs) typically list many more endangered species than do the feds.

Differences between federal lists and those of private authorities are also evident for vertebrates. For example, the American Fisheries Society (Williams et al. 1989) lists 123 imperiled fishes for the US, 37 more than occur on the 1991 FWS list.

In considering the actual number of endangered species, keep in mind that species *partially* endangered because they are vanishing from large geographic areas typically do not appear on national lists. For example, the lynx, wolverine, and river otter are federally *unlisted* even though they are clearly endangered in the Southwest.

What portion of America's wildlife is currently endangered? Comparing the number of (full biological) species that are wholly or partially at risk of extinction with the total number believed to occur, we find that up to 36% of our mammals, 20% of our amphibians and reptiles, 12% of our birds, and 9% of our fishes are in trouble. *[These percentages would be higher if we consider subspecies and varieties, which are of great evolutionary significance.—RN]*

Endangered species vocabulary should be briefly explained before we continue: Under the US Endangered Species Act of 1973, an endangered species "means any species in danger of extinction throughout all or a significant portion of its range." A threatened species is one "likely to become endangered in the foreseeable future." Informally, the term "endangered species" is commonly used to refer to both endangered and threatened species. The ESA defines a "species" to include "any subspecies of fish or wildlife or plants...and any distinct population segment of any vertebrate wildlife." The law wisely recognizes that for conservation purposes all of these groupings of wildlife are important and deserve protection.

TO WHAT EXTENT ARE ENDANGERED SPECIES BEING SAVED?

In passing the ESA, Congress encoded into law America's moral commitment to end extinctions and to restore endangered wildlife. (Since European colonization, 300-400 known species have gone extinct in the US and its territories. Many additional extinctions have undoubtedly gone unrecorded, particularly in the case of plants and invertebrates.) Unfortunately the law has not been properly implemented.

In a report to Congress, the FWS (1990) indicated that of 581 ESA listed species 38% were declining, 31% stable (but not recovering), and 2% were already probably extinct. Ten percent seemed to be improving, but not to the point of recovery. The status of the remaining 19% was not known.

Grim though these statistics are, they may in fact be overly optimistic. One can certainly take issue with the FWS on some of the species it considers "stable" or "improving." For example, the critically endangered Florida panther was considered "stable," even though the destruction of its essential habitat continues.

A key reason for the lack of recovery progress is bad government. For example, about 40% of the listed species do not even have approved recovery plans, while some 75% of those that do have less than 25% of their recovery objectives achieved (FWS 1990). Further, the FWS has failed to designate "critical habitat" for most listed species.

Money is a measure of government concern, and the FWS's budget for endangered wildlife averages a pitiful $10 million per year. Total recovery costs have been estimated by the Interior Department's Inspector General at $4.6 billion!

HAVEN'T SPECIES ALWAYS GONE EXTINCT?

People who question the need to save endangered species often argue that we need not fret about mounting wildlife extinctions today since they have naturally occurred in great numbers in the past. No doubt there have been spasms of extinction on Earth over the past 600 million years: five major ones can be seen in the geological record, with the "latest" ending the reign of the dinosaurs some 65 million years ago. Probably the greatest crash occurred about 240 million years BP (before present), when up to 96% of all marine animal species are thought to have vanished.

Despite these massive extinctions, the Earth's biological diversity has gradually increased to reach its recent all-time high. There were—until the present, anthropogenic extinction spasm—more "ways of life" on Earth than ever before in our planet's history. As Harvard biologist E.O. Wilson (1989) put it, this great variety "was hard won and a long time in coming."

Table 1. The "big ten" threats to endangered species in the western US.

Impact	% species threatened	Ranking of threat by species group: Animals	Fishes	Plants
Urbanization of the land	35-52	1	4	1
Agriculture	27-36	2	3	6
Livestock & livestock management	25-33	3	6	2
Water impoundments, diversions, withdrawals	31-32	8	1	7
Non-native species	28-31	6	2	8
Nat. resource extraction	16-28	7	7	3
Collecting or shooting	21-22	4	9	4
General human disturbance	12-16	5	8	9
Off-road vehicles	12-14	—	—	—
Pollution and garbage	11-12	9	5	—
Others	—	10**	—	10***

A range of percentages is given because of the indirectness or uncertainty of impacts to some species.

** poisoning

*** fire or fire suppression

Note: This table is based on 216 species accounts (25 mammals, 23 birds, 14 amphibians and reptiles, 55 fishes, 99 plants) from the 1990 WWF Guide to Endangered Species of North America. The accounts cover species that were listed as of August 1989.

Today the Earth is in the throes of a serious extinction episode generated solely by modern civilization. No asteroid-collision or earth-wobble theories are needed to explain what is happening. Humans are simply depriving other organisms of essential living space and resources, and are outright killing them off.

Some biologists put expected losses at 25-50% of the world's species in a century or less (Soulé 1991). Anywhere from 5000 to over 100,000 extinctions are believed to occur yearly, a rate *at least ten thousand times* greater than the naturally occurring extinction rate prior to the appearance of humans. (The great range in estimates results from our poor knowledge of the world's biota and of our actual impact on it.)

We in North America can find little consolation in the fact that most extinctions are occurring in the species-rich tropics. We import huge amounts of wood and agricultural products from where tropical forests once stood, yet conditions for wildlife continue to deteriorate right here at home too.

If present trends continue, it will soon be a biologically impoverished and entirely unnatural world, with little room for anything except people, their domestic crops and animals, their parasites and disease organisms, uninvited inquilines such as the common cockroach, and a handful of the most hardy, weedy, "wild" species, like dandelions and house sparrows. Of course, human abuse of the Earth might result in the planet "kicking us out" (if global life-support systems fail) and starting anew, as paleontologist Steven Jay Gould and others have suggested.

DO WE REALLY NEED TO SAVE SUBSPECIES?

A few years ago, Interior Secretary Manuel Lujan and others began challenging a fundamental provision of the ESA legal protection for imperiled biological subspecies and distinct vertebrate populations. Now, with the upcoming congressional re-authorization of ESA, that challenge is likely to intensify.

About 158 subspecies (and plant varieties) and 15 vertebrate populations are federally listed as Endangered or Threatened. These represent about 28% of the total number of ESA listings (as of mid-1991). Wildlife that would lose legal protection if subspecies and populations were dropped include:

—Grizzly bear, grey wolf, and bald eagle, as populations of these species are not considered threatened in Alaska.

—Eastern cougar and Florida panther, both biological subspecies of *Felis concolor* (mountain lion), which is still widely distributed in the West.

—Florida key deer, a dwarf subspecies of

white-tailed deer.

—Northern spotted owl. Although declining, the other two subspecies of spotted owl are not protected by ESA (the Mexican spotted owl of the Southwest has been proposed for listing).

—Brown pelican and least tern. These two species have East Coast populations not considered threatened.

—Desert tortoise in California, Nevada, and Utah, since the Arizona population east and south of the Colorado River remains unlisted.

—Chinook salmon of California's Sacramento River.

Needless to say, dropping ESA protection for these and other Endangered subspecies and populations would severely reduce prospects for their survival. Furthermore, the move would in effect dramatically alter the very concept of "conservation." We cannot cause further declines of endangered wildlife and still "conserve" nature. There are three good reasons why:

1. Species consist of geographic parts—that is, of populations and in many cases subspecies. Protection of these parts prevents the decline of species. If the word "conservation" means to preserve the quality and quantity of something, any further diminishing of endangered species cannot be tolerated.

2. Nature conservation also involves protecting and restoring whole communities of living things. Each time a species disappears from a locality, that locality is further artificialized. Biologists do not have a good understanding of the ecological roles that various species play in biotic communities. But all species, to a greater or lesser degree, function in the biotic community. In some cases, the loss of a species will cause additional, secondary extinctions.

3. Nature conservation requires the preservation of gene pools and evolutionary processes, as well as species, communities, and ecosystems. A subspecies is a genetically distinct portion of a species with its own evolutionary tendencies. A population also may have its own distinct genetic identity. Subspecies and populations thus provide much of the genetic diversity on earth. Such diversity allows species to adapt to changing conditions, such as climate change or the appearance of new diseases. The destruction of subspecies and populations not only heightens the long-term risk of species extinction, but also curtails the process of evolution itself.

Granted, the ESA itself was not designed to protect all of nature. However, it was intended to safeguard endangered species for their value to people. (The Act explicitly acknowledges that endangered species have esthetic, educational, historical, recreational, and scientific as well as ecological value.) Clearly, the protection and recovery of endangered subspecies and populations is essential in upholding these values. For example, the survival of the grizzly bear *only* in Alaska would not uphold the bear's values in the American West, which represents over half of its original range in North America.

If anything, the ESA needs a good dose of biocentrism. The Act should be strengthened to a) establish the right of endangered species to realize their evolutionary potential (free of undue human interference); and b) require reestablishing their populations in a manner consistent with that right. It is time we acknowledge in law that species and their descendants have value to *themselves* apart from their benefits to *Homo sapiens*.

WHICH HUMAN ACTIVITIES ARE MOST HARMFUL?

One measure of relative harm can be obtained by ranking various activities using the percent of endangered species that they threaten. The results of one such analysis for the western US are shown in Table 1.

Topping the "big ten" list is urbanization, which includes habitat destruction through the building of subdivisions, shopping malls, roads, highways, etc., as well as harm caused by pollution, impacts on natural waterways, and other activities directly or indirectly stemming from urban development.

In second place is agriculture, an activity ranging from plowing up habitat to withdrawing irrigation waters to spraying toxic pesticides.

Third place shows an apparent tie between the livestock and water development industries. However, livestock gets the ignominious distinction since it ranks worse for a wider variety of species (water impacts being more limited to fish). Livestock compete with endangered species for forage, trample and (in the case of plants) eat them, or carry diseases to them. Livestock management also endangers certain predators and range "pests," such as the Utah prairie dog.

Water development is particularly devastating to fishes. Rivers are dammed, streams are channelized, and habitats are dried out as water is harnessed for human use. Ultimately, almost all impacts on natural waters result from urbanization, agriculture, industrial development, and livestock management.

In fifth place is the introduction of nonnative species. Native fishes have suffered the most from this activity. Rainbow trout, brown trout, largemouth bass, redshiner (as baitfish), and other fishes, released outside their native habitat in the interest of sport fishing, prey on, compete with, and interbreed with native fishes, often to the point of eliminating the natives entirely.

The extraction of natural resources ranks sixth. This includes logging, mining, oil and gas development, and geothermal development.

In seventh place is the collecting and shooting of wildlife. Many wild plants, especially those in the cactus family, are endangered because of commercial and opportunistic collecting. Some animal species are threatened by shooting, when mistaken for game, killed for the "hell of it," or perceived as a threat to people. In some cases, endangered wildlife such as the bald eagle die by accidentally ingesting toxic lead shot in game carcasses left by hunters. Shooting of endangered species also occurs as a result of predator "control," generally in connection with the livestock industry.

Eighth is miscellaneous human disturbance, typically resulting from recreational activities, vandalism, or military activities. Off-road vehicles, used largely for recreation, take ninth place, being notorious for destroying plants and their habitat. Finally, pollution and garbage rank tenth.

In considering threats to endangered wildlife, one should keep in mind that urbanization, agriculture, livestock management, and other human activities don't automatically endanger *thousands* of wildlife species. After all, these activities have been ongoing, in some places, for millennia. Today's crisis stems largely from the two great "magnifiers" of what might otherwise amount to a far more limited impact: an enormous human population and an ecologically unsustainable culture.

Our US population now tops 250 million people—up nearly 10% since 1980. It is expected to increase by more than 20 million in 10 years, a number greater than the population of NY state today. In 30 years the US may add a population larger than the current populations of New York and California combined!

Especially troubling is that areas of the US with the greater number of endangered species also tend to be growing the fastest. Three of the four states with the highest number of endangered species (CA,FL,TX) show the greatest growth in crude numbers of people, and, in terms of percent population increase, are among the top seven states (Figure 1). The other of the four, Hawaii, is also growing rapidly.

US demand on energy, minerals, and other raw materials is expected to outstrip even population growth. For example, over a period of roughly 50 years, the US Forest Service expects that the demand for wood will increase 67% and that for livestock forage by 54% (USFS

1989 Resources Planning Act Assessment).

The inability (or unwillingness) of people to curtail their wasteful consumption of natural resources spells *big* trouble for wildlife. Add to this, further risk from a destabilized global environment and the prognosis for endangered species gets really bad!

Just as species are inseparable from their habitat, the habitats comprising the US are inseparable from the earth as a whole. Even if we were to conserve America's wildlife, it would be to no avail if the global ecosystem falters. If the planet as a whole goes "down hill" all parts tumble with it. Apart from nuclear war, primary global risks are: a) rapid climate change caused by a massive buildup of carbon dioxide and other "greenhouse" gases; and b) depletion of the Earth's stratospheric ozone shield, resulting from the release of CFCs and other industrial and commercial chemicals.

Rapid climate change is expected to cause severe and widespread damage to natural ecosystems and consequent species extinctions (Neilson et al. 1989). The effects of ozone depletion are also potentially catastrophic, at least for some ecosystems and species. Are animals such as polar bears in the north and penguins in the Antarctic suffering eye damage because of increased UV light now entering through the polar ozone holes? Might such effects extend to lower latitudes with more generalized global ozone depletion? What will be the effects of ozone depletion on food webs in marine ecosystems? We are long on questions but pathetically short on answers.

WHAT YOU CAN DO

The key to resolving the endangered species crisis is *you*—not the Sierra Club, not the Fish & Wildlife Service, not The Nature Conservancy. These and other such organizations have been around for decades—yet the endangered species crisis only worsens. There are simply too few people *personally* committed to the defense of wildlife and nature. That's not to say that millions are needed. A few thousand good people will do. As Margaret Mead succinctly put it: "Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has."

Consider these ways to help:

*Direct defense of endangered wildlife—Develop your own list of endangered and sensitive species for your state or region. Find out what's threatening those you choose and what's being done for them. Press responsible federal and state agencies on the job of recovery. Press the political powers that be. Be a "publicist" for your adopted species. Get involved in field studies of endangered species and their habitats. Become the expert. As needed, seek help and guidance from grassroots support groups such as Life Net and the Biodiversity Legal Foundation.

*Planning for land conservation—Identify and map unprotected wildlife habitat in your locality or region. Find out what endangered or sensitive species are present. Determine who owns the land and what's in store for it. Check with land conservation groups, local land preservation trusts, and city, county, and state planning agencies to identify options for protection.

*Changing human behavior—Campaign for reduced family size and immigration rates, and for the recycling and conservation of energy and materials. Give workshops and slide shows to city officials, schools, civic groups, and church groups. Press local and state governments to adopt earth-friendly programs and products. Organize boycotts of businesses that produce products or conduct activities harmful to wildlife. Lobby your representatives in Congress to remedy threats to the global environment. Vote and get others to vote for people who care about wildlife and nature. Run for office yourself.

Finally, for your own essential wellness, heed the advice of John Muir: "Keep close to Nature's heart, yourself; and break clear away, once in a while, and climb a mountain or spend a week in the wood. Wash your spirit clean..."

—Tony Povilitis, Ph.D, is a wildlife biologist and founder of Life Net, P.O. Box 66, Montezuma, NM 87731, (505) 454-8913.

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Beach Mouse Bingo (Part One): *Playing Games With Extinction*

by Ray Vaughan

You may never have heard of the Perdido Key beach mouse or even of Perdido Key. Nonetheless, both are involved in the high-stakes game of development and extinction, the dying throes of not only a species and its habitat but the Endangered Species Act (ESA) as well. The Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) is one of the rarest mammals on Earth; maybe fewer than a hundred remain in the wild. This small, sandy-colored mouse lives only on Perdido Key, a narrow island in the Gulf of Mexico on the Alabama-Florida border. On this little-known stretch of beach is being staged a legal and biological drama that represents the state of the entire planet.

Once a wild sliver of white sand dunes and pine forests, Perdido Key has been decimated twice in recent years. In 1979, Hurricane Frederick leveled the island, and in the decade after the storm, developers paved over almost the entire key.

The tiny Perdido Key beach mouse once darted about the beaches and dunes of the entire key, but after the hurricane and the development, the species survived at only one place: the Alabama state park lands on the western end of the island. These lands belonged to the state because of a bizarre deal in the 1950s. As the story was told to me by some drunk suit who claimed to have profited from the deal, in the 1950s, Alabamians thought it would be nice if they could drive along the beach and on into Florida over Perdido Pass, the outlet of Perdido Bay. This pass separated Alabama and Florida, and that was fine with the Floridians, who had no wish to go to Alabama for any reason. So when Alabama proposed that the two states build a bridge over Perdido Pass, Florida said no thanks. Then a few far-sighted businessmen had an idea: how about if Alabama paid for the bridge entirely on its own, but in return, Florida gave Alabama about two miles of Perdido Key and a nearby island called Ono Island.

Thus, exists some strange nomenclature: "Florida Point," the name of the western end of Perdido Key is in Alabama. Businessmen made millions when the real estate boom of the early and mid 1980s hit the Gulf Coast, but the part of the key that went to Alabama was put into Gulf State Park. As of 1991, all that remained undeveloped on the Alabama portion of Perdido Key were the state lands and three private parcels north of Highway 182, across from the state park lands. The western-most parcel of private land at Florida Point is the center of this tale.

In 1985, the United States Fish and Wildlife Service (FWS) listed this mouse subspecies as Endangered under the ESA. From the last group of a few dozen survivors at Florida Point came the mice that were transplanted between 1986 and 1989 to the eastern end of the key — about six miles of undisturbed beach and dune protected as a unit of the Gulf Islands National Seashore. The goal of the FWS recovery plan was to have three viable groups of the subspecies; then the mouse could be downgraded to Threatened. Yet the three groups would be unable to interchange genes due to the collections of condominiums between them, so they would forever be dependent upon the United States government to transport members back and forth to assure good genetic mixture.

However, after the second population of mice was established on the eastern end of the key, FWS dropped the ball. Creation of the third colony, which would have been established at a state preserve owned by Florida in the middle of the island, was postponed, and measures necessary to protect the most critical group, the western end colony, from human disturbance were not implemented. The policies of the Bush administration left no money for protecting mice on an unheard-of island, despite the good intentions of FWS field personnel.

Still with the two viable colonies and a captive breeding population at Auburn University, the species was holding its own at an estimated hundred individuals; although, for unknown reasons, the population would fluctuate from around 19 to almost 200 on an almost seasonal basis. Then something traumatic happened.

Despite the entire Alabama and Florida Gulf coast having been over-built in the 1980s a few private parcels remained undeveloped, and one of these was at the western end of Perdido Key, right next to the critical habitat of the most important colony of the mice. Of course, someone wanted to build another restaurant, lounge and hotel there. So began the game of beach mouse bingo.

"Sorry, ma'am, but hotel rules forbid you from bringing feral cats with you on vacation."

The developers, DeWitt DeWeese and Marvin Ratcliff, bought the land on the western end of the key and planned a hotel complex. Wanting to build a dock at the site, they applied to the Army Corps of Engineers for a permit, and the Corps consulted with Fish and Wildlife Service about whether the project would impact any Endangered species. FWS responded with a strongly-worded biological opinion unequivocally stating that the development of that land would jeopardize the continued existence of the Perdido Key beach mouse. Loss of this land would mean loss of habitat for the mouse, particularly in times of storm surge, as the land to be built upon was inland of the mouse's critical habitat along the beach. The development would increase the human traffic on the dunes and beach. This increased human disturbance would probably be enough to eliminate the mice from the western end of the key; then only one colony would be left, and the next storm to hit the eastern portion of the island would finish the species off. Also, there were possible threats from feral cats attracted to the project and from house mice that might compete with the beach mice for food and habitat.

FWS and the developers argued over whether there were any mice on the actual site of the project, but the developers never got the

points that (1) even if there were no mice on the land now, they needed the land to retreat to during storms, and (2) the people patronizing their project would impact the mice by walking on and injuring the dunes where the mice clearly were. Also, insisting that none of their customers would bring in wild cats, they failed to grasp that feral cats come to human development on their own, being attracted by garbage, food and the house mice that are also attracted by the garbage and food. ("Sorry, ma'am, but hotel rules forbid you from bringing feral cats with you on vacation.")

The developers had hired a biologist who knew nothing about beach mice to walk over the land and see if there were any mice. Yet beach mice are nocturnal; and it is very difficult to tell the difference between a beach mouse hole and a crab hole. This biologist could not tell the difference. The world's top expert on the Perdido Key beach mouse had trapped mice and seen tracks on the northern side of the road in 1988.

The developers dropped their plan for a dock so that they would not have to go through the hassle of public comment on the Corps permit, but the plans for the hotel, lounge, and restaurant went forward. Knowing what the impact was likely to be on the species, the Fish and Wildlife Service asked the Solicitor General's Office to file suit against the developers to prevent them from building on the property.

The Solicitor General's Office, being the good servant of the Bush Administration, decided it would not file suit, citing a lack of evidence that takings of the mouse had occurred or would occur. This determination was in direct conflict with findings of the mouse experts, but George Bush is a friend of the business community. He had set up Dan Quayle as head of the Council on Competitiveness to make sure that governmental actions do not interfere with whatever business wants. Even though this one development is small in the big scheme of American business, a suit stopping a development on private land due to an Endangered species would set a precedent that Republicans do not want. The Council has seen to it on other occasions that enforcement of the ESA does not hinder development.

Thus, nothing stood in the way of the developers. During October 1991, the bulldozers rolled in and leveled the eight acre site. Dune systems are dynamic, however, and according to experts, if someone could stop the project prior to the asphalt and concrete being laid down, the dunes would naturally recover within a year or two and the mice could again use the land. Moreover, there is a section in the citizen suit provision of the ESA that allows citizens to sue the Secretary of the Interior, the boss of FWS, to enforce the ESA. Prior to filing any such lawsuit, though, the citizens must give the Secretary 60 days notice. Despite the Perdido Key beach mouse being one of the most endangered species alive, no major environmental group did anything to help protect it; due to the recession and their resulting scramble for cash, the big boys couldn't take time to prevent a subspecies from going extinct. Fortunately two small, local groups came to the mouse's defense. In November 1991, The Alabama Conservancy and the Perdido Bay Environmental Association (PBEA) independently filed two 60-day notice letters to the Secretary notifying him that if he did not act to save the mouse, they would sue him.

This is where Ned Mudd, my friend, fellow environmental lawyer and a regular in the pages of *Wild Earth*, and I came into the picture. We had convinced the President of The Alabama Conservancy to hire us, without pay, to file the 60-day notice letter, and we had been in contact with the lawyers behind the notice letter from the PBEA. While wanting to help the mouse, the lawyers for the PBEA made it clear to us that their planned suit was mainly designed to get the developers to take a few mitigation measures that might prevent some of the adverse impact on the species. These measures included putting up money to reintroduce the species to the Florida state preserve and to a 7 acre island right off shore from the development site just inside Perdido Bay. The experts believed that although placing a colony of mice on Peroico Island might reduce the danger of extinction to the species, the island is so small that human intervention would be needed almost constantly. They felt that placing mice there would not balance the jeopardy the species would be put in by the hotel complex. The PBEA also wanted certain changes in the developers' plans to reduce dune destruction and to implement a program to trap feral cats and house mice.

Mudd and I intended to sue for what is necessary to protect the species from extinction. The lawyer for the developers, Rick Horder of Atlanta, called me many times and was friendly and straightforward. Most lawyers for developers can be very nasty and defiant. So, Mudd and I agreed to meet with him, the developers and their biologist at the site on December 17. From my communications with Horder, I had little doubt that the developers would indeed agree to make some minor changes and to put up money to attempt to establish two more populations of the species. This was to be a multimillion dollar project, and these concessions would do little to reduce its estimated economic value.

Meanwhile, the mouse experts were telling us that this development could mean the end of the Perdido Key beach mouse and that we should do everything possible to stop it. We vowed to do so. However, there was one more problem. A precedent-setting lawsuit under the ESA against the Secretary of the Interior during an election year would not help George Bush, with his low public opinion ratings on domestic affairs. The government would fight fiercely, and the developers would jump in with the best available lawyers. It came down to money. To press this suit (without pay), we would need at least $10,000. At the December board meeting of The Alabama Conservancy, our client told us no money was available to sue over the beach mouse. This despite the fact that the group had almost $80,000 sitting in the bank. At that same meeting, the treasurer of the group demanded $4000 for professional accounting help to aid him in managing all that money and the growing paid staff of The Alabama Conservancy; the Board had no problem with that appropriation. Mudd and I were witnessing this small organization, formerly run by grassroots volunteers, turn into a mini-bureaucracy; take the same administration-intensive direction that had doomed the large environmental groups. I began to pray.

On December 16, Mudd, his companion Joyce and I drove down to Fairhope, Alabama, on the eastern shore of Mobile Bay. We watched some wintering loons catch fish and then saw the sun set over the bay. Just after dark, we met with two of the field biologists from the Daphne, Alabama office of the Fish and Wildlife Service; their superiors would have forbidden them to see us if they had known. This meeting was to be strictly off the record so that Mudd and I could get the whole story on what the Service had done, what would happen to the mouse, and what we could do. We wanted the scoop on the negotiations that had occurred between FWS and the developers and on what the Administration had done to leave the mouse unprotected. The FWS biologists told us that anything short of stopping the development could mean disaster for the mouse. The Service and the Solicitor had failed to enforce the law, and in their opinion, all-out action from us would be good. They felt confident that the leading expert on the mouse, Dr. Nick Holler, and all the other people working with the species would back up our lawsuit.

We went over the bridge and out onto the dunes of the mouse's critical habitat. Mudd, Joyce and I stood on the boardwalk and waited. Where were those damn mice? We pulled out some cognac and drank to the mice's health and spiritual well-being. We were in one of the last two places on Earth where these animals

live; the moon was shining brightly; we were quiet. Where the hell were they?

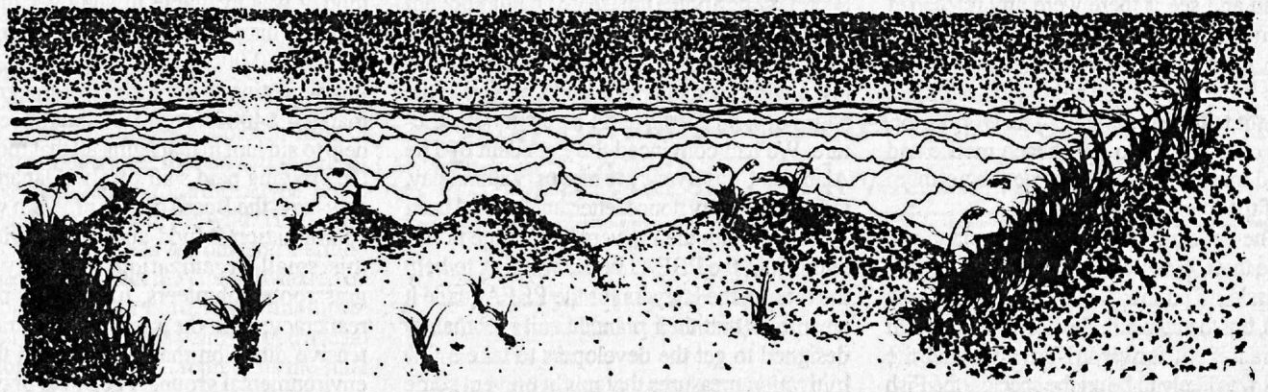
I found a few mouse tracks in the sand, but we saw no mice, so we decided to head down to the local drinking establishment. The Flora-Bama is just a mile from the critical habitat of the beach mouse; perhaps the mice lived here decades ago, but only debauchery lives here now. The building sits on the state line, with all of its interior in Florida. Alabama has no lottery; Florida does, and we bought a few tickets. Never know; may hit the big one and have enough money to fund a hundred lawsuits and a big plantation in St. Lucia. The Flora-Bama is unique among the dives of the world. Commit a crime in the bar, and a quick dash out into the parking lot brings you to another jurisdiction. Easy escape from the legal consequences of your actions, unless they have your name; but then they would have to go through the trouble of extraditing you. Mighty handy, particularly after a bottle of Rebel Yell.

Being a cold, Monday night at the beach, the place was pretty dead, but after awhile, the local newspaper reporter, who knew us, walked in with a local politician. They immediately began to assail us about the lack of merit of the beach mouse and of our case. The reporter told us that the story of the mouse did not play with the public so it would be best for us to let it go and wait for another, more-popular species with which to enforce the ESA. I informed this "journalist" that we were here to save the mouse, not to win popularity contests. He shrugged and continued on with how he had broken every environmental story in the country first. Obviously, such journalistic skill was why he was working at the weekly Gulf Shores, Alabama paper.

Then, the politician, a candidate for Gulf Shores city council, launched into a tirade. This guy was a middle-aged hippie, still with his ponytail, and he spouted Republican propaganda about "controlled growth." He explained that because the mouse had been on the key thousands of years before man had been, we owed those critters something, so let's give them an acre. Where, I asked. In the zoo, of course, because that is a better habitat for wildlife than outdoors where it can get hurt by storms. The zoo was the solution. Then, we could have all the controlled growth we wanted.

So, we knew how the local people felt about the mouse. Apparently, no one had educated the public about the value of beach mice and the dune ecosystems they inhabit. Of course, the next hurricane will educate these folks on what happens when you destroy a natural dune system.

I tried to imagine the world of the beach mouse: the constant contact with the sand, the taste of the sea oats, the smell of the salt spray, the nervous exploration under the light of the stars. What secrets does this mouse hold, what views and knowledge of a seaside world that we only play upon? If we could feel and see this ecosystem as the mouse does, then what new wisdom could we gain into the relation of things? I could almost feel the hesitant search of the mouse as my own, the anxious need to know what lies ahead.



Mudd hit me in the arm with the bottle, and my psychic connection with the mouse was broken. "Come on, Vaughan, let's get back to the hotel."

Back at the Hilton, we went over maps and planned how we would handle our meeting with the developers the next day. We decided to let them do most of the talking, to appear unprepared and reasonable, so that they would not suspect that we were determined to stop them cold.

Our meeting with Marvin Ratcliff, Rick Horder, and John Crowder, their biologist, was what we expected: they said the restaurant and 100-unit hotel would have no impact on beach mice, and any harm to the mice would be the fault of Fish and Wildlife. We got the impression they would be happy to support us in our lawsuit against FWS over all the other things the Service should be doing for the species but was not. We planned to make FWS do whatever is necessary to protect the mouse — better trash cans, closing the habitat to public access, reintroduction onto the Florida preserve — but we had no plans to let the developers off the hook just because other atrocities were going on as well.

Of course, it is the government's fault for not stopping the useless project. It is the fault of George Bush for not wanting anyone to enforce the ESA and for not providing money to help the Perdido Key beach mouse recover. It is not the fault of the people who actually do the work to protect the mouse; they do the best they can with the little given to them.

Mudd and I then set up a meeting with Dr. Holler on December 23. Dr. Holler is an employee of the Fish and Wildlife Service, but through a cooperative agreement with the State of Alabama, he teaches at Auburn University. Dr. Holler told us about the mouse, what little is known, and about how its population in the wild can swing up and down suddenly; any chance event could wipe out the Florida Point population or the entire species. In his opinion, the land being built upon was critical to the mouse's survival. Dr. Holler's concern for this tiny creature was obvious.

As we were discussing what could be done about the development, the phone rang. Dr. Holler spoke in low tones, but his voice conveyed a feeling of disbelief; the regional FWS office in Atlanta was calling and wanted to know if Mudd and Vaughan had gotten there yet. The good doctor answered that we were there now, and the voice on the other end got loud enough for us to hear the anger in it. After a pause, Dr. Holler said he did not think it was fair that the developers' attorney could meet freely with him and with personnel in Atlanta. Mudd met my look with a nod; we knew what was happening. The deal had come down; Holler was being ordered to throw us out. Hanging up the phone, Dr. Holler apologized but said our discussion had to end.

I called John Harrington, the attorney assigned to our case in the Solicitor's office, and he confirmed that Dr. Holler was not to speak with us. We could send Harrington a list of questions we wanted to ask Dr. Holler, and he would approve or disapprove of them individually for written responses.

Mudd and I went back to Montgomery and called Sandy Tucker in Anchorage,

Alaska; she had written the biological opinion on the mouse, and then transferred up to Alaska. We wanted to know what had gone into the writing of the opinion. Too late: even up in Alaska, she was under instructions not to speak with us unless a lawyer from the Solicitor's office was on the line. No suit had been filed, but government employees were being instructed not to talk to members of the public over the Perdido Key beach mouse. We must have hit a bad chord somewhere in the government.

To bring this part of the story to a close, our clients came up with $500 to cover the initial expenses of filing a lawsuit against the Department of Interior. A fund-raising campaign began, complete with mailouts and t-shirts depicting the mouse. On 30 January 1992, we filed our complaint on behalf of the mouse against the government in District Court in Mobile, Alabama. Now the game has shifted into litigious overdrive; the rest of the story will follow.

If you are relatively wealthy, send money to The Alabama Conservancy, Beach Mouse Litigation Fund, 2717 7th Ave., South, Suite 201, Birmingham, AL 35233. Every little bit, or huge endowment, helps. Ask about t-shirts; they should be ready soon. As the Endangered Species Act is up for reauthorization this year and the Republicans want to gut it, your senators and representatives need to hear your views on the ESA, as well as on new biodiversity legislation. Perhaps most important for the long run, when you vote this fall, remember that George and Dan do not want beach mice in their new world order.

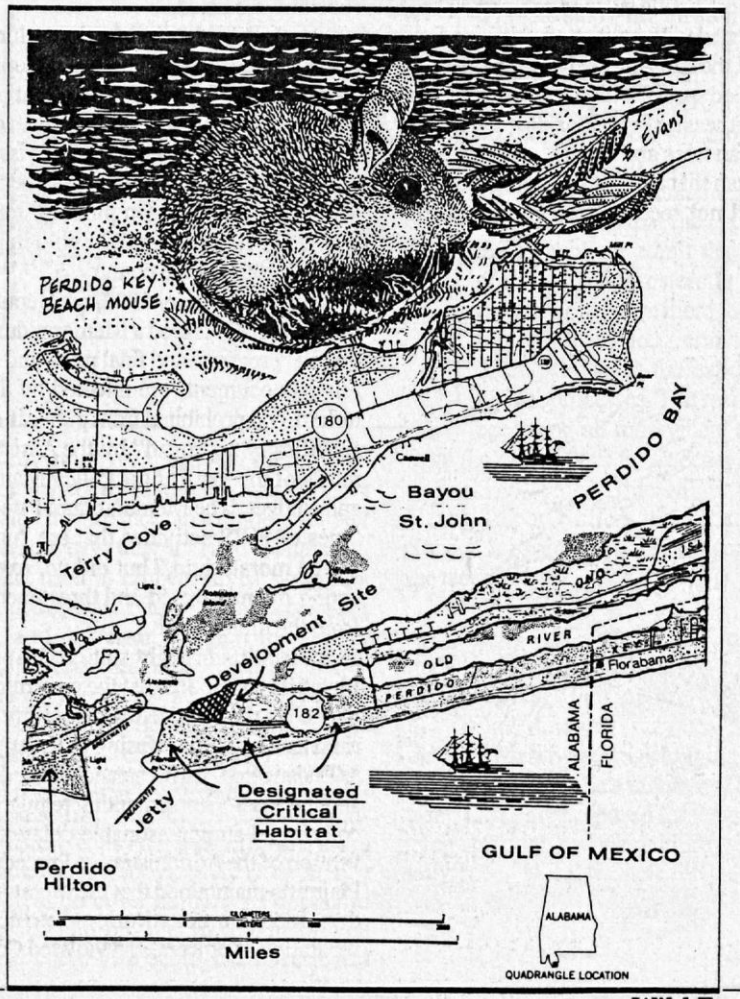
POSTSCRIPT:

The Alabama Conservancy and Joy Morrill, a resident of Orange Beach, have filed two, separate lawsuits against the Department of Interior and the Fish and Wildlife Service over the FWS's failure to act to protect the Endangered Perdido Key beach mouse from apparent threats posed by development along the western end of Perdido Key. Morrill also filed suit against developer DeWitt DeWeese, who is building a hotel/restaurant complex at the western end of Perdido Key. These suits were filed in federal court in Mobile under the Endangered Species Act, 16 U.S.C. 1531 *et seq.* An FWS biological opinion stated that loss of these lands "would likely jeopardize the continued existence of the Perdido Key beach mouse and would result in the adverse modification of Critical Habitat for this species." On May 26, facing a TRO request filed by Morrill, the developer agreed to stop work on the project until a hearing date of July 22 on the various motions now pending.

The Alabama Conservancy is represented by Ned Mudd of Birmingham and Ray Vaughan of Montgomery; Morrill is represented by Hank Caddell of Mobile. The government defendants are represented by Justice Department attorneys out of Washington, D.C.

Suddenly alive,
Raven brings me back,
lulled by the water, duck talk,
mountains reaching
into my heart,
the bridge of dreams,
the snow covered life.
Raven's voice pulls me back,
awake, tells me;
You Pay Attention
If you want to hear the story
put your hands in water
If you want to hear the story
watch where the wind carries us.

—Gary Lawless, from *Sitka Spring* (1991, by Gary Lawless with art by Li Ching; Blackberry Books, RR 1 Box 228, Nobleboro, ME 04555)



BLF Beats Bush

A lawsuit filed by Jasper Carlton and eight coplaintiffs in the US District Court for the District of Columbia on 2 April 1992 has been successful in forcing the federal government to continue adding animal and plant species to the list of those protected under the Endangered Species Act despite President Bush's 90-day moratorium on rulemaking. Manuel Lujan, Secretary of the Interior, and John Turner, Director of the US Fish and Wildlife Service, were named as defendants in the suit.

On January 28, President Bush issued a memorandum to the heads of federal agencies and departments which stated that each "agency should refrain from issuing any proposed or final rule" during a 90-day period. Although the Fish and Wildlife Service had prepared final listing rules for at least 11 species threatened with extinction, waivers from the 90-day moratorium had not been issued. The imperiled species—two fish species found in the Southeast, three Florida plants, five Puerto Rican trees and shrubs, and a snail located in Utah that needed an Emergency listing—could not receive protection until the final listing rules were published in the Federal Register. Listing packages for many other species that were near completion also came to a halt as a result of the moratorium.

"The situation in regard to the listing of new species under the ESA was already serious prior to the President's 90-day moratorium," noted Carlton. He explained that "serious bureaucratic footdragging in the listing process is also allowing other federal agencies to abrogate their responsibilities under the Endangered Species Act. The development activities of agencies such as the US Forest Service and Bureau of Land Management continue to fragment, degrade, and destroy the essential habitat of dozens of biologically threatened and endangered species which would not be allowed if all these species were listed."

The President's Memorandum to the heads of federal agencies and departments stated that "to the maximum extent permitted by law," and subject to several exceptions, "your agency should refrain from issuing any proposed or final rule during" a 90-day period. The President was attempting to stop all new regulatory rulemaking that could impact economic growth in the country.

On 12 February 1992, the Deputy Director of the FWS issued a Memorandum stating that all "proposed and final rules, and any rule-related documents are affected by the moratorium, and prohibited from publication unless specifically approved" by the Assistant Secretary of the Interior for Policy Management and Budget. The Memorandum listed several types of FWS activities that are "unaffected by the moratorium," but did *not* exclude the listing of endangered and threatened species from the moratorium.

Plaintiffs brought suit on 2 April 1992. Plaintiffs contended that the government's reliance on the President's regulatory moratorium as a basis for refusing to list any species as Endangered or Threatened violated the ESA and the FWS's implementing regulations, and constituted an unreasonable delay in contravention of the Administrative Procedures Act. Plaintiffs maintained that the moratorium undermined the constitutional principles of separation of powers, and violated Congress's prohibition against the use of economic factors as a basis for determining whether species will be protected under the ESA.

As a result of this legal action, the court secured an affidavit from the Department of the Interior that in effect acknowledged and agreed that "The President's moratorium was in no way intended to delay or affect unreasonably the orderly process of promulgating proposed and final listing rules." The government assured the court there would be no further delays.

The down side of the case was that assurances contained in affidavits and memoranda from the Department of the Interior were accepted by the court in place of the temporary restraining order requested by plaintiffs. Although all eleven species listing packages that were being held up have now been released to the Federal Register and waiver approvals expedited, close monitoring will be required to ensure continued compliance.

Judge Gesell made it clear that if plaintiffs believe the problem is not being solved, they may continue to pursue the matter. Another status hearing will be set in the near future to review the situation after the President's moratorium expires. However, in late April President Bush stated that the moratorium would be extended.

During hearings on the case, attorneys for the government maintained that "Secretary of Interior Lujan well knows what Section 4 (listing requirements) of the ESA means." Federal Judge Gesell responded: "You'll have to persuade me a great deal on that after what he did with the moratorium. He embraced it with both arms and took it in as a way of getting out of doing any environmental help for endangered species and he thought that was great, so don't give me the Secretary as having an understanding. There's nothing in these papers that indicates he has the slightest understanding of the statute."

That pretty much sums up the attitude of the Bush administration toward the ESA! Additional legal actions to secure reasonable compliance appear inevitable.

—Reported by the Biodiversity Legal Foundation

Forest Health and Forestry?

by George Wuerthner

A recent Forest Service publication, "Blue Mountains Forest Health Report" available from the Pacific Northwest Research Station, is a startling admission on the part of the agency that past and present timber management policies have resulted in sick and dying forests. The authors of the report do not mince words in concluding that our forests "face the probability of massively destructive forest health problems." Forestry, rather than saving our forests, is destroying them.

Though focused on the Blue Mountains of Oregon, the authors state that their conclusions have widespread geographic applicability.

Indeed, we see abundant evidence of the problems they describe everywhere in the West. According to a recent article on California National Forests in the *Sacramento Bee*, over half of the timber harvest in that state comes from salvage sales. The *Oregonian* reported a similar trend for Oregon's eastside forests; and such trends are evident in the Rocky Mountain forests as well.

The report concludes that decades of *timber mining*— usually called high-grading, removing the best trees from the forest — has reduced genetic diversity, hence the ability of the forest ecosystems to adapt to changing conditions. Moreover, little attention has been paid to long-term forest productivity. Livestock grazing has removed fine fuels that sustain small ecologically important fires. Grazing has also induced soil and watershed changes that exacerbate drought effects.

However, the report singles out fire suppression as having perhaps the greatest impact on forest health. Removal of fire as an ecological process dramatically reduced the ability of forest ecosystems to resist drought, as well as attacks from insects and disease, plus increased the occurrence of catastrophic blazes due to higher coarse fuel loading.

Although timber companies and many foresters often imply that timber harvest is analogous to natural disturbances like wildfires, there are substantial ecological differences. For instance, smoke from fires actually kills many forest pathogens, cleansing the surrounding living forests. Fires recycle nutrients, changing them chemically into a form more readily available for new plant growth; whereas timber harvest exports nutrients from the ecosystem. Fires create numerous snags — home for cavity nesting birds, many of which are insect eaters who provide insect protection for the forest ecosystem. Many fires thin, rather than totally remove, the trees, thereby increasing the viability of remaining trees. Fires create patch disturbances in a random mosaic which humans have thus far failed to duplicate. Equipment used in timber harvest compacts soil, reducing water infiltration, increasing erosion, and decreasing habitat for ground dwelling insects like ants which are major predators of insects that attack trees. (When was the last time you heard a forester express concern about the welfare of ants?)

In addition to the overwhelming evidence showing that fires are important for maintaining forest ecosystem health, there are economic considerations as well. Unnecessary fire suppression costs millions of dollars in direct costs, and billions in the uncounted ecological costs. Fire ecologists have found that most ignitions actually burn no more than a few hundred acres. Jumping on these fires under non-burn conditions is a waste of taxpayer money. Newspaper accounts that say fire fighters "controlled" a blaze ingrain this myth. In most cases, what really happened is that the fire died because it ran out of fuel or rain fell. In other words, such fires would have gone out anyway without burning significant acreage.

At the other extreme, when conditions are ripe for a fire, no amount of suppression can stop them. Again the government is wasting money and personnel fighting fires until climatic conditions—usually precipitation and abatement of winds— reduce fire hazard, enabling suppression efforts to succeed. We saw this in 1988 when snow on September 10, not fire fighters, ended the famous Yellowstone blazes.

There will always be a need for some fire suppression to protect homes and property, but setting up a fireline to protect a house is far different from trying to stop a fire on all fronts. Fire is an important ecological process which we can not emulate with timber harvest. If we are to preserve our forests, we need to preserve the ecological forces that shaped them.

The Blue Mountains Report is the first indication that the agency is willing to publicly admit that forestry as practiced by foresters is killing our forests. Forests are more than trees, yet foresters have long emphasized producing timber at the expense of ecological processes. The results are now becoming all too evident as, to quote from the report, "our forest ecosystems begin to unravel". The "Blue Mountains Forest Health Report" offers hope that the Forest Service is beginning to see the forest through the trees.

Science Editor's Note: Unfortunately, under intense political pressure, the Forest Service's "cure" for the forest health problems in the Blue Mountains may be worse than the disease. Massive salvage logging operations, which will also take a number of healthy live trees, are being proposed for the entire region as a precaution against wildfire (and, incidentally, to feed local timber mills). —RN

Shenandoah National Park

Central Appalachian Biodiversity at Risk

by Paul Torrence

Read these remarkable words written almost 7 decades ago: "There should be a typical section of the Appalachian range established as a National Park *with its flora and fauna conserved* and made accessible for public use..." (Stephen Mather, first director of the National Park Service; italics mine). In 1924, the Southern Appalachian National Park Committee (the Work Commission) reported that Shenandoah was among "several areas which fill the definition of a national park, because of beauty and grandeur of scenery, presence of a *wonderful variety of trees and plant life, and possibilities of harboring and developing the animal life common in the precolonial days but now nearly extinct.*" (italics mine) Some of these words and phrases might be mistaken as arising from the Preserve Appalachian Wilderness movement.

I would argue that we have broken our unspoken covenant with those who spoke these words, we are breaking the law itself, and we are imperiling future generations of many species of plants and animals in the Central Appalachians by allowing business as usual in and around Shenandoah National Park. Today acid deposition, poaching, trail and backcountry overuse, ozone from emissions of cars and coal-fired power plants, second homes, and creeping urbanization jeopardize the ecosystems and landscapes of the Park.

We are even violating covenants embodied in legislation. In 1976, under the authority of the 1964 Wilderness Act, Congress added about 80,000 acres of the Park, including the area around Old Rag, to the National Wilderness Preservation System. Under the terms of the 1964 law, any part of this National Wilderness Preservation System is "*an area where the earth and its community of life are untrammeled by man*...which is protected and managed so as to preserve its natural conditions...with the imprint of man's work substantially unnoticeable..." (italics mine)

Moreover, according to the US Congress (National Park Service Organic Act of 1916), the fundamental purpose of National Parks is "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

When Shenandoah National Park (SNP) was created by an Act of Congress in 1926, the determined boundary included 521,000 acres [meaning the Park could fill that acreage if monies for purchase of private lands therein became available]. Today, the Park includes only 195,000 acres, 80,000 acres of which are designated Wilderness. An unfortunate aspect of the creation of SNP (and Great Smoky Mountains National Park as well) was the stipulation by Congress that no Federal funds be used to purchase land for SNP. Money for the original purchases was obtained from the State of Virginia (about $1 million) and individual citizen donors (about $1 million). Land added since then has come by donation or trade.

SNP is a rich source of biological diversity in the Blue Ridge Mountains and the Central Appalachians. The Park is home to at least 1400 species of plants. More than 200 species of birds (104 breeding species) inhabit the Park, including 20 raptor species, 35 species of warblers, and 7 species of woodpeckers. Also native to the park are 52 species of reptiles and amphibians (including an Endangered species, the Shenandoah salamander) and 22 species of fish. The Park's population of the Eastern black bear is likely between 400-600. Bobcats are resident here and unconfirmed sightings of puma (potentially the Eastern cougar) have been reported.

SNP's current boundary makes it extremely susceptible to outside influences. In the words of the National Park Service itself (General Management Plan), "The land base of Shenandoah National Park is not considered ideal for a public park committed to protecting a mountain environment. Today certain areas lack visual and ecological integrity, and in many places, the perimeter of federal holdings remains unrelated to topographic features, natural and recreational resources and visitor access routes." Development is eating into the Blue Ridge ecosystems.

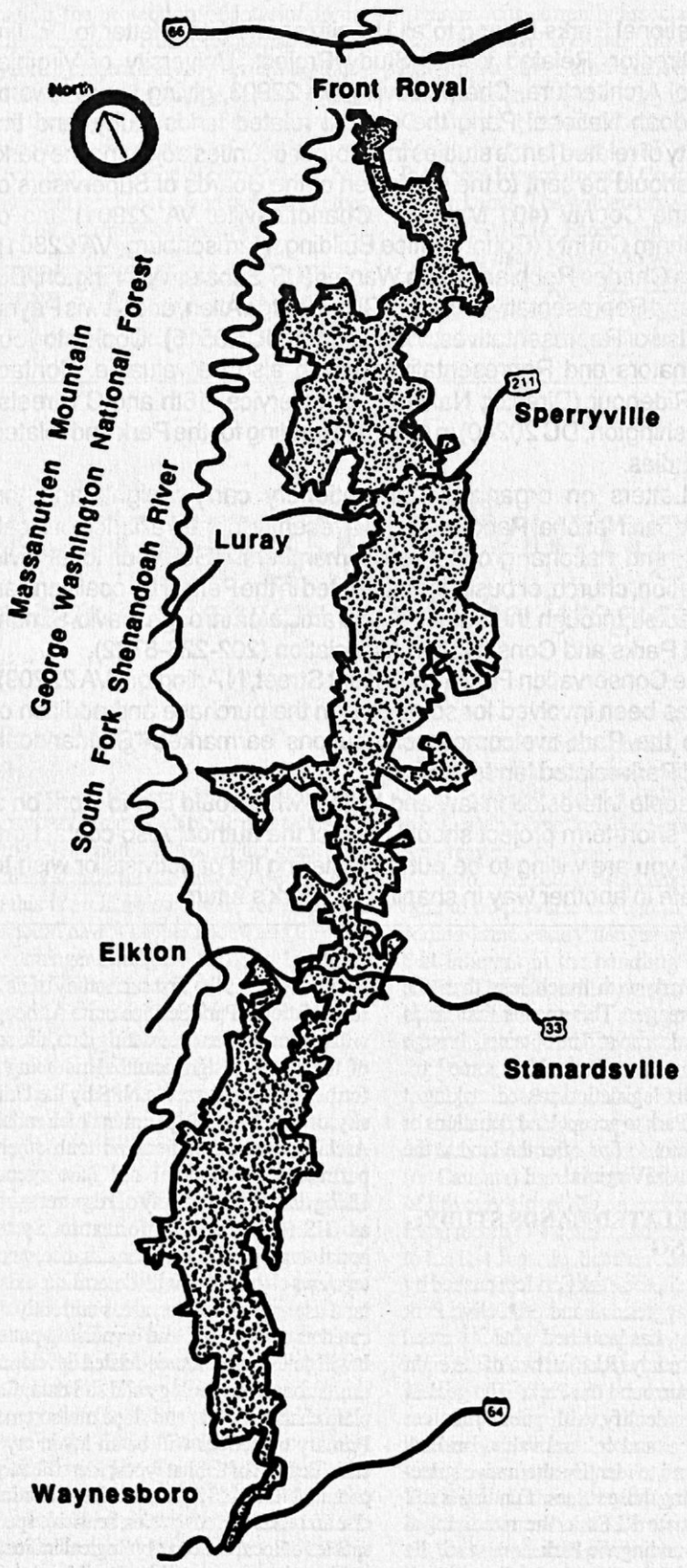
The city of Front Royal and Warren County to the north have permitted development to the very borders of the park. A natural migration corridor along the Blue Ridge via Chester Gap has been blocked by the "Blue Ridge Mountain Estates" and the Smithsonian Conservation and Research Center of the National Zoological Park. To the west, development of the Browntown area threatens to cut off SNP from the Massanutten mountains and the George Washington National Forest. In Madison County, local residents have appropriated a piece of the Park as their personal dump. In some areas, what appears as continuous forest cover from a distance is actually penetrated by a network of roads. With them come fragmentation of interior forest, additional edge, exotic plants, pesticides, herbicides, fertilizers, trash, sewage, increased hunter penetration, more deer, and more human-black bear contacts and conflicts. At SNP, a landowner can mow his fine fescue lawn right up to the border of a Congressionally designated Wilderness. To the south of the Park is the Wintergreen development: golf courses, ski slopes, townhouses, restaurants, parking lots, roads, and associated toxics.

If its surrounding lands were protected, Shenandoah National Park could be a cornucopia of species and genetic richness for the region, a preserve where evolution and natural systems continue largely undisturbed by human interference. It might also serve as a major biological corridor, connecting the Blue Ridge to the south with the Massanutten Range, both currently partly protected by the George Washington National Forest. In a greater scheme, it could be a key linchpin in connecting the Southern Appalachians with the Northern Appalachians.

FOREST SERVICE PLAN THREATENS SNP

The 1992 George Washington National Forest Plan threatens the biological integrity of SNP since the currently proposed preferred alternative (8) fails to account for the interrelatedness of the ecosystems and landscapes of these two federally owned lands. The revised Forest Plan is filled with buzzwords of ecology and conservation biology, but most of it is lipservice. [See GWNF article last issue.] Under the plan, clearcutting, pulpwood pro-

Shenandoah National Park



Legend To Map. From the more than one billion year old granites and gneisses of the Blue Ridge and Shenandoah National Park (stippled area), one can look east over the Piedmont toward Washington, DC (about 72 miles from the northern Front Royal entrance) and the Atlantic Coastal Plain. To the west is the Massanutten Mountain range rising from the floor of the Shenandoah Valley. Further west is Great North Mountain, West Virginia, the remaining Ridge and Valley Province, and the Appalachian plateau. To the south of the park is the George Washington National Forest which, together with federal lands of the Blue Ridge Parkway (under NPS jurisdiction), affords limited protection to the spine of the Blue Ridge. Farther south lies the Jefferson National Forest in southwest Virginia. Shenandoah National Park, along with other lands under federal control in the Massanutten Mountain area and the Blue Ridge, could form habitat corridors connecting southern Virginia to Maryland and Pennsylvania.

Not included in this representation of the Park is Skyline Drive, a north-south 105 mile road. Mitigation of the effects of this and its sister road to the south, Blue Ridge Parkway, will have to be considered in any scheme to bring back the Wild Appalachians.

The map scale is approximately 8.7 miles to the inch.

duction, off-road vehicle use, insufficient riparian area protection, increased road building, and management for early successional habitat would further deplete interior forest dwelling species. It calls for only 12,000 acres to be added to the National Wilderness Preservation System. This would bring the total Wilderness of the GWNF to just 40,000 acres (only 4% of the GWNF landbase). Biological impoverishment of the GWNF will be a death knell for many species of SNP.

PARK OPPONENTS MOBILIZE

The forces of exploitation and development are mobilizing even now to strike a death blow at Shenandoah National Park. Steve Hoffman, a Madison County supervisor, stated in reference to the park, "If I had a bulldozer big enough, I'd push the whole dang thing into the ocean" (*Madison Eagle,* 12-19-91). Anti-Park organizations have sprung up, including Virginians for Property Rights, the Madison County Preservation Coalition, and the Greene County Preservation Coalition.

These folks are deadly serious about derailing any effort to provide protection to the lands bordering the Park, no matter what the means of protection. This interest group recently produced a manifesto entitled "US vs. NPS. Virginians Defending the Bill of Rights." This slick publication purports to document abuses of individual rights by the National Park Service in attempting to protect areas of historic interest, such as Civil War Battlefields, as well as Shenandoah National Park. Mostly, old scars are opened such as those that resulted when some mountain residents were forced to leave their homes when the Park was created. Mistakes were made during that period of Park history, but does that mean the Park should be returned to the current residents of Madison County? That would suit some folks just fine, such as a major park opponent overheard at a social gathering saying, "This mama's boy is gonna get rich by building the first shopping mall in Madison County." Nonetheless, their rhetoric and call to Virginians to protect the Bill of Rights will be heard clearly by the Virginia Congressional delegation.

The Park's opponents claim that even though Congress originally authorized a 521,000 acre Park, since Congress twice had to reduce the minimum acceptable land area to make possible the Park's creation (due to lack of State and private funds), the larger SNP boundary no longer holds and the Park can no longer accept donations of land. However, the Acting Solicitor of the US Department of the Interior last year released a legal opinion stating that SNP's "maximum boundary" of 521,000 acres still holds even though Congress created the Park with much less than the maximum acreage. This means that lands within that border can still be obtained through private donation to the Park. Now some Park opponents want legislation passed making it illegal for the Park to accept land donations or requiring a donor to first offer the land to the county or State of Virginia!

THE SNP RELATED LANDS STUDY: A BEGINNING

To its credit, the Park Service, pushed by an unusually aggressive and protective Park Superintendent, has launched what is termed a related lands study (RLS) in two of the eight counties that surround the Park. The goal of the study is to identify, with public involvement, biological and cultural values on Park related lands and to identify alternative strategies of protecting those values. Funding is still needed to initiate RLSs in the remaining 6 counties surrounding the Park.

This related lands study for Shenandoah National Park is the first such study of its kind for a National Park Service unit. Although it will rely mostly on preexisting data, the scope of the study is significant. It is being performed under contract to NPS by the University of Virginia's Department of Landscape Architecture in collaboration with other departments, and federal and state agencies. Using data from a variety of resources—such as GIS (Geographic Information System), aerial surveys, field reconnaissance, and interviews—the RLS will determine existing land use and land cover, areas currently dedicated as open space, and ownership patterns. It will determine resource-related development limitations from geology and soil data, floodplain characteristics, and slope measurements. Primary objectives will be an inventory and classification of habitat types; identification of potential flora and fauna; and identification of rare and endangered species, sensitive species, species of local concern, biological indicators, and species aggregated into guilds. Areas of

WHAT WE CAN DO

National Parks belong to all US citizens. Write a letter to Dr. Jim Klein, Director, Related Lands Study Project, University of Virginia, School of Architecture, Charlottesville, VA 22903, giving your views of Shenandoah National Park, the current related lands study, and the possibility of related lands studies in six other counties adjoining the park. Copies should be sent to the Chairmen of the Boards of Supervisors of Albermarle County (401 McIntyre, Charlottesville, VA 22901) and of Rockingham County (County Office Building, Harrisonburg, VA 22801); Senators Charles Robb and John Warner (US Senate, Washington, DC 20510) and Representatives James Olin, George Allen, and Lewis Payne (US House of Representatives, Washington, DC 20515). Copies to your own Senators and Representatives would also be valuable. Contact James Ridenour (Director, National Park Service, 18th and C Streets, NW, Washington, DC 20240) in regard to funding for the Park and related lands studies.

Letters on organizational stationery carry weight; and the Shenandoah National Park Coalition, a recently formed alliance of local, regional, and national groups seeks members. Get your local civic organization, church, or business interested in the Park. The coalition can be contacted through the author of this article or through David Simon, National Parks and Conservation Association (202-223-6722).

The Conservation Fund (1800 Kent Street, N Arlington, VA 22209), which has been involved for some time in the purchase and addition of lands to the Park, welcomes contributions earmarked "Shenandoah National Park-related lands."

People interested in law and history who would like to work on a specific, short-term project should contact the author. Also contact the author if you are willing to be put on a mailing list of activists or wish to participate in another way in shaping the Park's future.

high species diversity are to be identified and examined, as are wildlife corridors; and large habitat areas will be delineated to provide information for protection of interior forest breeding species. This information will be analyzed to present a set of alternative strategies for conserving resource values on land around the park. These alternative strategies may include preservation of existing high quality habitat, protection of corridors, and best management practices on lands subject to other uses such as farming or forestry.

ENVIRONMENTALISTS ORGANIZE FOR SNP

To speak for the future of Shenandoah National Park, a variety of conservation organizations have formed the Shenandoah National Park Coalition. The eleven organizations currently associated are Sierra Club, National Parks and Conservation Association, Virginia Native Plant Society, Valley Conservation Council, Virginia Wilderness Committee, Northern Shenandoah Audubon Society, Warren County Izaak Walton League, Piedmont Environmental Council, Trust For Public Lands, The Wilderness Society, and the Virginia Wildlife Federation. The Coalition seeks activists who want to work for SNP and the dream of Wild Appalachians.

Action must come quickly, and it must come from all quarters: federal, state and local governments, as well as private organizations and individuals. Novel solutions are needed. To proceed in the current management direction would cause inestimable losses of biodiversity. *This generation of Americans will choose to kill Shenandoah National Park; or, this generation of Americans will choose to save Shenandoah National Park.*

Paul Torrence (106 East Deer Park Drive, Gaithersburg, MD 20877) resides in the Piedmont of Maryland, but his heart is in the Blue Ridge Mountains of Virginia. He helped organize the Shenandoah National Park Coalition and is the Sierra Club's Virginia and Maryland Chapters' issue chair on the park.

Biodiversity

Humongous Mongers Among Us

Or, Speleomanders and Other Trogloherps

by Bruce Morgan

There in the stygian darkness the humongous monger with black polka dots and bulging eyes snuffles through the detritus in relentless search for the unwary isopod. Perhaps this is an inapt metaphor, for to snuffle one should have a proper snout, and this particular monger is lungless, no heavy breathing here. Our Plethodontid pal is seized by a vague unease as he makes his way along the shin bone of a deer that took a wrong step in the night and plunged into hell. The talus pile on the floor of the pit is a dangerous place. One could be crushed by a falling cow; or, more likely, be confronted by a husky Dusky Salamander (*Desmognathus fuscus*) also rooting through the rich litter in search of the larvae of Dermestid beetles which reduced the deer, spiders, isopods, mites, millipedes, and various half frozen bugs which made the same mistake as the deer. Our hero, the Cave Salamander (*Eurycea lucifuga*), he who flees from the light, feels more secure clinging to the cavern wall. There he can pursue his special prey, the Cave Cricket, a peculiar pale relative of the Camel Cricket with extremely long antennae. The Cave Cricket rarely descends to the floor of the cave, so the Cave Salamander must ascend the wet vertical walls to search the cracks and crevices above. Our hero leaves the talus slope just in time. First comes a tinkle of small rocks, then the crash of a boulder, not an unusual event, then a rope? Then, look, up in the sky, a blinding light, it's a bat, it's a plane, no, it's Spunkalunker the Supercaver!

Most herpetologists consider their pastime to be perverse enough in itself without adding unnecessary danger over and above that inherent in the handling of venomous snakes. The real thrillseeker, however, should eschew the moccasin and go in search of salamanders. These modest creatures, especially the troglophilic varieties, are more likely to get you killed than a whole ball of moccasins.

Having been upstaged in the Permian by the antecedents of the dinosaurs, the Urodeles (or Caudata) have chosen modesty as a way of life ever since. (To be entirely correct, the fossil record of the salamanders only goes back to the late Jurassic, but the record is probably incomplete.) What better way to be modest than to inhabit the cold dark dank cracks and crannies of the world, especially the temperate New World. All other vertebrates shun such places. The reptiles had their one hundred million year long day in the sun and are loath to crawl back into the long night of oblivion, though we will surely drive them there soon. The fish have the water, the birds have the air, and the mammals lord it over all. Through it all, the salamanders persisted in the dark, safe in their obscurity. Until now.

Such retiring habits predispose salamanders toward life in karst (limestone, cave producing) landscapes. The crack gets deeper and deeper, and in the blink of an evolutionary eye the crack has become a cave, and the salamander an obligate dweller therein. All degrees of such adaptation can be seen, from the Dusky and Slimy Salamanders which are equally at home in a cave mouth or a forested brook, to the wholly troglobitic Georgia Blind Salamander which is white, eyeless, and lives so deep within the aquifer that it is rarely seen even in caves.

The Southern Appalachians and the adjacent Cumberland Plateau of eastern Tennessee and northern Alabama are particularly rich in species. Many feel that this area is the center of Plethodontid salamander evolution. The Cumberland Plateau is riddled with caves, and it is to this region that the brave Spunkalunker comes in search of speleoherps.

The pit we are about to descend is known to the locals as the Gaping Anus, or to some as the Bottomless Dungeon Pit. It is located in the Fiery Gizzard Cove just south of the Tennessee line in Alabama. After rappelling down 160 feet into the blackness of the bell shaped chamber, the Spunkalunker lands with a thunk on the pile of debris in the middle of the pit. A small waterfall trickles down the back of his neck as he derigs from the rope, then dodges under an overhang to escape the

rocks that continue to rain down from above. The huge cone shaped pile of debris in the middle of the room is proof of the dynamic nature of cavern development. The pile is made of rocks, logs, dead animals, broken bottles, more rocks, logs, bones, leaves, and salamanders. Most college students are taught in geology 101 that geological processes happen slowly over millions of years, but rest assured that when a boulder the size of a bus peels off the ceiling it does not settle slowly to the ground. This is a blind pit; all passages have been blocked by the fallen debris, so there is nothing for the Spunkalunker to do but wait in the cold and dark for his companions to descend like lemmings, look for salamanders, and ponder the folly of his enterprise. The usual justification for cave exploration is that if you get out alive the sky seems so blue and the trees so green.

The pile of debris is the entire basis of the food chain. Almost all of the energy to fuel the ecosystem falls down from above. Every time it rains, a new load of organic debris washes down the gullet of the cave along with more rocks. At noon a feeble beam of light reaches the cave floor, but it is insufficient to turn more than a few of the rocks a pale shade of green. Right in the center of the pit where the light is strongest a tiny liverwort struggles for existence. It is here, in the twilight zone of the cave, that most life occurs. Fungus is king. Entropy has the upper hand. Everything is broken down, consumed by microbes, which are consumed by invertebrates, which are consumed by salamanders. It is a simple system, and very delicate. Populations are low, which is why no one, not even scientists, should collect troglobitic animals.

Some animals, such as the Cave Salamander are only partial cave-dwellers; they also may be found climbing across the walls of narrow gorges, especially at night, in crevices, and near springs and along rocky brooks. Animals that can live in caves but are not obligated to do so are known as troglophiles. Those whose entire life cycle must occur within a cave are known as troglobites. Living in this particular cave are two close troglophilic relatives of the Cave Salamander, the Long-tailed Salamander (*Eurycea longicauda*) and the Three-lined Salamander (*Eurycea longicauda guttolineata*). The Long-tailed Salamander is thin with a long tail, and yellow with black spots. The eyes are normal sized. The Cave Salamander is similar, but is orange with large eyes. The large eyes are an adaptation to the twilight zone, not to the realm of total darkness beyond. The Three-lined Salamander is considered by some to be a larger, darker subspecies of the Long-tailed Salamander. Others consider it to be a legitimate separate species. The range of the Long-tailed overlaps that of the Cave Salamander, but it is less associated with cave habitats. The Three-lined has a much wider range of habitats, and may even be found in the coastal plain of the Florida panhandle. Any good naturalist can see that these three animals are closely related, so what are all three doing in the same cave? I can offer no explanation other than to observe that the Cave Salamander climbs higher on the walls and goes farther back into the darkness. The Long-tailed is intermediate in this respect, and the Three-lined stays as near the entrance as possible. There must be some sort of resource partitioning, and some method of preventing hybridization. The subject invites further study.

The Dusky and Slimy Salamanders simply fall in and make themselves at home. They never climb the walls, and always remain in the debris pile. Because they are continually falling in, sometimes more are there than the ecosystem can support. Any Dusky found in the depths of the cave is on its way to becoming food for the fungus.

Many unfortunate creatures fall into the cave. Larger animals always die on impact, but many herps don't. Looking about, I saw the shattered shells of Box Turtles which couldn't fly. Two Worm Snakes were moldering nearby. Being quite small, if they had belly flopped they would probably have made it, but chose to nose dive instead. Here's a prize! What looked at first like the rotten corpse of a Copperhead proved instead to be a fine big Tiger Salamander (*Ambystoma tigrinium*), a worthy candidate for rescue, and a first for me! If an animal can live and breed in the cave I leave it alone, but this animal was doomed. Just under an overhanging ledge was a row of sorry Gray Treefrogs (*Hyla chrysoscelis* ?) which were resigned to slow death in the dark by starvation and hypothermia. I rescued all fifteen of them. Then into the bag went three Leopard Frogs and a live Worm Snake. What a haul! On the way up I rescued my friend Adam who was inexperienced in such madness and having trouble on the climb. He runs a punk rock club, and before removing him I considered whether or not he could live and breed there due to similarities to his chosen environment. As there were no female punk rockers in the pit, I decided that he would be better off outside.

On other occasions in nearby pits I have rescued Copperheads, Rat Snakes and a Black Kingsnake. Every one of them has agreed that the sky was bluer and the leaves more green once their bellies were on a warm rock in the sun for the first time in many months. I hope by such good works to assemble a large collection of karmic brownie points, and perhaps to get rescued myself someday.

On other occasions in nearby pits I have rescued Copperheads, Rat Snakes and a Black Kingsnake. Every one of them has agreed that the sky was bluer and the leaves more green once their bellies were on a warm rock in the sun for the first time in many months. I hope by such good works to assemble a large collection of karmic brownie points...

It would seem reasonable to suppose that an extensive area of contiguous limestone strata would favor the evolution of troglobitic animals. In the case of salamanders, however, it has been suggested that the most extreme troglobitic development, such as the reduction of eyes and pigment, is expressed in populations separated by large areas of unsuitable habitat. As we have seen in the case of the genus *Eurycea* in the Cumberland Plateau, three closely related forms, two of which are widespread outside of caves, can coexist, even in the same cave. In the absence of genetic isolation the Cave Salamander has been unable to develop truly troglobitic characteristics, such as becoming neotenic, blind and white. An entirely different situation exists along the edge of the Edwards Plateau in Texas. There, the limestone is discontinuous, and the arid lands in between are inhospitable to salamanders. Presumably, an ancestral type of *Eurycea* existed in the area. As the region dried out, the populations retreated into caves and became isolated from one another. The small size of the gene pool in these isolated populations, coupled with strong selective pressures exerted by the difficult cave environment, resulted in rapid speciation and reduction of unnecessary features such as eyes and pigment. The results today are four different species of *Eurycea* in Texas which are completely blind, white and neotenic. Several species are restricted to single cave systems. Cave environments are noted for their stability. If any change should come to one of their caves as a result of man's interference, these Urodelian additions will be consigned to the great pickle jar in the sky.

Not all caves are so fearsome in aspect

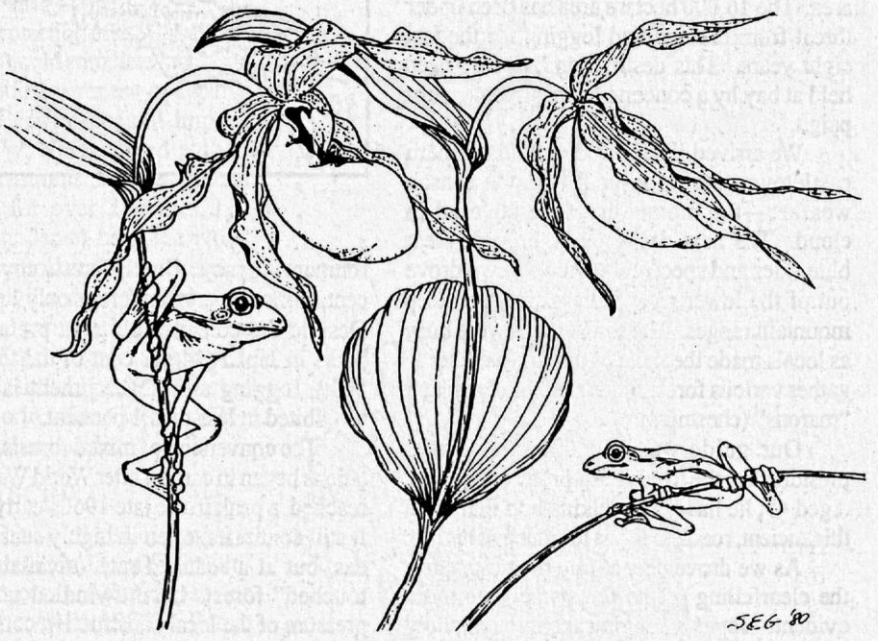
as the Gaping Anus; some, such as Ellison's Cave in nearby Georgia, which features a 586 foot free fall pit, are even worse. Some are positively benign. As one travels southeast from the edge of the Cumberland Plateau in Alabama one enters the Ridge and Valley Province. The limestone outcroppings here are smaller and more isolated, and the caves are hardly ever deep pits...

It had been a rough weekend; 1500 people had attended the caver gathering and hangovers were the order of the day. The caves were deep, the rocks loose. My friends Ann and Buford decided to visit a pit called Megawell which had claimed one victim this year already. Never use a Polish caving rope. The drop is 310 feet, but they only had a 250 foot rope and a 100 foot rope. When they announced their intention to tie the two ropes together I changed my plans, kissed Ann goodbye, and told Buford that it was nice to have known him. It is a difficult, dangerous and intricate maneuver to pass a knot under the best of conditions, but when hanging in the black void with a waterfall pouring on your head it is positively suicidal. Nevertheless, they lived, and the next day were ready for something a bit more sensible. (Really sensible people never go in caves, never catch snakes, and don't even know what salamanders are.)

We headed down into the Ridge and Valley Province at the headwaters of the Coosa River in search of a kinder gentler cave. There, in the low mountains along the Georgia border behind a dairy farm, we found Onan's Cave. This cave was well known to the locals, but relatively new to science. We shooed the cows away and walked along the pasture to the spring in the hillside just below the cave. The place looked like salamander heaven. I searched for the Spring Salamander (*Gyrinophilus porphyriticus*), but the cows had so thoroughly trampled the spring that nothing could be found. The entrance was a beckoning hole beneath the gnarled roots of a beautiful old tree. Inside, the passage opened up into a tight sinuous canyon with a small stream covering the floor. We chimneyed above the stream to keep our feet dry. About 200 feet in, swimming in a small pool, was the finest and rarest creature I have ever seen in my entire salamongering career. It was indeed a humongous monger. It was a fat pinkish salamander about seven inches long with fluffy red gills, a big tail fin, and a flattened spade-shaped head with vestigial eyes. The nose was square and indented at the tip. I supposed it to be a mudpuppy of some sort. It suffered my attentions for a while, then swam into a crack, never to be seen again. I subsequently learned that this wonderful creature was actually a Tennessee Cave Salamander (*Gyrinophilus palleucus*). Do not confuse this with the orange and black *Eurycea* discussed earlier which is also called a Cave Salamander. The Tennessee Cave Salamander is fully adapted to subterranean life. Under normal circumstances it is neotenic, but can be forced to transform if given a dose of thyroxin. Three subspecies are recognized, distinguished by pattern and range. This specimen appeared to be *G. p. palleucus* which is supposed to be restricted to the southeastern edge of the Cumberland Plateau, and had not previously been found south of the Tennessee River. This specimen was in the middle of the drainage of the Coosa, a major range extension!

The fun never stops. Shortly after returning home (mid October, 91) I kicked a rotten log off the trail through my property. Underneath were two large slugs, but one of the slugs appeared to have a head. I looked more closely. The slug did indeed have a head. Salamanders don't bother me, and I eat live mice and stir-fried bats, but for some reason I have an irrational fear and loathing of slugs, so I could not bring myself to touch the thing. I exhumed the creature with a stick to discover that it was a Mole Salamander (*Ambystoma talpoideum*) which was bedded down for the drought in a mucous cocoon. Another first for me! I was excited, but the salamander was not; it was nearly inert. I took the tubby little fellow home and gave it a bath, which greatly improved its outlook. It was so appreciative of my ministrations that it actually moved. (Steve Christman, the herpetologist, keeps clams for pets and holds races with them. I bet that monger could beat any clam hands down. After all, clams have no hands. It would be neck and neck, but possibly not, for my salamander had practically no neck, and clams are famous for their necks.) I returned the Mole Salamander to a veritable paradise of wet rotten logs replete with worms. Yet another species for my life list, and yet another karmic brownie point. What a day!

Bruce J Morgan is a spelunker, herpetologist, and conservation writer living in Florida.



A Walk in Japan's Beech Forest

ed. note: A longer version of this article appeared in Habitat Australia *(2-91), the magazine of the Australian Conservation Foundation.*

by Ian Penna

Tokyo's skyline seems to stretch forever—a tangle of rooftops, TV aerials and powerlines as far as the eye can see. Here, it is often difficult to imagine that Japan could have any wild places left.

But it has—a few. And two exceptionally fine days during Japan's typhoon season allowed some friends and me a glimpse of this country's last remaining tract of unlogged beech forest.

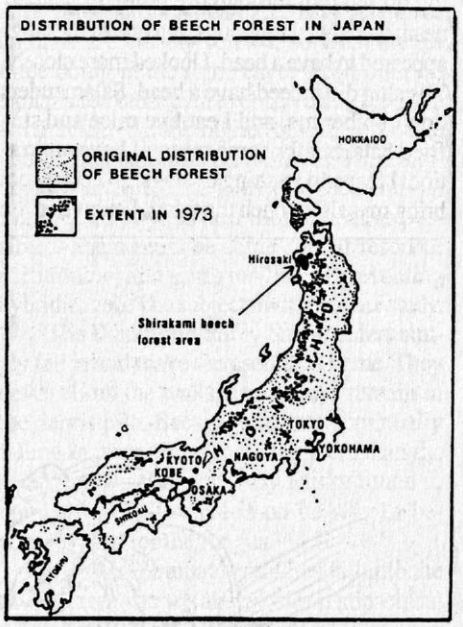
The Shirakami Mountains (Mountains of the White Gods) are tucked away in the northeast (Tohuku) region of Japan's main island, Honshu. The forests here are this country's last chance to save a fairly sizeable wilderness area. The 16,000 hectare area has been under threat from roading and logging for the last eight years. This destruction has only been held at bay by a concerted conservation campaign.

We arrived in Hirosaki, an old northern castletown, during typical typhoon season weather—the mountains were covered in cloud. The next day, though, brought clear blue skies and spectacular views as we drove out of the lower river valleys into the steep mountain ranges. The forest roads were busy as locals made the most of the fine weather to gather various forest foods—edible fungi and "marons" (chestnuts).

Our guide was Mikami-san, former president for the local forest protection group. Aged 45, he has been walking and fishing in this ancient, roadless forest for much of his life.

As we drove deeper into the mountains, the clearfelling of the forests became more evident. Japan's logging techniques allow access to very steep slopes. Thus, while 67 per cent of Japan is tree-covered, 40 per cent of this area is given over to artificial plantations, generally of *sugi* (Japanese cedar), or *hinoki* (cypress).

Relatively "natural" native forests are now restricted to less than 20 per cent of Japan's total land area, according to the Environment Agency. Beech forests cover 4 per cent, oak and evergreen forests only 1 per cent. Despite the considerable area protected by parks in Japan (14 per cent of the total land area), logging and development is legally prohibited in less than 1 per cent.



The conversion of mixed forests to plantations began in earnest after World War II, and reached a peak in the late 1960s/early 1970s. It still continues, often in highly sensitive areas, but at a reduced rate. Available "untouched" forests have dwindled under the pressure of the local construction companies, vote-seeking politicians, and a forest service whose wages come from timber receipts.

The forests of the Shirakami region are no exception. Large clearcuts and innumerable rows of native cedar covered the slopes of the Akaishi (Red Stone) River Valley, next to the virgin forests. The spindly young cedars contrasted with the bright green of the *buna* (beech), which in a few weeks would be a rich mix of reds and golds as winter began its journey south.

Walking off the forested ridge and down into our first valley, we came to perhaps the most important tree in the forest. An old straight *buna* is home for a pair of rare *kumagera* (Black Woodpeckers). This tree stands almost directly in the path of one of the two roads proposed for the Shirakami Mountains. Until recently the *kumagera* was only known on the northern island of Hokkaido and in one other site on Honshu. Its discovery in Shirakami was an important factor in the decision to postpone further road construction.

Our descent then followed steep creeks and waterfalls to the fast-flowing Akaishi River. Walking upstream we saw an unfortunate example of the price this forest is paying for its fame—gomi (rubbish), left by the increasing number of anglers attracted by the thrill of pulling native *iwana* (fish) from virtually untouched mountain streams.

Litter, however, is just a tiny part of Japan's chronic domestic and industrial waste problem. In 1988, 2.8 million tonnes of domestic trash were burnt in Tokyo. Another 2.9 million tonnes were dumped in Tokyo landfill sites which are expected to fill in 1992, three years earlier than planned. While the Tokyo Metropolitan Government is calling on citizens to reduce household rubbish, the National Government is promoting increased domestic consumption to reduce the trade surplus.

After camping by the river, we followed Mikami-san upstream, then up waterfalls, over ridges and through narrow gullies to the corrugated iron and timber shack of Shirakami's last traditional bear hunter. The beech forests are an important habitat for Japan's Crescent Moon Bear which, although exterminated from much of the country, is still widely regarded as a pest.

Mikami-san estimates that only about 1000 bears remain in Aomori, Honshu's northern-most prefecture. During 1988, about 100 were killed there—many forced out of the mountains and forests by habitat destruction, then shot as they approached human settle-

ments. The Crescent Moon Bear could easily go the way of Japan's wolves, which were exterminated around the turn of the century.

Japan's beech forests themselves date from before the last Ice Age, and have a much greater species diversity than European beech forests. About 40 per cent of Japan's 4000 seed-bearing plants are endemic, and most are found in beech forests. The forests have been described as a "treasure chest of insects" and are home for many birds and mammals. These include the Giant Flying Squirrel, the Japanese Macaque, the Marten (weasel), and the endangered Rabbit-eared Bat—a faunal heritage unknown by many Japanese.

The need to protect the remaining forests was brought home sharply as we reached the outer ridge of the virgin forests, and looked again over the miserable clearfelled slopes we had first climbed. Above us, like a friendly omen, soared a rare Golden Eagle.

Forestry in the area has been a typical "wood-mining" operation, similar to Japan's highly destructive practices in other parts of the world. Japan's own forests and plantations supply less than one-third of the country's demand for timber—which in 1986 totaled 95.45 million cubic metres roundwood-equivalent.

The roads proposed for Shirakami are a good example of the desperation of local authorities and business to maintain regional economic activity in the face of international economic restructuring, increased import competition and the flow of young people to jobs and a more exciting life in Tokyo and other big cities. The local government argued that roads were necessary to revitalize the ailing economy. Yet the roads would have been impassable during winter because of heavy snows.

Opposition to the the roads was so great that the work was frozen in 1987 and the area was given some protection in 1989. However, conservationists want it declared "wilderness," which would afford it the strictest protection under Japanese law.

Vital to the success of the campaign to stop the roads was a small dedicated group of locals, in conjunction with Tokyo conservationists. A critical media also provided support. Over 14,000 signatures opposing the roads were collected, no mean feat for Japan. Many small citizens' conservation groups spring up in response to local issues, but more often than not they lose when faced with Japan's development trilogy of government, big business and powerful public servants. For example, citizens from Fuji city are still fighting the dumping of pulp sludge from local paper mills at the foot of Mount Fuji which, they argue, threatens underground water supplies.

Tokyo's 12 million inhabitants are basically cut off from Japan's natural areas and the impact of their consumption habits. Yoichi Kuroda, of the Japan Tropical Forest Action Network, explains: "Japan's economy is fundamentally mercantile, importing resources and exporting finished consumer goods. The life of a typical salaryman is dominated by his corporation. He can work up to 100 hours of overtime a month. Family, leisure-time and individual ideals are all sacrificed for the good of the factory or business."

It is no wonder that a 1989 world-wide United Nations survey found that the Japanese public had a markedly lower understanding of environmental protection movements, and showed less support for them, than people in other countries. However, a 1990 survey by Japan's Prime Minister's Department indicated that public environmental consciousness is growing. Nearly 60 per cent of the people questioned thought that improvement of the environment should be the country's highest priority, a marked increase on the number who expressed concern in a similar 1988 survey.

The activities of non-government conservation organizations (NGOs), together with increased media attention, may have played an important part in this change. However, the Japanese Government's attitude to NGOs was shown clearly in 1989 when it failed to invite them to its international conference on the global environment.

Protection of the Shirakami forests could stimulate increased domestic awareness of Japan's global environmental impact. As C.W. Nicol, noted author, conservationist, and resident of Japan for over 25 years, has written: Japan has "the worst forestry policies of any presumably civilised or environmentally aware nation on earth. Until Japan's forests are saved, there is little hope for the rest of the world where Japanese big money has invaded."

POSTSCRIPT

The Shirakami campaign is spectacular in Japan for its ultimate success. After suspension of the road in 1989, a Forest Ecology Preserve was proposed for the Shirakami forests with a large core "Protection" area of about 10,000 ha., surrounded by a buffer zone that allows non-exploitive uses. In Dec. 1991, the Environment Agency announced that this 10,000 ha. core area will be declared a Nature Conservation Area, providing it with the strictest protection under Japanese law, allowing only limited access. This is the first major declaration under this law since 1983, and is about twice the area of all previously declared Nature Conservation Areas put together.

Citizen pressure over Shirakami and other beech forest remnants also caused the Forestry Agency to begin a process of instituting a new type of conservation area to protect biological diversity. At present, it has no legal basis and functions as a kind of administrative guide.

Logging of Japan's remnant beech forests continues, and the few concessions and small reserves gained may not be sufficient to protect their biological diversity. Some people believe that there should be a moratorium on the logging of all old-growth forests in Japan, while a nation-wide biological survey of remaining forests is conducted.

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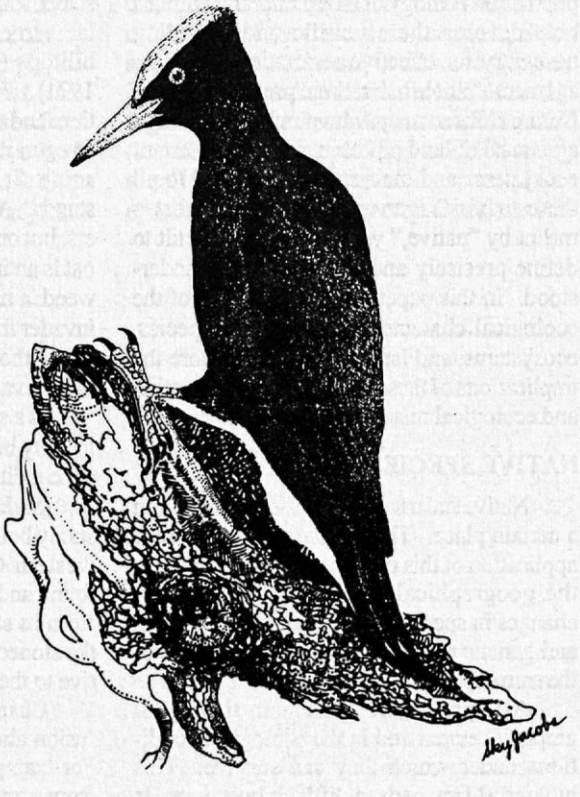

BLACK WOODPECKER

Native Plants, Native Ecosystems, and Native Landscapes

An ecological definition of "native" will promote effective conservation and restoration.

by Mark V. Wilson, David E. Hibbs, Edward R. Alverson

Much of the worldwide conservation effort seeks to protect plants and animals in their native habitats. Conservation activities in Oregon and the Pacific Northwest contribute to this goal in many ways. For example, state and federal endangered species legislation protects several of our native plants and animals, such as Bradshaw's lomatium and the northern spotted owl. Biologists studying the population ecology of rare plants and animals help develop the scientific understanding necessary for effective restoration and management. Whole habitats are protected by The Nature Conservancy, who purchase and manage tracts of land representative of important ecosystems and their species. Central to all these activities is an understanding of what is meant by "native," yet the term is difficult to define precisely and remains poorly understood. In this paper, we discuss some of the ecological characteristics of native species, ecosystems, and landscapes, and explore the implications of these concepts to conservation and ecological restoration.

NATIVE SPECIES

Native means indigenous, originating in a certain place. Three issues complicate the application of this definition to native species: the geographical distribution of species, changes in species distribution through time, and genetic variability among individuals of the same species.

All species are limited in their geographical extent and in the ecological conditions under which they can survive. This biological fact leads to difficult questions. Is a species native to an area if it grows somewhere else in the same country, same state, same region, or same continent? Wild oat (*Avena fatua*) is a widespread weed in cereal crops and grazed grasslands over western North America (Holm et al., 1977). Few would consider wild oat, which before agricultural development lived in the wild only in southern Europe, to be a native Oregon plant. But consider the cases of common ragweed (*Ambrosia artemisiifolia*) and Oregon white oak (*Quercus garryana*). Common ragweed is native to the eastern United States but has recently reached Oregon, where it grows along roadsides and in waste areas (Hawkes et al., 1985). Oregon white oak grew in the Willamette Valley before Euro-American settlement in the 1830s and 1840s as scattered, large trees in a savanna setting, generally on hilltops (Habeck, 1961; Johanessen et al., 1971). Following the control of fire by settlers and the onset of widespread agriculture, Oregon white oak spread onto hillslopes and some flatlands and formed much denser stands. All three of these species are invaders, but on different geographical scales. Wild oat is an invader from Europe. Common ragweed, a native North American species, is an invader from the eastern states. Oregon white oak, although native to the Willamette Valley, is an invader of new habitats in the valley.

Is a species native if it grows in the same locality but under distinctly different ecological conditions? For example, Oregon stonecrop (*Sedum oreganum*) grows naturally on sunny boulders along the Santiam River in the western Cascade Mountains, but is never found under old-growth trees just meters away from its stony refuge. In an important sense, the stonecrop is native to boulders but not native to the forest understory.

Changing environments can lead to confusion about what is and what is not native. For example, the Pacific Northwest has shifted from arctic climates during the Pleistocene glaciation to the temperate climates of today. Many plant species survived in glacial refugia and spread rapidly during the warming, post-glacial climates. Western red cedar (*Thuja plicata*) appears to have migrated from isolated populations just south of the ice boundary through northwestern Washington and eventually to northwestern British Columbia (Hebda and Mathewes, 1984). Are western red cedar and other migrating species really invaders, or are they just late-arriving natives?

Human activity is responsible for even more rapid changes. Tillage and grazing create opportunities for invading weeds to become established. Cheatgrass (*Bromus tectorum*) made its way to the Pacific Northwest by 1900, where it thrived in overgrazed rangelands (Mack, 1981). Native grasses have decreased in many areas because of overgrazing and the invasion of cheatgrass. Few would call cheatgrass a native Pacific Northwest species, yet its recent invasion differs from that of western red cedar only in that it was initiated by human activity.

The differences between native and non-native invaders will become further blurred if the rapid release of carbon dioxide and other greenhouse gases into the atmosphere by human activities changes the global climate. Significant shifts in species distributions are likely to accompany climate changes. This movement of species into new territory will further challenge our understanding of what constitutes a native species.

Many plant and most animal species possess considerable intraspecific genetic variability. Individuals from one part of a species's range are often genetically distinct in some traits from individuals elsewhere in its range. Failure to recognize this can lead to unforeseen consequences. Ponderosa pine (*Pinus ponderosa*) seed from trees growing in eastern Oregon have sometimes been planted in the Willamette Valley. The pines establishing from these genetically-displaced seeds are frequently devastated by a pitch moth

(*Synanthedon sequoiae*). In contrast, trees grown from native Willamette Valley seed stocks are relatively unaffected by the moth. This example shows that even within a species, some genetic strains are native and suitable to a site, while others are not. The practical lesson is that conservation efforts should preserve or restore the type, degree, and geographical distribution of genetic diversity that a healthy natural population would most likely possess (Millar and Libby, 1989).

NATIVE ECOSYSTEMS

A key to preserving native species is preserving suitable native habitat. But native habitat is more than a specific place on the ground; it is a functioning ecosystem. The continued success of many plant species depends on their interaction with other organisms (Perry et al., 1989). Mycorrhizal associations between fungi and plant roots are a particularly beneficial pairing, with the fungus providing enhanced nutrient and water uptake for the plant and the plant providing energy from photosynthesis to the fungus. Pollinating insects promote seed set (while eating nutritious pollen and nectar). Soil microorganisms help recycle dead plant and animal remains into nutrients that can be used by living plants. Other species, though not necessarily beneficial to plants, depend on plants for their survival, e.g., herbivores and plant pathogens. This network of organisms, coupled with their physical and chemical environment, defines the ecosystem. A definition of native ecosystems must consider not only the native species, but also interactions and roles within the ecosystem.

An example from Oregon illustrates the importance to species conservation of recognizing these interactions within ecosystems. The Fender's blue butterfly (*Icaricia icarioides fenderi*) was thought extinct, because it had last been seen in 1936. In the spring of 1989, however, a population was discovered in the Coast Range foothills (Chambers, 1990). The larvae of the Fender's blue butterfly appear to feed only on the leaves and flowering stalks of Kincaid's lupine (*Lupinus sulphureus ssp. kincaidii*), which itself is threatened throughout its range. If so, the Fender's blue butterfly could not survive without this subspecies of lupine. Recent research (T.N. Kaye, in prep.) shows that the lupine flowers do not self-fertilize; pollinating insects are necessary for seed set. Thus, the survival of the lupine population ultimately depends on insect pollinators. Other relationships among species may be important. Butterfly larvae of species closely related to the Fender's blue are tended by ants. Ants extract sugar-rich exudates from the larvae and protect them from predators. This possible protection by ants might be the reason the Fender's blue butterfly has been able to survive for so many decades in small, isolated populations. The Fender's blue butterfly has strong links with organisms in the rest of the ecosystem. A conservation plan that focused only on the butterfly and ignored the lupine, the pollinating insect, and the ant would surely be inadequate. Species conservation requires ecosystem conservation.

NATIVE LANDSCAPES

On serpentine soils in the Siskiyou Mountains, California laurel (*Umbellularia californica*) grows as a shrub on south-facing slopes and other hot, dry sites (Wilson, 1988). Pitcher plant (*Darlingtonia californica*), on the other hand, grows only on wet serpentine seeps. These two habitats are so different that they support different sets of species, even though they might exist in close proximity. These sites differ in plant species composition, in the types of animals they support, and in the nitrogen and oxygen levels in their soils. The collection of these and adjacent ecosystems constitute the landscape.

The variability typical of native landscapes can help them escape disruption. For example, fires and epidemics are often less likely to spread through complex landscapes because organisms of different susceptibility grow intermixed, acting as fire breaks and as "disease breaks." Likewise, the availability of a wide range of species speeds the recovery process after disturbance. For example, nitrogen-fixing trees such as red alder (*Alnus rubra*) can invade burned forest sites from nearby unburned areas within a native landscape. If the landscape does not include alder patches that serve as seed sources, adjacent burned sites would eventually be poorer in nutrients. The very complexity of native landscapes helps make them self-sustaining.

WHAT IS NATIVE?

Any definition of a native species, native ecosystem, or native landscape requires an historical benchmark. Consider the history of the Willamette Valley. In the past 20,000 years, since the latter stages of the Pleistocene, vegetation in the Willamette Valley has changed dramatically with changing climate (Barnosky et al., 1987). Vegetation in a single place has probably varied from boreal parkland, to conifer forest, to oak savanna, to prairie. Each climate phase supported a different flora. As the climate turned cooler and moister in the last few thousand years, the oak savannas and prairie ecosystems were maintained only by the frequent fires set by the native people to stimulate food plants and to help in hunting. Today, after over a century of agricultural use, the prairies and oak savannas are nearly gone. Any of the species, ecosystems, and landscapes present now or during earlier periods can legitimately be called native to the Willamette Valley. But is this a useful approach?

For the Pacific Northwest, the period that ended with Euro-American settlement is a natural historical benchmark. This period lasted long enough to have significant impact on the vegetation of the region. The climates of much earlier times were different enough to limit their usefulness in defining today's ecosystems. On the other hand, the wholesale changes since Euro-American settlement are too convoluted and too dependent on human influence to serve well as an historic benchmark.

Any definition of native must also have geographical limits. It is correct to say that common ragweed is native to North America, because it grew on this continent just before European settlement. But it would be misleading to say it is a native of Oregon, even though common ragweed has now reached the east slopes of the Cascades. Likewise, Sitka spruce (*Picea sitchensis*) is native to Oregon. But because its distribution is limited to the fog belt within a few kilometers of the coast (Franklin and Dyrness, 1973), it would be wrong to call Sitka spruce native to other parts of Oregon. Nor is Oregon stonecrop, limited as it is

to sunny, rocky areas, really native to old-growth forest understories just meters away.

These historical and geographical perspectives suggest a working definition for native species (cf. Lees, 1988; Maser, 1990). In the Pacific Northwest, any species that had occurred in a particular ecological habitat before Euro-American settlement is a species native to that habitat.

A native ecosystem, then, is one dominated by native plants, animals, and microorganisms that occurred together before the time of Euro-American settlement. Key species—for example, the dominant photosynthesizing plants, the top carnivores, the important decomposers, the nitrogen-fixers—must be present for a native ecosystem to persist and function on its own. To artificially maintain a conserved or restored ecosystem without all of its crucial components is both difficult and expensive. The species of a native ecosystem must also occur together in nature. For example, landscaping with an artificial mixture of native species like vine maple (*Acer circinatum*), bluebunch wheatgrass (*Agropyron spicatum*), and Jeffrey pine (*Pinus jeffreyi*) does not produce a native ecosystem. These species are native to different areas within Oregon, but they would not naturally grow together in the same ecosystem. Restoration of native ecosystems must also account for proper structure and appearance. For example, a red fescue (*Festuca rubra*) lawn does not have the structural complexity and species diversity exhibited by native bunchgrass prairies.

Finally, a native landscape is one composed of an array of native ecosystems and their species encompassing the variety seen in nature during the historical benchmark.

Conservation efforts should recognize the geographically variable and highly interactive character of native species, native ecosystems, and native landscapes. Piecemeal protection of just a few genotypes of a rare plant, of just a single species within an ecosystem, or of just a small tract of prairie or old-growth forest entails extensive and costly management. We should instead aim to protect whole systems, both to represent the full grandeur and complexity of our natural heritage and to promote the ability of these systems to sustain themselves.

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TSUGA CANADENSIS
A Tree For All Tastes

by Robert T. Leverett

INTRODUCTION

This is the third in a series of articles on identifying old-growth forest through examination of individual species. The last article covered *Pinus strobus*, the white pine. In this article we turn to another great eastern conifer, the hemlock.

RANGE AND DISTRIBUTION OF THE HEMLOCK

Tsuga canadensis, scientific name for the Eastern hemlock, is the state tree of Pennsylvania and an admired resident of many eastern states. The name tsuga is Japanese and pertains to the native hemlocks of Japan. Canadensis is Latin for Canada. Juxtaposed, these terms name a large eastern conifer with small, flat, greenish-yellow needles and scaly brown, pendant cones.

Tsuga canadensis grows north to Nova Scotia and south to the terminus of the Appalachian chain in northern South Carolina, Georgia, and Alabama. Its longitudinal range is from Nova Scotia to the Great Lakes. In the northern-most part of its domain, the hemlock is a lowland tree, sometimes populating swamp forests. In the warmer latitudes, the hemlock is restricted to the cooler climate of the mountain regions, occupying a niche in moist coves and ravines and sometimes dominating on the north facing slopes. However, the highest elevations of North Carolina and Tennessee are the province of red spruce and frasier fir, the hemlock generally being restricted to elevations under 5000 feet.

Between 40 and 45 degrees north latitude the hemlock is particularly well adapted; there it is often the dominant conifer and can be found as a constituent of several forest classifications. It mixes well with northern hardwoods. Pennsylvania's Allegheny Plateau is said to once have supported 6,000,000 acres of hemlock-beech forest. The adaptable hemlock also mixes with red spruce, forming dense stands that shade out other species. On disturbed sites, hemlock may mix with white pine or form relatively pure stands.

PHYSICAL APPEARANCE AND OLD-GROWTH CHARACTERISTICS

Two distinct species of hemlock are recognized in the East, the Canadian or eastern hemlock and the Carolina hemlock, *Tsuga caroliniana*. Despite its smaller size, the latter boasts larger needles and longer cones. However, variant hemlock forms proliferate. Horticulturists have named over 100 types, with many yet to be named. Their differences are subtle and overlapping.

When young and exposed to ample sunlight, the hemlock develops a bushy, conical shape with upward sweeping limbs. Young trees have bark that is lightly furrowed and brown to grayish-brown in color. As a hemlock matures several physical changes become apparent. With the passage of time, branches are pruned by the elements and the tree loses this symmetrical shape. Older trees develop a conspicuous basal root swell. Bark thickens and cracks into deep ridges that are covered in scales which retain the gray-brown color on top but exhibit a cinnamon-red under-surface. The lower, older limbs grow outward in search of light. Losing their upward sweep, they become nearly horizontal or slightly drooping. The limbs on older trees are noticeably thicker. The deeply furrowed bark and feathery spires of old-growth *tsuga* resemble some of the great Pacific Coast conifers.

TSUGA'S NICHE

The hemlock is a canopy tree in all forest types it inhabits. From a distance, young pointed crowns mixed with older stagheaded ones can often be seen blending with hardwoods. However, in dense, thoroughly shaded stands, hemlock can act as an understory component, being extremely shade tolerant. In fact, the subdued lighting beneath a closed canopy is *tsuga's* preferred environment for development. In old-growth hemlock stands, it is not uncommon to find understory trees over a hundred years in age hardly 4 inches in diameter. I have examined hemlocks that lived their entire lives in the shade of nearby, larger specimens. Those understory trees had reached a diameter of less than 6 inches when they expired 150 years after sprouting. But the slowest growth of which I am acquainted was recently reported to me by Doug Cornett of Marquette, Michigan—130 years in a tree that made only 2 inches in diameter.

Hemlocks can tolerate a variety of soil types, but they thrive in acid soil, which they help to produce. Their needles and twigs, when dropped, turn neutral soil acidic which subsequently discourages the growth of herbaceous plants. As a result, hemlock dominated woodlands are often relatively open, particularly in the northern latitudes. This contributes to the mistaken belief of some that old-growth environments are botanical deserts.

If the hemlock has a preference for shade and acid soil, fire is anathema to the species. Hemlocks are fire sensitive and cannot sprout from burnt stumps. Repeated fires will eliminate hemlock from the forest understory altogether. However, flash fires that merely scorch the forest floor may do little harm to larger trees with thick bark.

REPRODUCTIVE STRATEGY

From pollen grain analysis, the hemlock appears to have recolonized southern New England between 8000 and 9000 years ago, after the recession of the ice sheets. By 5000 years before the present, the hemlock appears to have reached its greatest distribution. Now along with other conifers such as white pine, eastern hemlock appears to be in gradual decline. Unfortunately, human tampering with the environment may drastically alter the timetable. Not only are the distributions of our eastern trees likely to be affected by anthropogenic climate change, but the very survival of many may soon be in doubt.

The hemlock starts to bear seeds between 20 and 40 years of age. A heavy seed crop can be followed by a couple of years of light production. Seeds are tiny and though they are produced in copious quantities, only a few will ever germinate. Of those that do, few seedlings will survive. Yet a sufficient number beat the odds and make the hemlock an important constituent of both young and old-growth forests.

HUMAN USES

Human exploitation of the hemlock is a sad story, but thankfully, as a lumber tree, the

hemlock gets poor marks. Those accustomed to working with wood are familiar with tsuga's stone hard knots. Its wood has always been rejected for such purposes as furniture making. However, the wood holds nails and railroad spikes extremely well and, consequently, has been widely used for crossties. In more recent times, it has found its way into barns and sheds, industrial pallets and crating. We know what it means when an important use for one of nature's creations is discovered.

The 19th and early 20th century tanbark industry decimated large stands of this tree to extract tannin from its bark for tanning leather. In her book on trees, published in 1924, Julia Ellen Rogers noted that, "Peelers go into the woods in May, when the new growth is well started and the bark will peel readily. They fell and strip hemlock trunks and remove the bark in sheets, which are piled to dry and be measured like cordwood, and later shipped to the tanneries. The cross-grained coarse wood is left to rot and feed forest fires." Her thinly veiled criticism could have been multiplied a thousand-fold and still not have been too strong a condemnation of those "wretched dispoilers" in the tanbark industry.

While the hemlock's uses by those of European stock are all too well known, it is hard to obtain information on its significance to aboriginal Americans. We do know that its needles were used to make a tea rich in vitamin C. Some tribes used green hemlock boughs as smudges to drive away the mosquitoes. Hemlock bark was used as an astringent in colonial times, probably first by Indians, who passed the formula to white settlers.

On the lighter side, hemlock is known for its tendency to pop when burned. A rain of sparks on an unlucky soul sitting close to a blazing hemlock flame provides a lesson not quickly forgotten. Of course pioneers knew of this undesirable property of hemlock and did not use it as fuel.

VALUE TO WILDLIFE

Though perhaps not so important as nut bearing trees, hemlock stands are valuable to wildlife. Birds such as black-capped and Carolina chickadees, pine siskin, and crossbills utilize dense stands of hemlock for cover and use the seeds as a food source. Great horned, long-eared, and screech owls along with black-throated green and yellow-rumped warblers nest in hemlocks. Wild turkey and ruffed grouse find cover in young hemlock. Whitetail deer browse hemlocks in winter, particularly during periods of heavy snow cover where deer populations are unnaturally high. Porcupines are notorious for their impact on hemlocks. By stripping bark and chewing branches, they prune trees into shapes that mimic aging and wind damage. Snowshoe hares content themselves by nibbling seedlings.

No less significanct is *tsuga*'s role after death, when it nourishes other life forms indispensable to the health of the forest. Decaying trunks of once proud monarchs provide denning habitat for both small and large mammals and act as nurseries for a variety of plants. Those misguided individuals who would tidy up every forest floor by removing downed and decaying biomass have shut their eyes to nature's methods of supplying food, cover, and nutrients to the many species of animals that can be supported by a mature forest.

DISEASES

This article would not be complete without at least mentioning the diseases that affect the hemlock. The hemlock wooly adelgid is one of two conspicuous threats facing this eastern conifer. The hemlock looper is an insect that is causing considerable damage to hemlocks in the New England region. It appears to be cyclical in nature. The effects of the wooly adelgid are explained in Volume 1, issue Number 2 of *Wild Earth.*

DIMENSIONS OF THE GIANTS

As a big tree aficionado, I am driven to know maximum and mean sizes. Unfortunately, I am unable to rely on conventional tree guides to slake my thirst for the numbers. Popular sources are, at best, skimpy on information and, at worst, misleading, particularly regarding old-growth. *TREES OF NORTH AMERICA, A GUIDE TO FIELD IDENTIFICATION,* puts the height of the hemlock at 60 to 75 feet with the diameter at 2 to 3 feet. No mention is made of considerably taller possibilities. Other sources, such as naturalist and hiking guides describing specific places, sometimes mention old-growth hemlocks, usually citing dimensions of 3 to 4 feet through and 80 to 100 feet in height.

Frustrated long ago with the dearth of data, I took matters into my own hands. Today, weekends often find my now grown children, Rob and Celeste, accompanying me on old-growth treks, searching and measuring. With clinometer, tape measure, plumb bob, compass, and scientific calculator featuring those all important trigonometric functions, we hunt for new champions.

Let me assure all who have stood beneath the drooping limbs of a forest giant and contemplated its feathery crown above, mature hemlocks have little problem exceeding the 100 foot mark. There are recorded heights of 160 feet, but don't expect to encounter such specimens, unless you know where to look. Confirming heights in a closed canopy forest is no mean task. Steep terrain, dense undergrowth, and the obscuring foliage of nearby trees often make precise measurements of a potential champion a challenge that only "tree nuts" accept. What can the big tree hunter hope to find? That depends on what part of the country you live in. As indicative of sizes in the Northeast, let me begin with an area I have "measured to exhaustion," the Berkshires of western Massachusetts. There the largest *tsugas* reach 90 to 120 feet in height and 8 to 12 feet in circumference. The tallest Berkshire *tsuga* I've measured so far is in the Mohawk Trail State Forest. A moist, protected environment has nourished an old-growth specimen now close to 130 feet in height and 11 feet in circumference. The largest overall specimen I have found in the Baystate is on the Mount Tom reservation near Holyoke, MA. At 13.5 feet in circumference, nearly 120 feet in height, and sporting an average crown spread of 46 feet, this leviathan yields 294 points on the big tree formula—enough to make it the state champion. (The "champion tree formula" requires three separate measurements: inches in circumference at 4.5 feet off the ground, height in feet, and 1/4th the average crown spread in feet are all added together to arrive at the total number of points earned by a tree.)

Moving farther south, *tsuga* attains gargantuan proportions. The current national champion grows in West Virginia, stretching the tape to 18.7 feet in circumference and attaining a height of 123 feet. A specimen in the Great Smoky Mountains is even larger in girth, making nearly 20 feet around, but loses out in total points to the West Virginia tree. The state champion hemlock of South Carolina is 141 feet in height and 12 feet in circumference. In the southern Appalachians, I have measured hemlocks to 150 feet in height and nearly 15 feet in circumference. But what of times past? Stories persist about old-growth leviathans of incredible proportions. Dolly Sods, West Virginia, reportedly once grew hemlocks in a deep, peaty soil up to 9 feet in diameter. Humanity's unforgivable trashing of the environment has probably closed the door on our ever again witnessing such sights.

AGES OF OLD-GROWTH SPECIMENS

On average the hemlock is thought by many to be the oldest tree species of the northeastern forests. The northern white cedar may eclipse the hemlock. In either case, *tsuga* is notoriously long lived, though sources differ on the maximum age. Some stands are capable of producing trees 100 to 200 years older than the normal maximum. Many old-growth Berkshire specimens I have personally studied exceed 300 years. A small percentage surpass

400. The oldest tree that I have dated lived to approximately 425 years before it toppled in a storm. The 300-400 year age range seems to me to be typical throughout much of the Appalachians. Last summer, I dated a large, downed hemlock on Apple Orchard Mountain in Virginia to 350 years. Ages of the big hemlocks in Shenandoah's Limberlost are between 350 and 400 years of age.

At least one authoritative source cites the maximum confirmed age of an eastern hemlock as 988 years. A few trees growing in Ricketts Glen, Pennsylvania, have been ring dated to around 900 years. I have not heard any explanations for such remarkable ages. However, other areas of Pennsylvania containing old-growth hemlocks have recorded ages in the 400 to 500 year bracket.

THE HEMLOCK OF THE IMAGINATION

Few eastern trees impact the imagination as does the hemlock. In his book, *THE BEST LOVED TREES OF AMERICA*, Robert Lemmon counts himself as privileged to have been raised in hemlock country. For me, images of ghostly mist enshrouded masts, thrusting upward through luxuriant mantles of rhododendron, persist from childhood memories in the Great Smokies. A stroll among ancient hemlocks may be the closest that we in the East can come to experiencing those incomparable West Coast forests. The hemlock's elixir is most potent when experienced in virgin forest. Attendees of the old-growth excursions I lead never are bashful in expressing their sentiments. Yet it is difficult to state in words precisely why *tsuga* so penetrates the psyche. Perhaps we can turn to the mystics for answers.

Some believe the hemlock has special powers that serve to channel or focus energy. As such, *tsuga* is of particular interest to those gifted with second-sight. My daughter, Celeste, is such an individual. A walk among giant hemlocks in her company can be inspriational as she describes the sensations she experiences in proximity to particular trees. Others corroborate her feelings. In the winter edition of the *Katuah Journal*, Charlotte Homsher describes a power that she believes hemlocks possess. She writes that, "The hemlocks are the sentinels of the woods. They are like the antennae of the Earth. They take the cosmic energy and shoot it into the Earth, thus energizing the whole area around which they grow." Whatever the source of *tsuga's* power, it commands our respect and deserves our every effort to insure its survival.

WHERE TO SEE OLD-GROWTH EASTERN HEMLOCK

Few species indigenous to our eastern woodlands have survived in sufficient old-growth sites to enable one to see outstanding examples without considerable travel. The hemlock is an exception. There are too many locations to list in this article. A small sample is presented to give the reader a taste of *tsuga* extraordinary.

1. Mianus River Gorge hardly 30 miles from New York City has superb old-growth specimens over 12 feet in circumference, 100 feet in height, and 300 years in age.

2. The Adirondacks of upstate New York have numerous spots with ancient hemlocks. New York's other great range, the Catskills, has at least a scattering of old-growth hemlocks. The ancient hemlocks of Kaaterskill Falls are well worth seeing.

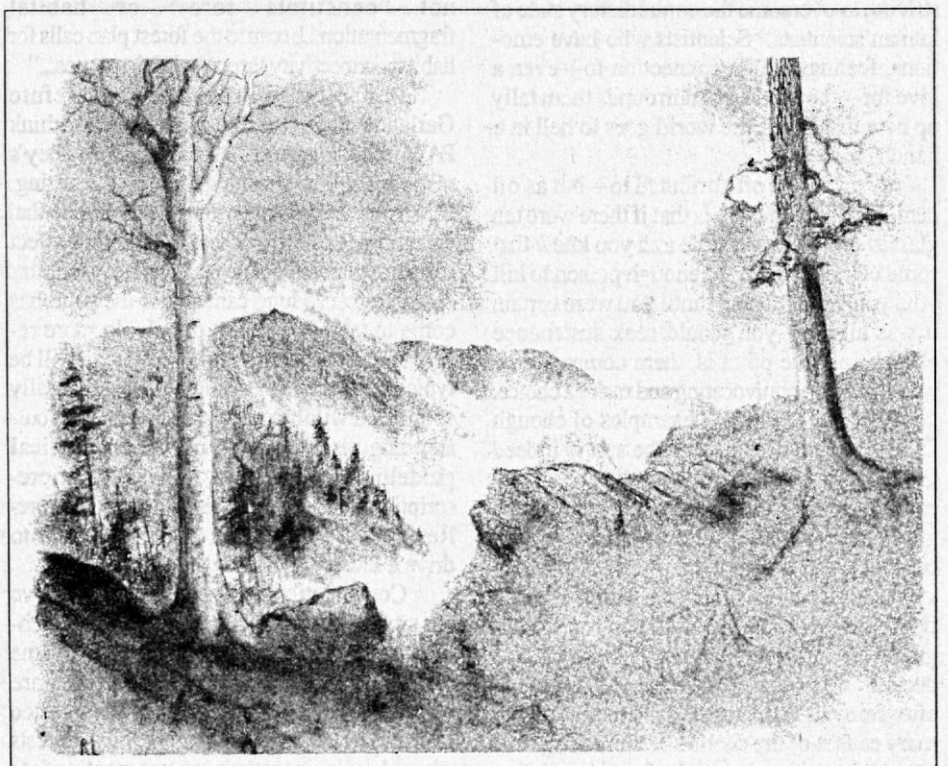
3. Of Pennsylvania's original mixed hemlock forest, only a few thousand acres of old-growth remain. Several groves have large, ancient specimens. In Cook State Park, Tionesta Scenic Area, and Tall Timbers State Natural Area heights to 130 feet are not uncommon.

4. The Southern Appalachians contain many outstanding hemlock groves. The Great Smoky Mountain National Park, Joyce Kilmer-Slickrock Wilderness Area, Moses Cone Memorial Park (just off the Blue Ridge Parkway in North Carolina), and Walker Cove Natural Area in North Carolina's Pisgah National Forest contain specimens 4 to 5 feet in diameter. This summer, I plan to measure the heights of the great trees growing in the Joyce Kilmer Memorial Forest. Among the nearly 30 species to be found along Little Santeetlah Creek are some of the tallest hemlocks I have ever seen. I will report measurements in a future edition of *Wild Earth*.

5. One miracle of our time is the survival of old-growth forest in industrial southern New England. I have mentioned the Berkshire stands, but a few tiny fragments also exist in Connecticut's Litchfield Hills and in the Taconics along the border with New York. Sadly, old-growth trees in the Constitution State are to be found only in tiny, scattered patches. With one exception, there no composite old-growth environments larger than 3 or 4 acres of which I am aware.

CONCLUSION

As people write to me on locations and issues affecting eastern old-growth, I will make the information available to *Wild Earth* readers so all can benefit, unless specifically requested to keep the information confidential. If any of you know of an old-growth hemlock site not currently recognized or protected, I would greatly appreciate hearing from you.



Rob Leverett, Jr.

Toothless Wonders

Government Programs and Neotropical Migratory Songbirds: A Reply to Bonney

by Buck Young

One bright and clear spring day I asked a scientist friend of mine if the sun was shining. "There is a high probability of it," he said, "due to empirical evidence. But I cannot state so assuredly as the sun may have extinguished itself moments ago and what we are experiencing may be but the rays that left shortly before its demise."

It is a hackneyed cliché to call scientists dispassionate equivocators, but in the case of institutionally funded research projects, it is unfortunately often true. Scientists strive to overcome their emotions, passions, world views, and will to advocacy. In this way they remain true to the great tradition of science: clear, impartial, and accurate. Some notable exceptions to this model include Galileo, Da Vinci, Newton, Darwin, Einstein, and Hawkins.

Conservation Biology has recently made its mark on the scientific community by striving to overcome the contradictory state of human scientists: Scientists who have emotions, feelings, and a connection to—even a love for—the world that surrounds them tally up new data while the world goes to hell in a handbasket.

A statement oft attributed to—but as oft denied by—Reed Noss is that if there were ten glasses of water on a table and you knew that some of them contained enough poison to kill you, you wouldn't wait until you were certain it was all ten—you would seek sustenance elsewhere. The point is, there comes a time when you stop equivocating and make a choice.

One of the clearest examples of enough data being in (besides that the sun is indeed shining, and smoking cigarettes "may" indeed cause cancer) is the plight of neotropical migratory songbirds. More research has been conducted on songbird populations than on virtually any other biological guild. Recent figures tell us that 70% of all neotropical migrants are in decline nationally, with 85% in decline in Vermont (my home state). Study after study has concluded that among the primary causes of the decline of these songbirds are nest parasitism by cowbirds, and predation by skunks, raccoons, cats, etc., facilitated by increased edge due to fragmentation by roads, power lines, logging, and development. (See Mark Donham's article last issue for an excellent bibliography.) The time has come to put on sunglasses, quit smoking, and stop all further fragmentation of interior forest habitat.

In his otherwise excellent article last issue, Rick Bonney extols the virtues of the Partners in Flight research program, but questions activists' use of the type of data generated, as in PAW's appeal of the Baker Brook timber sale on the Green Mountain National Forest. He notes that PAW has raised the issue of the negative effects of forest fragmentation and increased edge on songbird populations which would result from the Forest Service's plans to clearcut adjacent to the last known old-growth stand on the Green Mountain National Forest. He quotes Larry Garland, District Fish and Wildlife Coordinator of the Vermont Agency of Natural Resources, refuting PAW's claim of negative effects by stating that the clearcutting would not "constitute forest or habitat fragmentation...because the forest plan calls for habitat connectivity through riparian zones..."

Bonney says that he cannot refute Garland's claim, and that he does not think PAW's challenge will be successful. Bonney's response is disheartening, but not surprising. It is true that we have no more evidence that clearcutting interior forest habitat will affect songbird populations negatively than we do that cigarettes cause lung cancer, but the time has come to take action, not merely do more research. I fear that this sort of response will be typical of Partners in Flight. Most federally sponsored wildlife research projects yield outstanding research, well phrased rhetorical guidelines, and flaccid management prescriptions. There will be just enough More-Research-Is-Needed's in their conclusions to drive a few well loaded skidders through.

Conservation biologist David Wilcove has something to say on this subject, in a publication of the Forest Service itself: "Some people [question] whether such studies are applicable to the management of large forested landscapes, such as eastern National Forests where logging practices are not creating isolated stands of trees surrounded by barren land but rather an interconnected matrix of forest at different stages of succession. However, studies of deleterious edge effects are clearly applicable to the management of large forest ecosystems, because edges are precisely what clearcuts and wildlife openings create." (David S. Wilcove, "Forest Fragmentation as a Wildlife Management Issue in the Eastern US," in *Is Forest Fragmentation a Management Issue in the Northeast?*, published by Northeastern Forest Experiment Station, Forest Service, USDA, Gen Tech report NE-140)

Fortunately, a growing number of ecologists out there are willing to take a stand, as in Reed Noss's refutation of Garland's assertion, above, that the riparian connectors prescribed in the forest plan will negate the detrimental effects of a large clearing and new roads in one of Vermont's last large interior forest tracts. Representatives of the American Union of Ornithologists stated recently at the PAW Neotropical Migratory Songbird Symposium at Swarthmore College that there is near consensus among their members that ALL remaining interior forest tracts should be protected to promote songbird recovery. Many said that even this would not be enough, and that extensive restoration is necessary.

The great philosopher Lou Reed once said "Between thought and expression, there lies a lifetime."[1] We can expect great thoughts to come out of Partners in Flight, but as with federal research councils on acid rain and global warming, lifetimes may pass before those thoughts are expressed in action. Those lifetimes may be the last lifetimes of many neotropical migrants.

Equivocating may keep people's respectability within the field, or among funders and government agencies, but it rarely sits well with history. If we have successors to look back on us, those scientists who took a stand for the life support systems of the planet will sit next to Galileo and Einstein in their minds.

Oh, and by the way, about Baker Brook: PAW won.

Buck Young works for Preserve Appalachian Wilderness, POB 52A, Bondville, VT 05340.

FOOTNOTES

1. Reed, Lou, 1969, "Some Kinda Love," in The Velvet Underground, Polygram, NY.

Neotropical Migrants Dependent on the Northern Forests

Sharp-shinned Hawk
Cooper's Hawk
Broad-winged Hawk
Band-tailed Pigeon
Flammulated Owl
Vaux's Swift
Yellow-bellied Sapsucker
Red-naped Sapsucker
Williamson's Sapsucker
Eastern Wood Pewee
Acadian Flycatcher
Least Flycatcher
Hammond's Flycatcher
Pacific Slope Flycatcher
Great Crested Flycatcher
Golden-crowned Kinglet
Veery
Gray-cheeked Thrush
Swainson's Thrush
Hermit Thrush
Wood Thrush
Solitary Vireo (East only)
Yellow-throated Vireo
Red-eyed Vireo
Black-whiskered Vireo
Northern Parula
Magnolia Warbler
Cape May Warbler
Black-throated Blue Warbler
Yellow-rumped Warbler
Townsend's Warbler
Hermit Warbler
Black-throated Green Warbler
Blackburnian Warbler
Yellow-throated Warbler
Grace's Warbler
Pine Warbler
Bay-breasted Warbler
Blackpoll Warbler
Cerulean Warbler
Black-and-white Warbler
American Redstart
Worm-eating Warbler
Swainson's Warbler
Ovenbird
Louisiana Waterthrush
Kentucky Warbler
Hooded Warbler
Canada Warbler
Red-faced Warbler
Painted Redstart
Olive Warbler
Summer Tanager
Scarlet Tanager
Western Tanager

Compiled by Sam Droege, US Fish and Wildlife; Jeff Hoover, Penn State; Scott Robinson, Illinois Natural History Survey; and Janet Williams, Swarthmore College

Activists may want to read the Forest Service management plans and demand that the above forest species be included in management plans as indicator species. Only by including forest species as indicator species can the Forest Service possibly manage for preservation of diversity.

Science editor's note: Intensive monitoring of each of these bird species individually is probably more than we can expect of any agency or research group. However, *relative* abundances of all bird species in a National Forest or other area can be monitored. Trends in abundances of various functional groups (for example, declines in forest interior species, increases in edge species) can be very informative.

—RFN

REPLY TO BUCK YOUNG FROM RICK BONNEY

Buck is basically right on. However, I'd like to address three of his points.

First, I'm afraid that Buck has oversimplified the neotropical migratory bird situation. As I pointed out in my article, not all data show a decline in neotropical migrants. In New York State, for example, Breeding Bird Survey data suggest that most species are increasing, probably because the total amount of forest cover in the state is increasing. This fact does not mean that we shouldn't preserve huge tracts of contiguous forest. We should, or else forest interior birds in New York will decline in the future. Increases in birds in New York and elsewhere do mean, however, that wilderness activists must be careful about statements such as "recent figures tell us that 70 percent of all neotropical migrants are in decline nationally." Although I'm all for scientists being emotional and compassionate, this statement is easily refutable, and it turns off biologists who are leaning toward activism but haven't yet made the jump. We cannot afford to alienate any of these crucial allies for wilderness preservation.

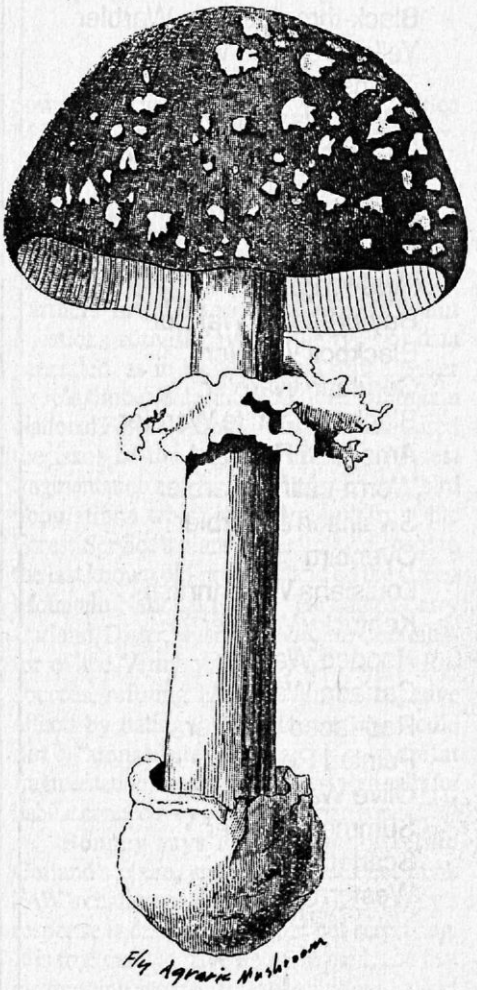
Second, I did not mean to imply that I was questioning activists' use of neotropical migratory bird data. What I said was, I did not expect forest appeals based on potential negative impacts on neotropical migratory birds to be successful. If one has been, I am pleasantly surprised. I am all for activists using whatever data are available in any way possible. I fully agree with Mark Donham that it is the duty of activists to comb the scientific journals and find research data documenting the real impacts of government programs.

Finally, I understand Buck's dubious feelings about Partners in Flight, as government-funded conservation programs often do lead to flaccid management prescriptions and statements that more research is needed. Nevertheless, I refuse to give up hope. For one thing, the Partners in Flight effort includes representation from many conservation organizations, not just government agencies. Also, as I said in my article, the feds are actively soliciting input from these organizations, which just might be a first.

Time will tell, but as the program develops, I hope all wilderness advocates will support it. There's little to lose and lots to gain. The next big meeting, to be held in September, will focus on bringing information about conserving neotropical migrants into the hands of land managers. Stand by for a report.

Fungus And The American Way Of Life

by Christopher Manes



Let me admit my biases. I used to live in a town that holds an annual mushroom festival attended by hundreds of people who come to see giant cabbage-sized puffballs, virulently ruddy fly agarics, delicate inky-caps, and great globular morels that look like the cratered moons of Jupiter. I admire a kingdom of organisms that can defy the neat categories of science through ill-defined genetics and folkloric charm. It seems to me any genus deserves respect that can produce such beguiling prodigies as *Amanita virosa*, the destroying angel, whose pallid, lethal flesh regularly seduces even the most cautious mushroom experts into taking the taste that kills. Fungus remains terra incognita to humans—look into any field guide and every other page will warn, "toxicity unknown." Years ago, when Gary Snyder came to my home in Oregon for dinner carrying a bag of plump, yellow, apricot-scented chanterelles he had picked while hiking, I sautéed them, but politely declined to partake, just in case they turned out to be false chanterelles, a slightly poisonous imposter. Poetry may be truth, but mushrooms have the talent to deceive even a Pulitzer Prize winner.

I can be excused, therefore, if I state that American history began as a spore in a pine forest in Norway. The *Amanita muscaria* mushroom of Scandinavia contains muscarine, a particularly lethal alkaloid. After what must have been years of deadly and dim-witted trial-and-error, Norse warriors discovered *Amanita* taken in just the right amount produced psychotropic effects valuable in their profession: delusions of grandeur, mindless aggression, superhuman strength. The berserker, the medieval equivalent of the Terminator, was born.

Berserkers became a warrior class, a mercenary cult really. Dedicated solely to warfare and contemptuous of regular work, they were an expensive weaponry only the wealthiest chieftains could maintain. But they were worth it. By gnawing on the rim of their shields where they apparently applied their secret narcotic, they were transformed into savage combatants. (Knowing their habits, Grettir the Strong, an Icelandic hero, dealt berserkers a preemptive strike by kicking their shields through their heads as they began to gnaw.)

In their mushroom-induced frenzy, berserkers changed the course of Scandinavian history. They upset the balance of power among petty chieftains by helping their rich patrons overrun neighbors and unify into kingdoms. The Norse were then able to invade England in the ninth century, again with berserkers in the vanguard. These Vikings brought with them two important institutions: a system of laws that applied to everyone (the word "law" is Norse in origin), and a tradition of seasonal assemblies that would come to be known as parliament.

The Anglo-Saxons eventually retook their country (as everyone knows, the Vikings tend to fade in the second half). But Norse ideas persisted and were ferried by the English across the Atlantic, where they were eventually enshrined in our Constitution, the greatest fungus-born document of the age. Curiously, it's kept in a humidity-free case to prevent mildew from forming.

This may be a fanciful account, but only slightly so. Fungi have been making cultural, not to mention evolutionary, history since humans first observed the green ravages of Thallophyta on a human corpse. Ethnobotany is destiny, says Henry Hobhouse in his fascinating book *Seeds of Change*, and fungus is part of the natural history of Americana.

Smut, for instance. Not the pornographic kind, but the type that grows in quintessentially American corn fields. Corn smut has been the bane of Midwest farmers since sodbuster days, costing millions of dollars a year in crop damage and fungicide use. In particularly rainy years these black bulbous growths have been known to destroy a tenth of the harvest. For generations, farmers have sat around kitchen tables fretting about smut "poisoning" their corn.

Recently, however, corn smut was found not only to be edible, but exceptionally tasty, with a smoky flavor approaching that of the renowned truffles from the Périgord forests of France. (Actually, Central Americans have eaten the fungus, which they call "cuitlacoche," since Aztec times.) Suddenly, a trendy market has developed in corn smut. At present prices, a farmer can make over twice as much per acre raising corn for smut as for kernels, though a change in product name is definitely in order: "maize mushrooms" and "Mexican truffles" have been suggested. These humble thallophytes seem to have been the proverbial pearls before swine—almost literally since most corn goes

to feed livestock. But American know-how triumphs belatedly and farmers are learning the truth at last: fungus grows on you.

Fortunately it also grows on a lot of other things, including cockroaches. If you ever wondered why these virtually immortal insects haven't long since overrun the Earth, not to mention our kitchens, the answer in part lies in pathogenic fungi that have been infecting them since the Carboniferous period. One such fungus, *Metarhizium anisopliae*, can penetrate the roach's exoskeleton with its rootlike mycelia, where it proceeds to consume the insect's internal organs. An inventor has created a bait station that inoculates the insects with the deadly spore. Patent 5,057,315.

My favorite fungus is the lowly shelf mushroom, a peculiar kind of toadstool that grows in the old-growth forests of the Pacific Northwest. These mushrooms, *Ganoderma applanatum*, are a variety of woody, stemless, parasitic fungus that attach themselves to the boles and roots of trees, weakening the tissues and encouraging blowdowns. [science ed. note: in turn enriching the complexity of the forest] Some live as long as a decade, grow as big as a man's thigh, and weigh fifteen pounds. They are commonly known as "conks," either because loggers sometimes bump their heads on them or, more likely if more incongruously, because their delicate whorls are reminiscent of the sea conches that wash up on tropical shores.

They are also called "artist's conks" since their pale silken skin instantly turns mahogany brown when scored, a quality much admired by craftspeople from Portland, who etch quaint nature scenes on them and sell them to tourists at $25 a mushroom. Perhaps for this reason, [science ed. note: but also because old-growth forests produce a lot more fungi than the tree farms that replace them] the population of shelf mushrooms seems to be dwindling, and you have to go deeper and deeper into the forest to find a really large specimen. Three hundred million years of organic evolution coming to an end on someone's end table.

Alas, what could be more traditionally American than that?

Christopher Manes is an amateur mycologist who never eats what he picks.

Fungal News

by Brian Carter

In the magazine *Nature* it was recently reported that one of this continent's largest terrestrial organisms was "captured" and "weighed" on Michigan's Upper Peninsula. Its existence was no startling discovery, but until the use of genetic testing, individuals of the species had been hard to identify. Researchers in the science of mycology hope this work will elevate the consideration of fungi in the natural order.

Working in a pine forest, researchers identified the mycelium of *Armillaria bulbosa*, the honey mushroom, an edible species common in the area. Using genetic testing to ascertain the exact identity of each new sample, they sampled the ground throughout the woods. What emerged is an individual that covers 37 acres and, by rough estimate, weighs about 100 tons—in the same category as an adult blue whale. Large enough to cover the Pentagon, the minimum estimated age is 1500 years, based on how long it would take the fungus to spread over that area.

Inspiring as this news is, it may be coming too late to spur a reconsideration of the value of healthy soil organisms. In *Science* magazine (Vol. 254, p.1458) news comes of the devastation of fungi in Europe and the speculation that much of North America is undergoing a similar mass extinction. Fungal ecologist Eef Arnolds of the Agricultural University of the Netherlands has been documenting the disappearance of species after species, using the extensive records kept by collectors and mycologists back to the early part of this century. Surveys carried out in 1912 in the Netherlands show almost twice as many species collected as those made between 1973 and 1982. Also in Holland, records kept of marked plots showed a drop from 37 species to 12 in the past 20 years. Surveys in England had similar results.

The species most endangered are those associated with forests. The symbiotic relationship between tree roots and fungi is being drastically altered, yet it's difficult to determine exactly why. Fungal species seem to drop out before the trees show their decline, but the weakening of the trees may be contributing to the fungal decline. Arnolds contends that overpicking of edible species and forest management are not the main factors, since inedible species and all forest species, regardless of management, are in trouble. A further troubling observation, from Philip Mason of the Institute of Terrestrial Ecology in Scotland, is the premature aging of trees. Fungal relationships change as a tree ages, with a species succession reflecting the tree's maturity. This process is being disrupted and middle age trees are now showing association with fungi that normally accompany old trees. These trees show the infirmities of age—early leaf drop and death.

The most likely reason is air pollution, since a negative correlation is proven between healthy, diverse fungi and smog—nitrogen, sulfur and ozone in the air. In Holland, the main source of trouble appears to be hydrides and oxides of nitrogen coming off farmland where heavy fertilizer applications allow airborne dispersal; the chemicals return to the ground with rain. Thus the contentions that forests may be made more productive with chemically formulated fertilizer are debatable.

Ecologist John Jaenike of the University of Rochester believes it is urgent to begin monitoring US fungal populations. With the help of amateur mycologists he hopes to start such a project. The database and cataloguing of species is far behind that of Europe, but if the rate of decline is as accelerated here as in Europe, results over a short period may be telling. Given the graphic evidence from Michigan that a single fungus can carry a forest on its back, it is only logical to protect the life below our feet as carefully as that around and above.

POSTSCRIPT:

In Washington state, south of Mount Adams, a fungus related to the Michigan one, *Armillaria ostoyae*, covers 1500 acres, say forest pathologists Ken Russell and Terry Shaw in a recent AP article. It's unclear from this article what the function of this fungus is in the ecosystem, but according to the above pathologists, *ostoyae* can be more lethal to trees. Yet it favors stumps—very abundant in the Northwest thanks to the employer of Shaw (the USFS) and big lumber. In fact, Champion International has spent the last 20 years trying to eradicate this particular organism and getting rid of tree stumps (?).

It would appear, then, that whatever role the fungus has had historically (it's 400-1000 years old) the imbalance created by extensive logging may have made it more of a threat to living trees. Perhaps the same is true in Michigan, logged of all white pine by the same folks now finishing off the Northwest forests.

SEQRets of Ecosystem Restoration in New York

by Mike Biltonen and the PAW Journal *Staff*

Unlike Western states with large blocks of land under federal ownership, in New York State the greatest potential for ecosystem restoration is on state lands managed by the New York Department of Environmental Conservation (DEC).

Over one million acres of Adirondack Park are designated as Wilderness, 200,000 acres as "Primitive Areas," and 1,355,000 acres as less well protected "Wild Forest." Catskill Park also contains one of the largest Wilderness Areas in the Northeast. The state lands in these two Parks, protected by the Forever Wild amendment to the New York State Constitution, are keystones to the restoration of New York.

In addition to the two Parks, the DEC manages 472 State Forests, totaling approximately 700,000 acres. Proper regional landscape management of these state lands in conjunction with the two Parks could create a New York Wilderness Recovery Network, helping to connect the Adirondacks and the Catskills with the Allegheny National and State Forests in northern Pennsylvania, as part of a large Wildlands Recovery Network in eastern North America.

NEW YORK'S STATE FORESTS

In the past, New York's 472 State Forests have been managed separately. This year, the implementation of the newly developed State Forest Master Plan will consolidate individual State Forests into Unit Management Areas (UMAs). Each UMA will be managed under a multiple-use Unit Management Plan (UMP).

Finger Lakes Wild recently reviewed two of the draft UMPs, and it appears that the DEC is focusing almost exclusively on resource extraction and recreation. Both plans call for 75% of each UMA to be logged over the next 20 years, though some short-term protection of isolated habitat is offered for state listed flora and fauna, usually unrepresentative species at the edge of their range.

New York State was mostly deforested by the end of the 19th century, and it could happen again. If the unrealistically high levels of resource extraction currently proposed by the DEC become a reality, there may not be another chance to restore New York's forest ecosystems.

THE SEQR PROCESS AND YOU

Federal laws will be of little use in protecting New York State Forests. The Endangered Species Act may be useful in specific cases; but, generally, wildland advocates will need to turn to the state environmental laws of New York to gain protection of the forests. New York wilderness restorationists need to acquaint themselves with the state's environmental statutes. The most comprehensive state environmental legislation, and the vehicle for the protection of New York's forest ecosystems, is the State Environmental Quality Review act (SEQR), or ECL article 8. SEQR's purpose is to "declare a state policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and enhance human and community resources; and to enrich the understanding of ecological systems ..."

Like the National Environmental Policy Act (NEPA), on which it was modeled, SEQR is a procedural law designed to serve as an "action forcing device." SEQR forces the "lead Agency" to choose the most beneficial alternative from a wide range of considered actions, based on sound scientific, economic, and social analysis.

New York's state legislature has designated 5 classes of actions under SEQR: Exempt from Environmental Review, Excluded from Environmental Review, Type II, Type I, and Unlisted. Actions categorized as Exempt, Excluded, or Type II have been pre-determined to "never" have a significant impact on the environment; therefore no environmental review is required. Unlisted actions comprise the largest category of activities that may be, but are not always, subject to further environmental review. Type I actions "may" have a significant impact on the environment, and further environmental review is required. A UMP is generally treated as a Type I action, since a Type I action is a "project or action which involves the physical alteration of 10 acres."

The first step in the SEQR process is to assign a lead agency to the project or action. The lead agency for most actions involving our State Forests is the DEC's Division of Lands and Forests (DLF), though several agencies may be involved in the environmental review. The lead agency must make a Determination of Significance (DS) for the action. Several criteria are used to determine the environmental significance of an action:

Precedence

If an action is the same as or similar to a past action, that will factor into the DLF's Decision of Significance. Generic Environmental Impact Statements (EISs) have been developed for certain types of actions (e.g. road maintenance) and may be applied to particular portions of a UMP. Nonetheless, the DEC must address cumulative impacts in an EIS.

Significant Environmental Criteria

There are 11 Criteria listed in State Law 6NYCRR§617.11 that the Division of Lands and Forests must focus on during the Decision of Significance process. The most important are:

#2. "The removal or destruction of large quantities of vegetation or fauna; ...impacts on significant habitat areas; ...or other significant adverse effects to natural resources." #10. "Change in two or more elements of the environment ...which when considered together result in substantial adverse impact on the environment." #11. "Two or more related actions which when considered cumulatively would meet one or more of the criteria in this section." Unfortunately, the DEC usually interprets these criteria in such a way that the potential impacts of a UMP are never addressed.

The Determination of Significance process consists primarily of the preparation of an Environmental Assessment Form (EAF), of which there are two types: full and short. Either type may be used for an unlisted action, but a full form must always be used for a Type

I action. Although the requirement of a full EAF forces the DLF to more thoroughly assess the potential impacts of a proposed action, it still falls far short of providing the information required by an EIS.

If an action is determined to potentially have a "significant" impact on the environment, then a "Positive Declaration" is made. If not, the proposed project receives a "Negative Declaration," and no further assessment is required. Usually a negative declaration is made because the preliminary environmental review was inadequate.

If a "Positive Declaration" is made, then a Draft Environmental Impact Statement (DEIS) is prepared. The DEIS must present a "reasonable range of alternatives" for the "proposed action" including a "no-action" alternative. It must discuss the potentially significant environmental impacts of each of the alternatives, and mitigation measures to minimize the adverse environmental effects. After a public comment period and an additional information analysis, a Final Environmental Impact Statement (FEIS) is developed.

Getting Involved

New York's State Forests should be allowed to return to a steady-state shifting mosaic forest ecosystem managed for the preservation and restoration of native biodiversity and natural processes. Misleading use of ecological terminology and environmental rhetoric by the DEC is rampant in UMPs and deceives the public owners of these forest lands. Ecosystems are described as something that can be created by land managers, and only "game species" that thrive under human disturbance regimes are described as desirable. The DEC should acknowledge the impacts of UMP implementation on ecosystems. Residents of New York should force DEC to do full EISs for every UMP, and to make these EISs address ecosystem recovery and biodiversity on a landscape scale.

The UMPs to date have received negative declarations. They have not undergone the scrutiny of the EIS process. Fortunately, a negative declaration can be rescinded. However, it is better to have the DEC address all potential ecological impacts of each UMP from the outset. That means wildland advocates need to get involved in the UMP planning process.

Here is where the over-used adage, Think Globally, Act Locally really has its place: It is necessary to become involved with the State Forests in your area. In order to push for the "Positive Declaration," citizens and groups must first establish "standing" in the UMP process. To establish standing, it is necessary to be involved from the beginning of the planning process. This can be done as an individual, as a member of your own citizens group, or as a member of Finger Lakes Wild!. Contact your local DEC office and ask to be sent scoping notices and other planning documents pertaining to your local forests. Submit comments for each UMP proposed.

Beyond Scoping

The DEC has a great incentive to ignore or underestimate the environmental consequences of timber harvesting, since its budget is partially a function of the amount of timber harvested. With this in mind, it is important to remember that while submitting comments on UMPs is important, it is also important to convince your legislators to provide the DEC with a budget that is not even partially based on timber production.

Please write Finger Lakes Wild! (FLW!) and Preserve Appalachian Wilderness (PAW) and tell us which forest(s) you are interested in working on so we can coordinate activities. Keep us informed of your progress. Keep checking here and in the *PAW Journal* for UMPdates.

New York state environmental law is complicated. If possible, secure the help of a legal consultant. A consultant's advice from the beginning of the process could be very helpful in case you need to go to court. Also, read about state laws: ECL Articles, NYCRR, Title 6§617; SEQR Handbook; State Forest Master Plan; and the Environmental Conservation Law Handbook. Have these on hand, and learn them well.

ADDRESSES

FLW!, POB 4542, Ithaca, NY 11852 (607-257-6220)

PAWNET, POB 52A, Bondville, VT 05340 (802-297-1022)

NY DEC Central Office, Division of Lands and Forests, 50 Wolf Road, Albany, NY 12233 (518) 457-2457

NY DEC Regional Headquarters:

Region 1—Stony Brook, Bldg. 40, SUNY, Stony Brook, NY 11790 (Nassau, Suffolk)

Region 2—New York, 4740 21st Street, Hunter's Point Plaza, Long Island, NY 11101 (New York City) (718) 482-4942

Region 3—New Paltz, 21 South Putt Corners Road, New Paltz, NY 12561 (Orange, Rockland, Sullivan, Ulster) (914) 255-5453

Region 4—2176 Guilderland Ave., Schenectady, NY 12306 (518) 382-0680

Region 5—Ray Brook, Route 86, Ray Brook, NY 12977 (Franklin, Clinton, Essex) (518) 891-1370

Region 6—State Office Bldg, 317 Washington Street, Watertown, NY 13601, (315) 785-2513

Region 7—615 Erie Blvd. W., Syracuse, NY 13204 (315) 426-7400

Region 8—6274 E. Avon-Lima Road, Avon, NY 14414 (716) 226-2466

Region 9—600 Delaware Ave., Buffalo, NY 14202 (716) 847-4590

Strategy

Ancient Forest

H.R. 1969 WOULD PROTECT 48 FOREST CLASS SYSTEMS—Old Growth Bill Would Save 7

HR 1969, the Forest Biodiversity and Clearcutting Prohibition Act, would protect biodiversity by banning even-age logging in all federal forests. It has 51 cosponsors, from both parties, coast to coast.

The bill, by Congressman John Bryant, would stop federal agencies from conducting clearcuts, seed tree cuts, shelterwood cuts, group cuts wider than the height of the tallest adjoining tree, and would limit salvage logging drastically. It would require a shift to selection management, the growing of all-age, all-species stands. It provides for enforcement by citizen suits, including recovery of cash penalties.

The Native Forest Protection Act would do all these things and also ban all logging in federal forests that still retain significant native biodiversity, possibly 30 to 35% of federal commercial timberland, an estimated 26 million acres. Additional provisions include retraining and economic assistance for workers and affected communities. We have not yet been able to find a congressperson who will sponsor such a bill.

The Old Growth Forest Reserve bill that the House Interior subcommittee has drafted, HR 4899, would prohibit removal of merchantable timber, including salvage, from late successional forests of the Pacific Northwest. See also S 1536, by Brock Adams (D-WA).

The Money-Losing Timber Sale Bill, HR 2501 by Jim Jontz (D-IN) and S 1334 by Wyche Fowler (D-GA), would phase out Forest Service timber sales that recover less revenue than the costs. It would repeal the Knutson-Vandenberg Act which incites money-losing sales. It would provide retraining assistance for unemployed timber workers and their communities.

If we are able to stop even-age logging on 80 million acres of federal commercial timberland from coast to coast, we will substantially protect all 48 forest ecosystem classes mapped by A. W. Kuchler, 1978, in RARE II, Map B, Ecosystems of the United States. That compares with examples of seven classes we will save if we preserve 11 million acres of old growth in the Pacific Northwest. Kuchler designates the seven main forest ecosystems in the Pacific Northwest old growth as spruce/cedar/hemlock, cedar/hemlock/Douglas-fir, silver fir/Douglas-fir, fir/hemlock, mixed conifer, western spruce/fir and Western ponderosa pine.

The obvious point is that if Congress passes a bill equivalent to both the Ancient Forest Protection Act, introduced last year as HR 902 by Jim Jontz, and the Biodiversity and Clearcutting Prohibition Act, it would save large examples of all the major forest ecosystems, rather than focusing entirely upon the Pacific Northwest. This same reasoning applies to the proposed Native Forest Protection Act. It would protect examples of virtually all forest classes. Most members of the Forest Reform Network support all three acts.

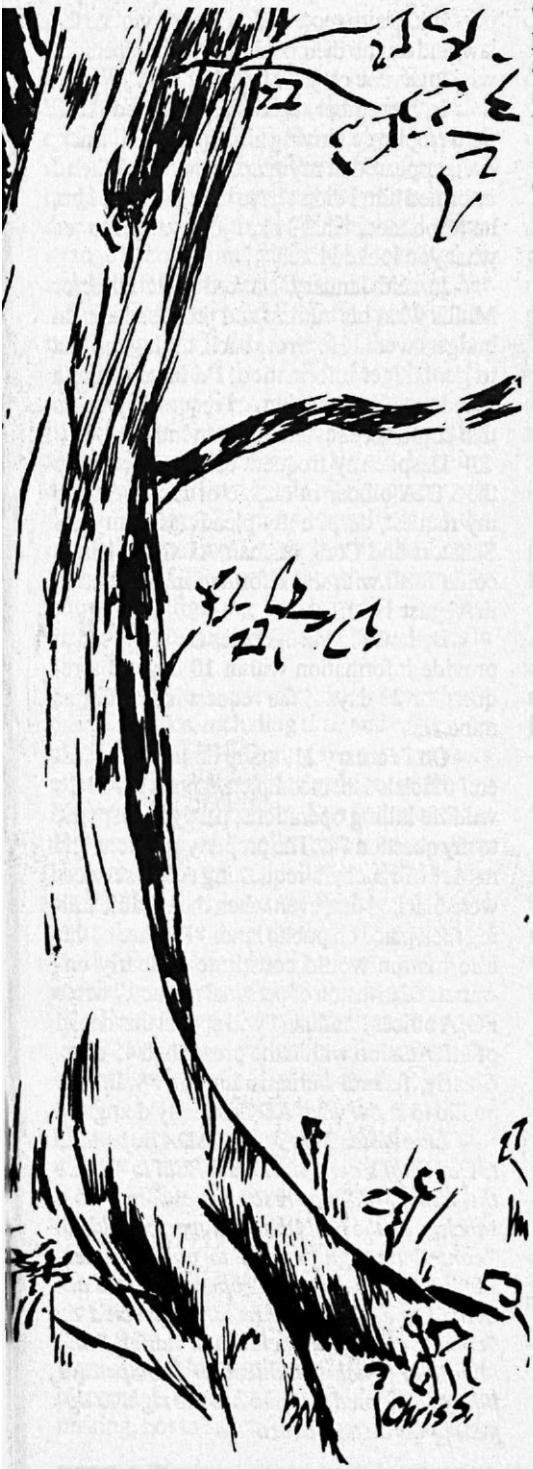
Most Kuchler classes contain multiple examples of plant associations or ecosystems. The ratio of forest plant associations protected by the bills would probably approximate the ratio of Kuchler classes protected, according to a Forest Service official who prefers to remain unidentified. His conclusion is: "While the ancient forest bill would protect certain important ecosystems by placing them off limits to cutting, HR 1969 goes beyond that to offer protection to those ecosystems in which we continue to harvest trees."

If the 7 million acres of spotted owl habitat recently designated by US Fish and Wildlife Service is preserved by Congress from any logging, HR 1969 may become essential to protect the four million or more acres of forest between the fragments of owl habitat so that the fragmented populations in between will have adequate forest cover to interbreed and thereby to retain genetic diversity essential to survival

—Edward Fritz, Forest Reform Network, 5934 Royal Lane, Suite 223, Dallas, TX 75230

Legislation Dialogue

Science Editor's Response



Ned Fritz has long advocated the position that the real evil of federal timber programs is even-age management. If we were to replace even-age management (clearcutting and plantation silviculture) with uneven-age management (selection forestry), Fritz and his supporters claim, we could protect native biodiversity on federal forestlands. Surprisingly, Fritz thinks we could make the shift from even-age to uneven-age forestry on federal lands without any decline in timber production. As Fritz wrote recently in his newsletter, "selection would provide more jobs than even-age, would provide at least as much wood for the nation's demands, and would set an example for additional private timber interests to save native biodversity in their logging."

I reject Fritz's optimistic appraisal of selection forestry, particularly if tied to a scenario of non-declining yield of federal timber. Although I agree that even-age forestry is *nowhere* an adequate emulation of a natural disturbance-recovery regime, and therefore can be expected to be harmful to native biodiversity, selection forestry is not necessarily any better. Indeed, if the Forest Service were to take the same amount of wood from National Forests using selection forestry as they do now with clearcutting, which Fritz thinks they could, possibly even more ecological damage would be done.

Intensive selection forestry would require an extensive road network for access and frequent entry into stands. Although Fritz (personal communication) claims that selection requires no greater road network than even-age management, neither he nor anyone else has verified this counter-intuitive claim. Even if he is right on this point, intensively managed forests require high road densities, for example, about 5 miles of road per square mile in the Pacific Northwest (E. A. Norse, 1990; *Ancient Forests of the Pacific Northwest).* Open road densities above 0.5 miles or so per square mile are known to be harmful to large carnivores and other sensitive wildlife, and have many other deleterious effects. We should be closing roads on federal lands, not leaving them open or building more for uneven-age management.

Also, intensive selection forestry, if based on "natural selection" principles that retain only vigorously growing trees, would deplete a stand of the broken and diseased trees which are most valuable to wildlife. This would be just as destructive as the opposite process of "high-grading" (removing the best trees). Thus, a selectively harvested forest is a green illusion; it may look natural and healthy, but it is missing many critical components.

So, what is the solution to the even-age versus uneven-age quandary? It is simply to cut much less wood, which in turn means reducing drastically our use of wood products. Most National Forests and other federal forestlands are already severely overcut; cutting more timber on these lands *by any method* is insane, the only reasonable exceptions being thinning of dense and simplified plantations and fire-suppressed natural stands when necessary for restoration. Forest landscapes not yet overcut might possibly be managed sustainably with light selection forestry, using horses or other non-mechanical means to remove timber, building no new roads, and entering stands infrequently. However, even such gentle approaches to forestry are only experiments; we would need to watch them for several centuries before concluding that they are truly sustainable in the sense of maintaining all ecosystem components.

No forest bill before Congress comes close to an ecological approach to forest protection and restoration nationwide (Tim Hermach's Native Forest Protection Act, not yet introduced to Congress, comes closest). If HR 1969, the anti-clearcutting bill that Fritz endorses, was truly a step in the right direction, we should support it. But as written, HR 1969 is ecologically naive, allows continued non-sustainable timber production on federal lands, and fails to address the roads issue. Under such conditions, a substitution of uneven-age management for even-age management creates only an illusion that something positive is being done for federal forestlands.

—Reed Noss

ed. note: Tim Hermach plans soon to do what conservationists should have done decades ago: draft legislation that would ban commodity extraction on all public lands. See Native Forest Council's article in this issue, and write NFC for more information. —JD

A Fight to Know ADC's Dark Secrets

by Pat Wolff

The Freedom of Information Act (FOIA) was passed 25 years ago to protect the American public's right to know what its government is up to. The act's aim is to promote openness in government and to make federal bureaucracies more accountable to the public.

It sounds good in theory, but in actual practice, the law is frequently undermined and violated by bureaucrats who would rather operate their agencies without public scrutiny. So I discovered when I filed a request for information under the Freedom of Information Act on 14 August 1991 with the US Department of Agriculture's Animal Damage Control (ADC) program.

In New Mexico, ADC poisons, traps and shoots thousands of animals every year on public and private land, allegedly to protect livestock. To me, ADC was just another ranching industry welfare program, a self-perpetuating government bureaucracy that wastes wildlife and tax dollars. I decided ADC needed a good dose of public exposure.

Under FOIA, any citizen can request and receive documents from any federal agency, provided the requested information is not exempted from disclosure under one of the government's nine exemption categories. Too frequently, however, the government labels documents "exempt" just to cover up bureaucratic bungling and avoid political embarrassment.

I studied the categories and made an effort to ask for information that I felt should not be exempted. My request was comprehensive— necessarily so, because of ADC's history of withholding information from the public. In summary, I sought:

1. Documents that revealed the education and training level of field personnel.

2. FAA numbers of all fixed-wing aircraft used in aerial gunning of coyotes.

3. Copies of written agreements with cooperating federal and state agencies.

4. Documentation of each request for service, including address and ownership of property, nature of request and action ADC took in each case during 1990.

5. Policy criteria that justify lethal control activities.

6. Documentation for how many of the reported livestock losses were confirmed on site by ADC, number of losses determined not due to depredation, who determines value of livestock lost and under what criteria.

7. Lists of animals killed since 1980 that are state or federally listed as threatened or endangered.

8. Information related to the inadvertent killing of domestic dogs and cats by ADC.

Receipt of my FOIA request was acknowledged in an August 15 letter from State ADC Director Curt Mullis and in an August 16 letter from Cheryl Landini, FOIA officer for the US Department of Agriculture.

Landini also sent a fact sheet on FOIA fees, indicating that I could be charged $20 an hour to have a professional search done for the documents and 20 cents per page for copies. Apparently, federal officials hope they can discourage citizen inspections by threatening to charge hundreds of dollars for the public documents they seek.

On September 6, I fired off a letter to Landini challenging the fees. On October 6, Landini responded that "additional information is needed before we can make a fee waiver determination...fee waivers are decided on a case-by-case basis and full justifications are needed for each request." I was required to answer five lengthy essay questions.

Finally on November 1, my request for a fee waiver was granted and a few days later, one of my questions was answered: I was given the FAA aircraft numbers. In the same letter, ADC claimed it had no records on how many threatened and endangered species it had killed, and no records of any communications with owners of killed pets.

Then I received a phone call from State Director Mullis, saying the primary information I wanted would be "blacked out" on the documents they were going to send me. He said the ownership and location of property on which ADC wildlife killing takes place is secret and would not be disclosed. He also said that his agency would no longer publish an annual report because he had discovered that annual reports were "illegal!" (He was quoted in the Nov. 10 *Albuquerque Journal* as saying that he wouldn't publish any more annual reports because the public had "misused" them.)

Anyone hoping to get public information out of ADC or other intractable federal agencies should be warned: The feds will do everything they can to intimidate, discourage, exhaust and defeat you. They will threaten you with fees, drown you with red tape and paperwork, claim records don't exist, violate the law, and thumb their noses at Congresspersons who intervene on your behalf.

In December, a Las Vegas-based ADC field employee, driving an official ADC truck, even appeared at my place of work. When I informed him I didn't have time to talk to him, he responded, "that's ok, I just wanted to see what you looked like."

In mid-January, I asked State Director Mullis what his current and proposed annual budgets were. He wrote back, telling me that to get budget information, I'd have to file a Freedom of Information Act request, a process that could take several more months.

Despite my frequent calls and letters to the FOIA officer in charge of responding to my request, despite my pleadings to my US Senators and Congressman, ADC still hasn't come forth with the information I requested in August 1991.

By law, federal agencies are supposed to provide information within 10 days of a request, or 20 days if the request is lengthy, as mine was.

On February 21, many months late, federal officials sent incomplete reports of ADC's wildlife killing operations, partly in response to my question #4. The property locations and names of ranchers requesting ADC services were blacked out, even when the wildlife killing took place on public land. "Release of this information would constitute a clearly unwarranted invasion of personal privacy," wrote FOIA officer Landini. I will appeal this denial of information within the prescribed 45 days. Clearly, federal bureaucrats don't want the public to know what ADC is really doing.

Late Note: *May 5, the USDA responded to Pat Wolff's appeal with a refusal to release the names of "the resource owners" and ranches, on the basis that the names would not "contribute significantly to public understanding" of the agency's operations and activities and, furthermore, are protected as "commercial or financial information," the release of which could lead to "competitive injury." It noted that she has the right to appeal in US district court.*

Strategy

Toward Realistic Appeals and Lawsuits

by Lance Olsen

When a Ranger District of a National Forest issues notice of another timber sale, environmentalists often file an appeal. When such an appeal is filed in the name of a wide-ranging species such as the grizzly bear, it may do more harm than good. This will seem strange to environmentalists who take it as an article of faith that appeals are important, but a key factor for grizzlies and other wide-ranging species is the content of the appeals.

The reason is this: *no* single timber sale, all by itself, can jeopardize the continued existence of an otherwise viable grizzly population. Appeals filed on a single logging operation — or on a single oil rig, or any one federal action — are as unrealistic as the similarly piecemeal planning by the Forest Service itself. Piecemeal appeal— commonly known as "fighting brushfires"— against piecemeal destruction tends to bring losses in its wake.

Moreover, conservationists often exhaust their resources, including time and energy, on piecemeal appeals. During the past ten years of observing habitat destruction in Rocky Mountain grizzly habitat, I've had numerous conversations with colleagues who say they just can't keep up with all the federal action planned in grizzly country. We have all had to let timber sales drop through the proverbial cracks for this reason. The bears and other species have lost each time this happened.

Further loss occurs each time an appeal leads to negotiated mitigation of a timber sale. Mitigation, by definition, softens the blow but does not stop it. Enough of these softened blows across an ecosystem adds up to a significant cumulative effect, such that a bear faces a little risk everywhere it must travel.

CHANGING COURSE

Filing and pursuing single appeals allows the Forest Service and other agencies to continue their piecemeal destruction of ecosystems. Appeals should seek to reverse this piecemeal, environmentally blind decision-making, not to sanctify it. Appeals should go to the root of the larger problem.

Forest Service and related agencies typically ignore the rest of an ecosystem when they plan some single action such as one road to one oil-drilling operation, or one more timber sale. Agencies treat each such action as if it were the only development in an otherwise pristine environment.

When a federal agency proposes any single action in isolation, appeals should target that action's contribution to the total, cumulative effect of all the past, present, and proposed actions in the same ecosystem. That is, each appeal should list and discuss every other action taken or likely to be taken in the same ecosystem. This means that environmentalists need good inventories of the ecosystems they intend to defend. Simple, inexpensive inventories are best. A wall map with color-coded pins can identify dams, logging roads, ski resorts, and other problems that federal agencies are required to account for in analysis of ecosystem-wide cumulative effect. A similar map can be devised to submit with each appeal, to get important facts into the record for possible lawsuit. This can help a judge — or even an environmental attorney — grasp what is actually at stake.

A BETTER UNIT OF ANALYSIS

What is actually at stake for wide-ranging species is the integrity of the ecosystems that support them, not merely one site in that ecosystem. A key word is "threshold," and a common sense understanding that a judge or lawyer will easily grasp is expressed in the old parable of the straw that breaks the camel's back.

Another key word is "process." Agencies have devised a process of decision-making that chips ecosystems to pieces, little by little. Environmentalists need to prepare appeals that go straight to the heart of the systematic process that agencies employ in order to circumvent their responsibilities to ecosystems. Environmental appeals should confront process because faulty process sets up ecosystems for faulty outcomes.

Ecosystems have little to gain and much to lose if environmentalists persist in piecemeal appeals to piecemeal destruction. If an appeal is pursued all the way to court, and agency lawyers argue that no single action — e.g. a timber sale — can jeopardize a population of grizzly bears, wolves or whatever, most judges will see the truth in that claim. It is better to lay a broader and more realistic foundation from the very start of an appeal, so a judge will more readily understand that the case at hand is not trivial.

This approach to appeals is especially critical for wide-ranging species. For example, a grizzly bear in the Northern Continental Divide Ecosystem of Montana and southern Canada may encounter acreage flooded by Swift and Hungry Horse Reservoirs, clearcuts adjacent to Hungry Horse Reservoir, train traffic along the south border of Glacier National Park, open roads and clearcuts in the Skyland area near the Bob Marshall Wilderness, more roads and clearcuts on the "Noisy Face" of the Flathead Mountains, expanded tourism inside Glacier Park, reduced trout (food) supplies in the streams affected by logging, and other problems within its home range.

There is a limit to how much these bears can take and still succeed in feeding, breeding, and sheltering; yet agencies and environmentalists have not attempted to account for such cumulative effects across entire ecosystems. This is not intended as criticism of appeals that enviros have filed so far; it is intended as a suggestion that we — all of us — have unwittingly let the agencies' own errant process act as a ring in our noses. The remedy is to begin filing appeals and lawsuits that reflect biotic realities.

Lance Olsen is president of the Great Bear Foundation, established in 1982 for conservation of the world's wild bears. Olsen believes that the grassroots groups are ahead of the nationals in recognizing and responding to systemic problems in the Forest Service appeals process. GBF recently made a small grant to a grassroots botanist concerned with ecosystem-wide, cumulative effect on grizzly bears.

Civilian Conservation Corps

A Proposal for the 1990s

by Jamie Sayen

"One of the penalties of an ecological education is that one lives alone in a world of wounds."

-Aldo Leopold, "Round River"

An updated version of the Civilian Conservation Corps could provide an antidote to Leopold's poignant observation. The creation of a CCC that provides training in ecologically appropriate activities will be an essential tool in the ecological restoration of America.

By engaging large numbers of young people in ecological restoration, several goals could be simultaneously achieved: Job retraining and creation of new jobs reduce unemployment; environmental clean-up and healing work is performed; and participants begin the life-long process of healing the psychic wounds caused by our culture's alienation from Earth's natural rhythms and processes.

The CCC should train and employ people locally. Residents of rural areas with few employment opportunities do not want to see urban and suburban dwellers bused into their region, while they remain unemployed. Also, rural areas, while not as densely populated with humans as are cities, often are already overpopulated in terms of biological "carrying capacity."

CCC jobs should not be "make-work." Nor should they be permanent. CCC should produce "graduates" after perhaps 18-24 months, trained in ecologically sustainable occupations.

The CCC should be fun. Youth who have grown up in a nature-estranged culture are ecologically ignorant through no fault of their own. Re-connecting them with their roots should be challenging and creative.

The CCC should be an arm of the ecological restoration movement. The training should include useful work. The restoration work should be viewed as a valued by-product of the training, as well as an end in itself. Many graduates of the CCC could become full-time restorationists.

Here are a few examples of ecological restoration work that the CCC could do:

-Remove junk from forests, lakes, and rivers, and recycle it.

-Help soils through erosion control, toxic clean-up, and reversing soil compaction and nutrient loss.

-Close roads and remove dams.

-Retro-fit homes and buildings to improve energy efficiency.

-Grow food organically.

-Remove or kill exotic species.

-Inventory biological diversity.

This last, an inventory process, is especially crucial, and should be integrated into every project. It is key to engaging the CCCers' interest and helping them understand how native ecosystems operate. And it would provide valuable information for ongoing restoration and preservation projects.

EXAMPLE: *Suppose the task is to remove a car dumped into the Connecticut River years ago.*

The CCC crew would begin with a study of river dynamics. The Crew Leader would ask questions such as: Why does a river meander? How do natural and anthropogenic erosion differ? What species are found on the banks of the river? In the river?

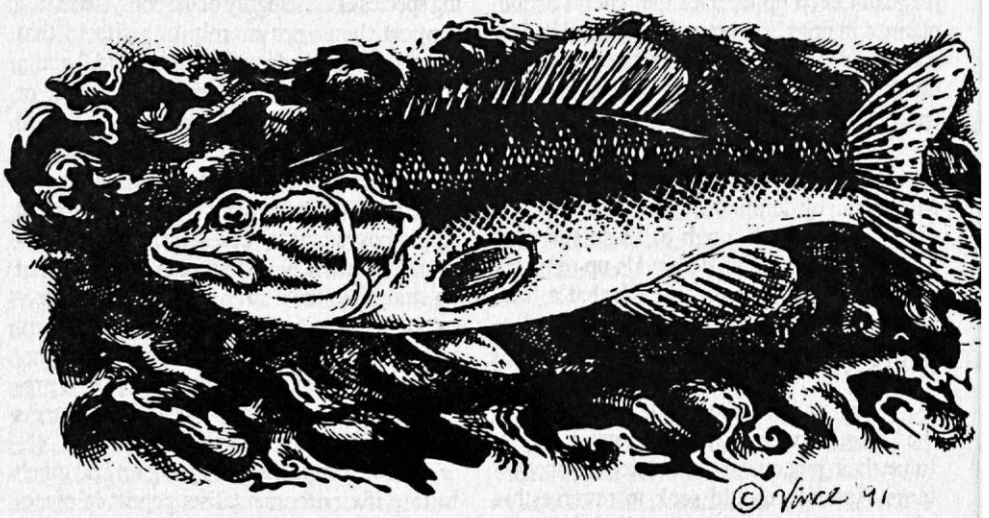
Once this study and inventory has been accomplished, the work team can decide the most ecologically benign way of removing the vehicle. Mechanized options would not be available. Perhaps the solution would be to employ, in a humane fashion, a team of work horses to winch out the vehicle. Once removed, the vehicle would be recycled.

Most critical is not job training, but the restoration of a lost ethic, a bond of love and respect between the individual and the land. CCCers who recover this ethic will find ways of providing for the necessities of life in an ecologically respectful way.

Leopold concludes his landmark essay "Round River" with the following observation:

"What conservation education must build is an ethical underpinning for land economics and a universal curiosity to understand the land mechanism. Conservation may then follow."

Jamie Sayen, POB 52, Groveton, NH 03582, is a founder of Preserve Appalachian Wilderness.



Strategy

Civil Obedience

by Naomi Rachel

"Sorry" said the store manager at R.E.I. "I can't allow you to post that flier." When I asked him why, he replied that they couldn't (no matter their personal feelings or beliefs) promote anything about civil disobedience. "Of course not," I agreed, "but please check this out closer. At the First Annual Colorado Ancient Forest Gathering, we will host workshops on Civil Obedience." The manager apologized profusely. "It is funny how I read what I expected to read and not what I actually read."

Is this just a sneaky way to get a flier posted? Is there any difference between "civil disobedience" and "civil obedience"? Now that we are almost two years into the decade that was to be the turn around decade, I think we need to make a distinction. Forest activists getting arrested around the country and in Canada are not, in actuality, being disobedient. They are being, by any definition of the word, honorably obedient. Even our weak environmental laws are broken daily by the Forest Service. In 1976 Congress mandated the Forest Service to manage for biodiversity. Obviously, with less than five percent of our original forests left, such management has not occurred. The well documented case of the Forest Service Regional Forester John Mumma is a classic example of broken laws. He refused to increase logging rates in Montana and Idaho National Forests because to do so he would have to break environmental laws. Logging at the rate prescribed would further endanger the Grizzly Bear and thus be at odds with the Endangered Species Act. Mumma lost his job because he refused to break the law. And if forest activists block roads and put their bodies in the path of the destruction of these disputed forests in Montana—destruction that is based on breaking the law—they too are being obedient to the law and to the land.

Paul Watson of The Sea Shepherd Conservation Society does not believe that he is practicing civil disobedience when his ship rams and sinks a private vessel. He considers the *Sea Shepherd* a law enforcement vessel. The laws from the International Whaling Commission are not otherwise enforced. Paul Watson is one of the few non-compromising activists without a criminal record. Even when he has demanded to be charged, governments have refused. They know he has a solid case and will publicize their disobedience. Public land activists tend to think that Paul "gets away" with his actions because they occur on the high seas, but I think we need to take the same pro-active, unapologetic offensive approach in the forests.

Malcolm X said "Power recognizes only power, and all who recognize this have made gains." Wherein lies the power of the environmental movement? I believe our power is twofold. First it is to enforce survival laws for all species, and second, it is to use our bodies as tools of enforcement. In his very complete examination of civil disobedience, *The Politics of Nonviolent Action*, Gene Sharp writes, "Power derives from sources in the society which may be restricted or severed by withdrawal of cooperation by the populace." Ideally, if a logging road were being built, the workers themselves would withdraw their cooperation in the form of their labor and services. Until that day, it is the responsibility and the power of activists to withdraw their cooperation by blocking the road, interfering with the operation, and thereby, in the true sense of the word, being fully obedient to the laws requiring preservation of biodiversity.

I feel strongly that, both for moral reasons and to broaden the movement, it is necessary to be powerfully non-violent in these actions. As Thoreau wrote, "Let your life be a counter friction to stop the machine." The friction must be created by a non-violent power. Your opponents may have the sanction for violence, but using non-violence against them is like the techniques of jiu-jitsu. By throwing your opponent off balance politically, their violence can rebound on them. Paul Watson said, "Killing to protect life is the type of mentality which has infected our political institutions for thousands of years." Recently in Colorado, forest activists, arrested at a peaceful occupation of Forest Service offices, appeared in court in shackles and chains. The community had, up to then, declined to be involved in the issue of logging ancient forests, but after the display in court, citizens were angered and have since become supportive and active.

These same activists are being charged with interfering with the forest officers "in their official duties in the protection, improvement and administration of the national forest system." Here is a golden opportunity to be pro-active, to change the defensive stance of civil disobedience to an offensive stance of civil obedience. If the arrestees can put the Forest Service on trial for not protecting the National Forests, then the arrestees' interference would be seen as upholding the law. The reverse trial is an effective non-violent strategy. It is similar, again, to Sea Shepherd's tactics. When the two whaling ships were sunk in Iceland, Sea Shepherd claimed credit and Paul Watson demanded to be charged with the deed. When the Icelandic government refused, Paul flew to Iceland and was soon deported. The only legal action is a suit by Paul against the government for illegally deporting him. He was, in a powerful manner, being civilly obedient. Paul had simply been enforcing the laws of the International Whaling Commission. As Thoreau wrote, "A minority is powerless while it conforms to the majority; it is not even a minority then, but it is irresistible when it clogs by its whole weight."

In defending one law (for example, the mandate for biodiversity in the National Forests) one sometimes must break another law (interfering with a forest officer). Martin Luther King addressed this in his famous "Letter From Birmingham City Jail." "One may well ask, 'how can you advocate breaking some laws and obeying others?' The answer is found in the fact that there are two types of laws: There are just and there are unjust laws. I would agree with Saint Augustine that 'An unjust law is no law at all.'" The strength of civil obedience, in part, lies in actions taken within full public scrutiny. If one is arrested for a covert action, no matter how morally and environmentally inspired, it is difficult to convince others that one was acting to enforce the just law.

Recently, *The New York Times, The Atlantic Monthly*, and *Newsweek* have all published excellent articles stating that it is unnecessary and economically unsound to log any of the ancient forests on National Forest lands. With this mainstream media support, we can become law enforcers. There are enough laws on the books already to protect our ancient forests. Now we need enough bodies to publicize and defend those laws. Practicing pro-active civil obedience may be one of the most effective ways for environmental activists to ensure that the turn around decade does not become the terminal decade.

Naomi Rachel works with Ancient Forest Rescue (Box 1309, Lyon, CO 80540). AFR is leading the effort to save the San Juan NF's remaining old growth.

The Siskiyou Projects

Siskiyou Regional Education Project

POB 220, CAVE JUNCTION, OR 97523

Siskiyou Action Project

POB 1310, CAVE JUNCTION, OR 97523

PHONE:(503) 592-4459; FAX:(503) 592-2653

Siskiyou Regional Education Project (SREP) was founded in 1983 to educate the public about the environmental issues of the Siskiyou Mountain Bioregion. The long-range vision of the Project is the preservation of the remaining wild areas of the Siskiyou region and maintenance of its biodiversity. We work toward a human community that lives in this place in a way that encourages local economic diversity and self-sufficiency, and that uses the forests and rivers in a sustainable, knowledgeable and respectful way. Using the national tour of Lou Gold and his Ancient Forest slide show, we have built a national constituency for this region. We inform a network of 16,000 people about the status of national legislation and agency decisions through two newsletters per year. SREP also supports a Conservation Program to monitor and respond to agency decisions. SREP is unusual in that it is specifically based in a geographic ecosystem, but has developed a national constituency for that place.

Siskiyou Action Project (SAP) was formed in 1989 to allow us to undertake lobbying efforts. Because of the central role of the US Forest Service and Bureau of Land Management in our bioregion, lobbying the United States Congress is essential. Our lobbying consists mainly of encouraging grassroots letter writing.

The Siskiyou National Forest of southern Oregon has over 314,000 acres of "de facto" wilderness: large unprotected roadless areas. The "Greater Kalmiopsis," a combination of designated Wilderness and the imperiled North and South Kalmiopsis Roadless Areas, constitutes one of the largest and most diverse low to mid-elevation virgin forests in the Pacific Northwest.

The Siskiyous, as part of the California Floristic Province and Klamath region, will be identified as an area of global botanical significance in an upcoming publication by IUCN, the World Conservation Union. Only seven sites are so designated in North America.

Yet the Siskiyou National Forest Land Management plan, adopted in 1989, calls for war on the remaining Siskiyou Roadless Areas. These are the refugia of diversity as well as critical freshwater habitat for dramatically declining wild salmon and steelhead runs. If the Forest Service is allowed to implement the Forest Plan, only 13,700 out of the 314,000 acres of roadless areas will remain at the end of the planning period (15 years). The Forest Service's failed showcase of "new perspectives" and citizen involvement, Shasta Costa (North Kalmiopsis Roadless Area), and the diverse landscape of Canyon (South Kalmiopsis Roadless Area) are the first scheduled for the chopping block.

The Final Environmental Impact Statement on Canyon will be released on 31 July 1992 but the Forest Service is laying out logging units and surveying roads now. SREP is building a Canyon legal defense fund in anticipation of a potentially unfavorable environmental decision in late August.

The Siskiyou National Forest received over 700 comments from across the country on the Canyon draft—more than any other timber sale of its size in Oregon and Washington. Close to 70% of those comments were in favor of the no-action alternative (no logging, no road-building). Canyon has captured the hearts and minds of advocates of wild places. It epitomizes the FS's timber biased management, with logging to take place on the only 8% of the 21,000 acre planning area that is classed as suitable for timber production.

Five National Wild and Scenic Rivers flow through the Siskiyou wildlands, with many additional streams currently being inventoried for possible Wild and Scenic designation. The complex stream systems of the Siskiyous were described in 1987 FS documents as some of the most valuable salmon and steelhead habitat in the U.S. and as ranking highest in the production of wild (non-hatchery) salmonids in Oregon and Washington.

The American Fisheries Society has identified many of those wild salmon and steelhead runs as being at moderate to high risk of extinction. The National Wild and Scenic Illinois River is a prime example of mismanaged fresh water fish habitat. Over 80% of the Illinois basin is publicly owned (Forest Service 71%, BLM 10%). In 1974 the Forest Service estimated the total annual value of Illinois basin salmon and steelhead to sport and commercial fishermen at $2,273,730. Eighteen years later, the Illinois River's wild populations of coho, fall chinook, winter steelhead and cutthroat trout are all severely depressed and its fishery is no longer capable of supporting harvest.

In April of this year American Rivers named the Illinois River to their list of the 15 most threatened rivers in North America and in May eight local and national environmental organizations and one national sport fishing organization joined the Oregon Natural Resources Council and the Siskiyou Regional Education Project in filing a petition with the National Marine Fisheries Service to list the unique Illinois River winter steelhead as federally Threatened or Endangered. Meanwhile, the Siskiyou National Forest is planning major timber sales into roadless tributaries of the Illinois in the next four years.

The core organization of the Siskiyou Regional Education Project is now comprised of ten part-time staff members: Leslie McCombs and Lou Gold organize and accomplish the Tour; Kelpie Wilson and Beth Howell specialize in publications and play with computers; Romain Cooper, George Shook, Rich Nawa and Barbara Ullian are the conservation staff; Barry Snitkin is the grassroots organizer; Shel Anderson and Cathy Hocker manage the finances and organize the office. Decisions are made by the staff through consensus; the Board of Directors ratifies and provides input to staff decisions.

Fund for Wild Nature

Strategy

POB 1683, Corvallis, OR 97339
(503) 752-7639

The Fund for Wild Nature, formerly the Earth First! Foundation, needs a few new members for our Board of Directors. We're looking for fresh ideas and fundraising abilities. We're a nonprofit funding source for activists in pursuit of big wilderness, biodiversity, and ecosystem restoration. We advance the ecocentric view that humans are an important but not necessarily dominant part of nature.

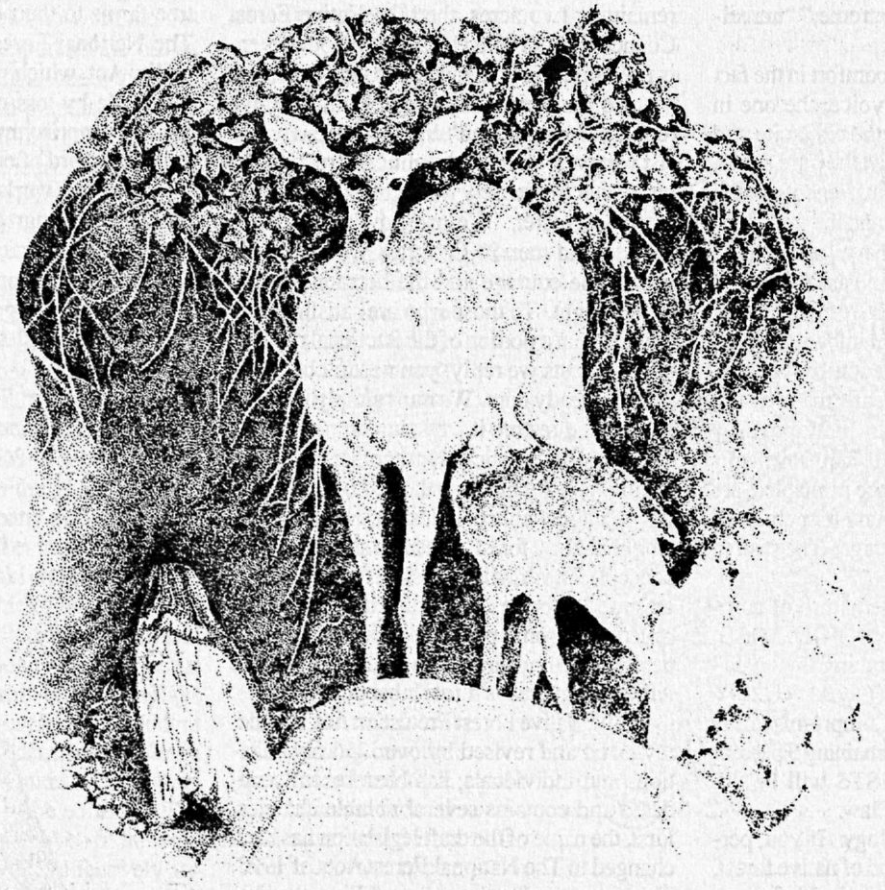
Our focus is on grassroots activism. We offer financial support to individuals and small groups on the front lines of defense of wild nature. We think that existing power structures are an integral part of the problem; hence, we don't fund lobbying or influence-brokering or similar activities, nor do we spend money on massive direct-mail campaigns. In addition, we pay no salaries; most of our money goes to dedicated volunteers who, because of their uncompromising defense of Earth's ecosystems, are unable or unwilling to get help from mainstream foundations or corporations. Members of our Board of Directors are themselves active in ecocentric education and activism.

We favor innovative ways to educate those unfamiliar with the threats to the planet. As a result, we look for projects that are radical in the truest sense of the word—that go to the root of the problem. Most of our revenue comes from individuals who donate between $20 and $200, but other foundations help fund our work also. We're lean and our overhead is modest; we give a higher percentage of donations to projects than does just about any other funding source.

Contributions to the Fund for Wild Nature are tax-deductible. We incorporated in 1982, and shortly thereafter were awarded 501(c)(3) nonprofit status by the IRS. We frequently grant fiscal sponsorship to individuals and organizations who need an umbrella to raise their own funds.

If you agree that it's time we all started putting our surplus back into the Earth, then we invite you to help us support front-line activism. If you want to join our Board of Directors, send a letter of interest and tell us something about yourself. For a copy of our annual report, submission guidelines, Board of Directors list, or other information, drop us a line.

—Daniel Conner



Black Tail Deer by Peggy Sue McRae

The Cost of Compromise

The Native Forest Council was founded out of frustration. Frustration with myopic vision; frustration with chasing regional solutions for a nationwide problem; and most of all, frustration with compromise as the primary means toward these inadequate solutions.

The leadership many of us have sought from the national organizations on the forest issue hardly existed several years ago. After much prodding and deserved outrage from grassroots groups around the country, the nationals moved cautiously—almost reluctantly—into the arena. Still, their positions seemed to us unconscionably weak; more focused on compromise than preservation. When voices in protest, ours included, rose against the rush to compromise, we were labeled by our own side as "extreme," "unrealistic," "divisive."

That hurt. But we took comfort in the fact that if native forests had a voice, the one in twenty remaining trees and the exquisite and essential ecosystems of which they are a part, would not have shared that judgement. In the dash for political acceptance and the frenzy for funding, environmentalists have forsaken the vision of Muir and Brower and are often content with the bones left over from 150 years of timber-feasting. Growing numbers have not strengthened the environmental movement, rather it has become diluted, safe, mainstream. We put shoes on the savage and now, properly briefcased and boardroomed, he grows soft and pliant. Organizations, once principled, are betraying the moral high ground for perceived political and financial advantage. The rush to compromise is on.

Let's be clear about the nature of compromise: compromise means YOU LOSE; THE FORESTS LOSE. Nothing is "saved" by compromising because YOU ALREADY OWN PUBLIC LANDS. Compromise only guarantees that most of the remaining 5 percent of YOUR NATIVE FORESTS will be destroyed with the sanction of law.

Let's use a simple analogy. If you, personally, owned a 40 acre stand of native forest, and an unscrupulous neighbor decided to cut down one of your trees each week (and, thoughtfully, replaced your 400 year old tree with a seedling), would you demand the theft stop immediately, or would you negotiate the rate and duration of destruction?

The problem with negotiating over the fate of the public forests is that it gives unearned stature and legitimacy to the offender. We do not need to apologize for the belief that the cut must stop now. Continued subsidized liquidation of our native forests can not be justified ecologically or economically. The burden of proof lies squarely on the timber industry, not on the owners of the land.

Back to my analogy, 38 of your 40 acres of native forest have already been logged by your unscrupulous neighbor (as have 95 percent of all native forests in the U.S.). If you still want to be "reasonable" and negotiate the remaining two acres, then the Native Forest Council will not help you do so, although there is no shortage of organizations that will.

To those who say it can't be done, we reply: only if you don't try. To those who insist we work within the political structure we reply: that is precisely what got us to the brink of this disaster. We are now looking for women and men in Congress who have the vision, the courage and the hormones to do what is right. To those who are satisfied with "saving" but a portion of the fractional remains of our forests we reply: you needn't be. This land is already ours. We must simply reclaim, protect and restore it.

Not another stick. Not another twig. The economics, the biology, the ecology all point to one inescapable conclusion: No more logging of national forest. It seems a simple enough concept. The unwillingness of the nationals to grasp and embrace it, will only guarantee the destruction of some portion of the remaining 5 percent. Call us ungrateful, but with so little left, compromise is a fool's bargain.

The Native Forest Protection Act, drafted, reviewed and revised by over 250 organizations and individuals, has been recently updated and contains several notable changes. First, the name of the draft legislation has been changed to The National Forest Acts of 1992. This was done for two reasons: First, the timber industry has already managed to dispatch just about all of the native forests that had the misfortune to stand on private lands; and, second, a public-lands focus is empowering since everyone has a stake and a voice in the issue.

We were told that omnibus bills have little chance of passage, so we divided the bill into five separate acts: The National Forest Preservation Act, which would protect all remaining native, virgin, natural forestlands and watersheds on public lands; The National Forest Domestic Processing Act, which would heavily tax exports of raw-material woodproducts; The National Forest Economic Recovery Act, which would provide funds for transitional timber workers and timber-dependent communities and would promote recycling; The National Forest Restoration Act, which would restore public lands converted to tree farms to their original biodiversity; and The National Forest Government Accountability Act, which would hold the rascals accountable by loss of job, pension, fines and possible imprisonment, for willful and deliberate disregard of our environmental laws.

We have worked hard to get this bill introduced in Congress and expect some movement within the next six months. Sadly, the failure of the nationals to adopt a strong and uncompromising position, is in part responsible for the legislation not being advanced.

—W. Victor Rozek, General Manager, Native Forest Council, POB 2171, Eugene, OR 97402 (503-688-2600)

Some Wise Use Movement Lies

by Nick Ervin

The past few months have brought a rush of publicity to the newly proclaimed and self-styled "wise use" movement in America. Its proponents view environmental laws and those who lobby for them as enemies of the American way of life, threats to free enterprise. The wise use agenda includes a call for: mining and oil exploration in all National Parks, Wildlife Refuges, and Wilderness Areas; systematic logging of all ancient forests; and major weakening of the Endangered Species Act.

The tone of this new movement is nothing if not shrill. One of its chief spokesmen, from the Center for the Defense of Free Enterprise, is Ron Arnold. Appearing on the "Nightline" television series, he minced no words in declaring that he and his supporters are out to destroy the environmentalists whom they fervently believe are bent on pursuing an anti-human agenda. According to published reports, Mr. Arnold has theorized that environmental groups may well have engineered the *Exxon Valdez* oil spill in order to galvanize public opinion against the big oil companies.

Characterizing the coalition of groups representing the wise use philosophy—the Alliance for America—as "Davids" against the "Goliath" conservation organizations apparently plays well in the rural West. The list of interests financially supporting the Alliance for America, for which Arnold raises money, includes such "Davids" as the National Rifle Association, timber company owners, mining company executives, and even Japanese corporations such as Kawasaki and Honda which manufacture off-road vehicles.

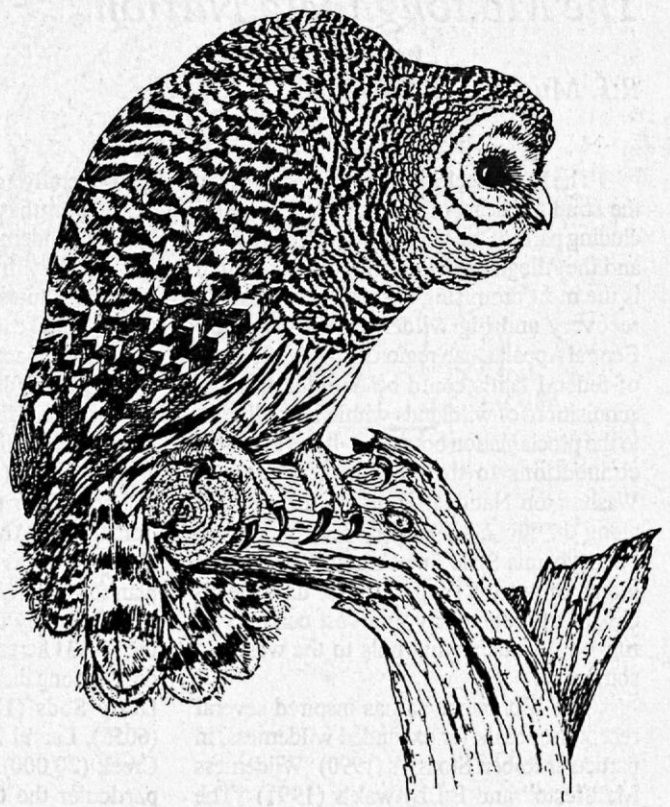
Extremist or not, this increasingly strident and organized backlash to the environmental reform and biocentric movement displays considerable political muscle and abundant financing. It presents a fundamental challenge to those who believe that humanity's impact on the natural world must be softened. The clash of world views could not be more striking. Philosophies that would effectively annihilate what is left of the relatively pristine natural world thrive in times of economic uncertainty, when anxieties run high and scapegoats are eagerly sought.

Under the deceptive banner of preserving free enterprise and multiple uses of the land, backers of "wise use" boldly claim that environmental protection initiatives, if they stand, will gut sacred private property rights and even endanger our liberty as a people. Lost in all the hyperbole are some salient facts about the current state of our mostly Western public lands and the economic interests that exploit them. In point of fact it is the very logging, mining and grazing interests benefiting the most from public largess that yell the loudest about interference with their traditional privileges.

Graziers on the federal public lands, for instance, receive forage at less than 1/4 the market rate charged by private landowners. They pay so little that the federal government, at the expense of taxpayers, loses large sums of money annually just trying to prop up these welfare ranchers. Such massive subsidies encourage the grazing of marginal lands which quickly become degraded on a large scale, as reported by the General Accounting Office. Free enterprise arguments for eliminating these practices are indeed compelling, especially when one considers that barely 3% of the nation's beef is raised on the public lands.

Mining interests are just as pampered. Under the outdated 1872 Mining Law, the search for hard rock minerals on federal land takes precedence over all other uses, whether they be wildlife protection, Wilderness status, recreation, or scientific study. Not only are profits exempt from royalty payments to the US treasury, but the miner or mining company can purchase the land outright for a pittance if a "valuable" deposit of ore is located. Blatant land speculation has sometimes ensued. With minimal responsibility to clean up a site afterward, mining companies (often foreign-owned) scrape the landscape for minerals, take them for free, and leave the public with an ugly permanent scar.

Prominent headlines have surrounded timber cutting of our ancient forests in the Northwest and the northern spotted owl controversy. The owls versus loggers scenario greatly oversimplifies the situation. In the first place, the spotted owl is an "indicator" species; it is the proverbial canary in the coal mine



Steve Gatewood

which tells us when the whole ecosystem itself is sick. Rapidly declining owl populations due to overcutting in the ancient forests of the Northwest reflect the imminent fate of all of the animals and plants that live there. And while timber production has increased 10% since 1979 in the ancient forests, timber industry employment has fallen by 26,000 jobs. This is due largely to mechanization of mills by owners seeking higher profit margins, the large-scale movement of mill jobs by the industry to lower wage locales like Mexico and the American Southeast, and the escalating practice of exporting raw logs overseas. For the timber industry to blame the spotted owl for employment decline is the height of hypocrisy. The industry that cut private lands at unsustainable rates for decades in the first place now seeks to cut the last 10% of the ancient forests, which exist almost entirely on public land.

"Multiple use" is now a favorite slogan of the environmental backlash movement. Ironically, it is activities like logging, mining, grazing and off-road vehicle use that actually violate the principle that the public lands should be managed for multiple uses. Extractive activities like the above necessarily involve permanent alteration of the land itself, the wildlife that inhabits it, and the recreational or scientific uses to which it may be put; whereas hiking, camping, bird watching, and nature study preserve the land intact for the enjoyment of future generations.

In all the ballyhoo of wise use the theme of individual rights is paramount. What about individual responsibilities? Unfettered rights and liberties often exist in conjunction with flagrant abuses. Health codes, zoning laws and anti-trust statutes all evolved to constrain boundless individual rights and their all too frequent abuses. Only about 2% of the lower 48 states is currently set aside permanently as designated Wilderness. More than that remains intact and pristine enough to qualify for Wilderness status but is gravely threatened. Our parks and wildlife refuges already suffer from excessive commercial use. A genuine philosophy of wise use must surely encompass the rights of future humans, whose DNA we hold in trust, as well as non-human wild creatures, the product of the same evolution that produced us. To stand for what is left of the natural world does not imply an anti-human posture. Rather it proclaims the dignity inherent in restraint, modesty and respect for others.

Nick Ervin is Chairperson of the Conservation Committee of the Sierra Club's San Diego Chapter.

Wilderness Proposals

Central Appalachian Wilderness in Perspective

The Monongahela National Forest

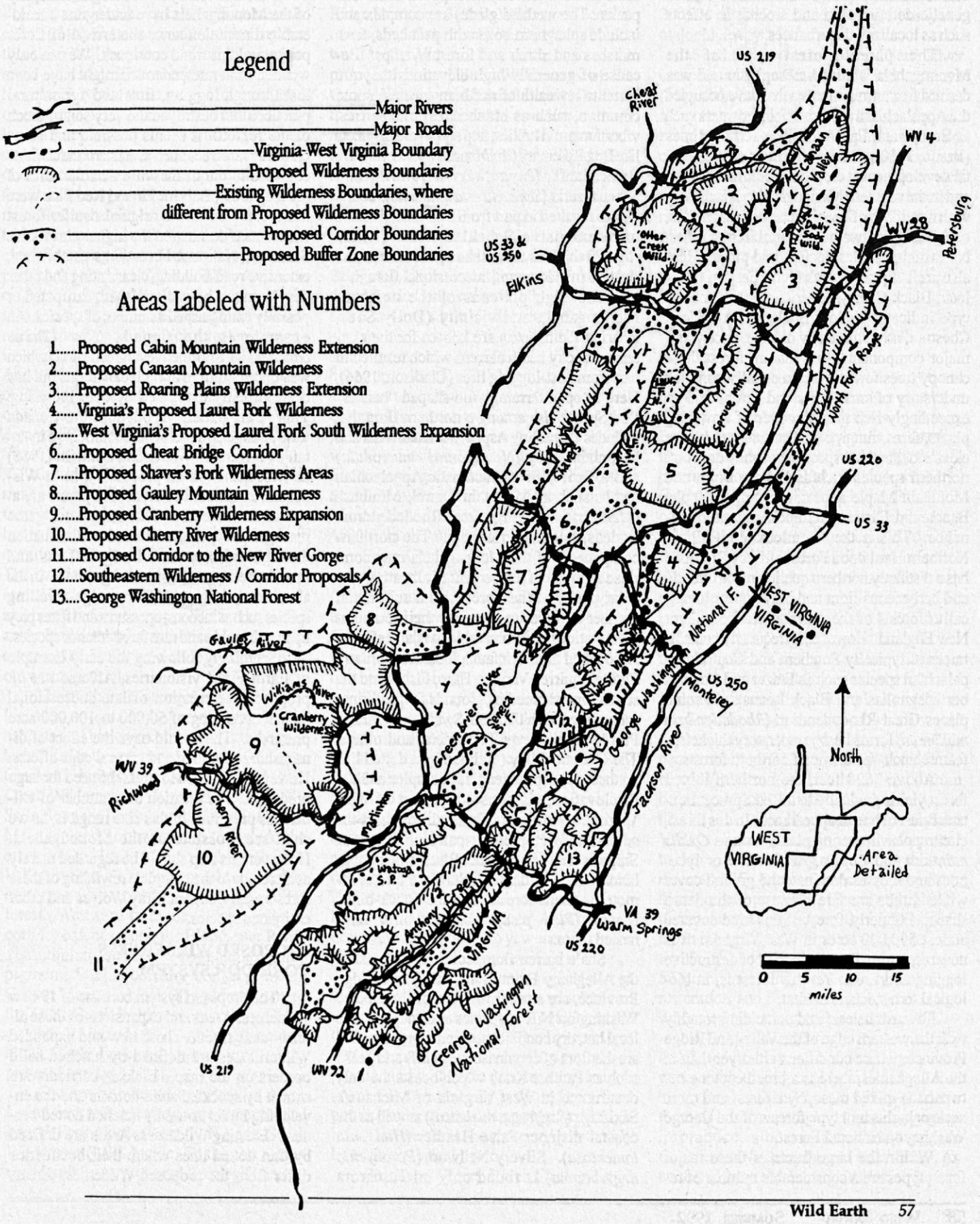
R.F. Mueller

The Monongahela National Forest lies in the strategic heart of the Appalachians. Including parts of the Valley and Ridge Province and the Allegheny Mountains and Plateau, it is the most promising bastion for wilderness recovery and big wilderness in the entire Central Appalachian region. Its 900,000 acres of federal lands could be doubled through acquisition of wildlands within and adjacent to the proclamation boundary. It has excellent connections to the million-acre George Washington National Forest to the east and along the mountain ridges to Maryland and Pennsylvania State Forests. It is the best regional center and support for the ultimate recovery of biodiversity in a vast complex of rugged mountains and hills to the west and southwest.

The Monongahela has inspired several recent proposals for expanded wilderness, in particular Robert Stough's (1990) "Wilderness Manifesto" and Ed Lytwak's (1991) "The Monongahela Forest, An Alternative Vision." It is generally agreed among those who share this vision that we should finish, not with isolated wilderness tracts in otherwise hostile terrain, but with integrated preserves in which wilderness cores are linked by broad migration corridors and enveloped by buffer zones where only low impact human activities occur.[1] Advocated particularly by Noss (1983, 1987), the wilderness/corridor system was adapted to the Appalachians by the writer (Mueller, 1985) and by Sayen (1987). Recently it has been elaborated for the George Washington National Forest (Mueller, 1991) and has been incorporated as an alternative in the pending plan for the GWNF.

Currently there are five areas, comprising 78,131 acres, of designated Wilderness in the Monongahela: Cranberry (35,864 acres), Dolly Sods (10,215), Laurel Fork North (6055), Laurel Fork South (5997) and Otter Creek (20,000). Several of these areas, in particular the Cranberry and Otter Creek, would lend themselves to immediate substantial expansion, each perhaps doubling in area. This would be especially easy for the Cranberry Wilderness since the adjacent Cranberry Back Country already has its roads closed to private vehicles. In answer to a recent inquiry, the Forest Service stated (letter, 6-3-91) that there is currently no roadless area review and evaluation (RARE) study of the Monongahela, and that no formal proposals for additional Wilderness have been made by citizens.

The Monongahela varies considerably in terrain and climate, with elevations ranging from less than 1000 feet above sea level near Petersburg, West Virginia to 4862 feet on Spruce Knob. Precipitation increases more than 30 inches per year from east to west so that the linear, folded mountains of the Valley and Ridge lie in a rain shadow of the high Alleghenies. Mean temperatures in the region may vary 10° F, with the lowest temperatures in high valleys where air drains down from the peaks. These variations in climate have cre-


Legend
Major Rivers
Major Roads
Virginia-West Virginia Boundary
Proposed Wilderness Boundaries
Existing Wilderness Boundaries, where different from Proposed Wilderness Boundaries
Proposed Corridor Boundaries
Proposed Buffer Zone Boundaries
Areas Labeled with Numbers
1.....Proposed Cabin Mountain Wilderness Extension
2.....Proposed Canaan Mountain Wilderness
3.....Proposed Roaring Plains Wilderness Extension
4.....Virginia's Proposed Laurel Fork Wilderness
5.....West Virginia's Proposed Laurel Fork South Wilderness Expansion
6.....Proposed Cheat Bridge Corridor
7.....Proposed Shaver's Fork Wilderness Areas
8.....Proposed Gauley Mountain Wilderness
9.....Proposed Cranberry Wilderness Expansion
10....Proposed Cherry River Wilderness
11....Proposed Corridor to the New River Gorge
12....Southeastern Wilderness / Corridor Proposals
13....George Washington National Forest
US 219
Cheat River
WV 4
Canaan Valley
Otter Creek Wild.
Dolly Sods Wild.
WV 28
Petersburg
US 33 & US 250
Elkins
North Fork Range
Spruce Mtn.
Shaver's Fork
US 220
US 33
WEST VIRGINIA
George Washington National F.
US 250
Monterey
Gauley River
Williams River
Cranberry Wilderness
Greenbrier River
Seneca St. F.
WV 39
Richwood
Cherry River
Marlinton
Jackson River
Watoga S.P.
Anthony Creek
VIRGINIA
VA 39
Warm Springs
US 220
US 219
WV 92
George Washington National Forest
North
WEST VIRGINIA
Area Detailed
0 5 10 15
miles

ated habitat islands in which northern disjuncts or other species formed small isolated populations. Such populations are vulnerable to genetic deterioration and stochastic effects such as localized disturbances.

The parent forest type of the Monongahela is mixed mesophytic and was derived from similar forests that have occupied the Appalachians and other forest centers such as Europe and East Asia since Tertiary times (Braun, 1950). It shows its most characteristic development at elevations below 2500 feet and in the southern Monongahela. It is diverse with a number of species each of magnolias, oaks, hickories, walnuts, elms, birches, ashes, basswoods, maples, locusts and pines. Here also are Tuliptree, Black Gum, Eastern Hemlock, Black Cherry, American Beech and the type indicator Yellow Buckeye. American Chestnut, now stunted by disease, once was a major component. In a mature forest these canopy trees tower over an equally complex understory of small trees and shrubs and an exceedingly rich ground cover of flowering plants, ferns, fungi, etc. On ascent to higher elevations southern species gradually drop out, northern species such as Yellow Birch and Mountain Maple appear, and Sugar Maple, Beech and Eastern Hemlock assume dominance. This is the Hemlock-White Pine-Northern Hardwood Forest of Lucy Braun. It has a distinctly northern quality in both woody and herbaceous flora and may appear identical to forests of the Adirondack foothills or New England. However, it frequently contains traces of typically Southern and Central Appalachian species such as Frazer and Cucumber Magnolias and Black Locust. In some places Great Rhododendron (*Rhododendron maximum*) forms heavy understory thickets, a feature uncharacteristic of northern forests.

Above 3500 feet, the northern mixed forest yields gradually to a Red Spruce montane forest of boreal appearance. In this forest, circumpolar flowering plants such as *Oxalis montana* and *Coptis grœnlandica* or lycopods and mosses dominate the ground cover while shrubs are rare because of the dense shade. Formerly, forest of this kind covered almost 500,000 acres in West Virginia. It is now recovering from the period of destructive logging and fires. Yet this forest is, in biological terms, island habitat.

Toward the east and coinciding roughly with the western edge of the Valley and Ridge Province, where conditions are dryer than in the Alleghenies, there is a broad ecotone between the mixed mesophyte forest and more xeric oak-chestnut type forests of the George Washington National Forest.

Within the large tracts of these major forest types are a considerable number of restricted habitats such as glades (open wetlands or other openings), heath barrens, grass balds, shale barrens, caves and exposed cliffs and peaks. The wetland glades are complex and include sphagnum bogs with peat beds, fens, marshes and shrub and forest swamps. Because of generally high elevations they are home to a wealth of northern species[2], some common, such as cranberries, blueberries, viburnums and hollies, and some rare disjuncts like Bog Rosemary (*Andromeda glaucophylla*), Buckbean (*Menyanthes trifoliata*) and Scheuchzeria (*Scheuchzeria palustris*). Many glades resulted in part from Beaver action and have extensive Speckled Alder (*Alnus rugosa*) thickets as well as open water or derivative meadows and successional flora.

The high plateaus of the northern Monongahela and vicinity (Dolly Sods, Roaring Plains, etc.) are known for their extensive rocky heath barrens which resulted in part from post-logging fires (Clarkson, 1966). Here in open terrain, wind-shaped "banner" Red Spruce rise among a northern flora that includes Trembling Aspen, Mountain Ash and Mountain Holly (*Nemopontus mucronata*) and a variety of characteristic Appalachian heaths such as Mountain Laurel, Minibush (*Menziesia pilosa*), Great Rhododendron, azaleas, huckleberries, etc. The northern components of the Monongahela may comprise as much as ten percent of all native vascular plants of the Forest and a substantial number of these are at or near their southernmost stations and vulnerable to island effects. Associated northern fauna includes Northern Flying Squirrel, Varying Hare, Fisher and the southernmost breeding grounds for passerines such as the Hermit Thrush, Swainson's Thrush, Purple Finch, several warblers, and others. The Canaan Valley (outlined by a dotted line on the map), a premier glade complex at 3200 ft. elevation, contains 40 percent of West Virginia's wetlands. These glades host the southernmost breeding pairs of Common Snipe as well as a disjunct Black Duck population. The Northern Goshawk, a bird of remote northern forests, and the Black-billed Magpie (*Pica pica*), a Western bird, have nested there.

Shale barren flora, concentrated east of the Allegheny Front in the Valley and Ridge Province, are similar to those of the George Washington N.F. in species and adaptation to local hot, dry conditions. Even more restricted are the flora of certain isolated cliffs and peaks such as Panther Knob which boasts the only occurrence in West Virginia of Michaux's Saxifrage (*Saxifraga michauxii*) as well as the coastal disjunct False Heather (*Hudsonia tomentosa*). Silvery Nailwort (*Paronychia argyrocoma*) is found only on Tuscarora quartzite, of which the most famous exposure is Seneca Rocks in the North Fork Mountains.

Native diversity and ecological integrity of the Monongahela have undergone considerable diminution since the arrival of Europeans, and this trend continues. We can only wonder what rare endemics might have been lost through logging, fires and agricultural practices that destroyed the very soil of much of the region. It seems possible that some currently rare trees such as Eastern Larch (now confined to the Cranesville Swamp north of the map area), Balsam Fir and Red Pine were more common in the original conifer forest which once dominated the higher elevations. Since the National Forest was established, extensive road-building, clearcutting and other developments have diminished, extirpated or possibly extinguished a number of species. An example is the Canada Yew (*Taxus canadensis*), a northern evergreen shrub which was once common at high elevations but has been virtually extirpated by deer browsing. This is the pattern throughout the Canada Yew's range and has been documented in detail by Alverson, Waller and Solheim (1988) in Wisconsin. In all probability, as in Wisconsin, a number of herbaceous plants are at risk of the same fate.[3] The timber and "game management" policies have led to this situation through the creation of edge effects and abundant early successional vegetation. In the absence of large predators, edge-dwelling species such as racoons, opossums and foxes prey upon vulnerable and rare forest interior species.

Seemingly following the early example of Earth First! visionaries, Alverson *et al.* proposed the creation of late successional habitat consisting of 50,000 to 100,000 acre preserves. This would have the effect of diminishing deer food and general edge effects. However they failed to stress the need for large predators. The creation of a number of wilderness preserves in this size range is, as we shall see, possible on the Monongahela. However this step should be regarded merely as a prelude to the complete rewilding of these forests with Cougars, Gray Wolves and other extirpated species.

PROPOSED WILDERNESS CORRIDOR SYSTEM

The proposed system consists of 19 new Wilderness Areas and expansions of those already designated. These new and expanded Wildernesses are defined by hatched solid borders on the map. Linking corridors are shown by speckled solid borders and the enveloping buffer zones by hatched dotted borders. Existing Wilderness Areas are defined by thin dotted lines where their boundaries differ from the proposed Wilderness Areas.

Some areas referred to in the text are indicated on the map by numbers.

The system is concentrated on National Forest tracts, but in certain critical areas is extended to private lands with the assumption that these will be purchased or protected in some other way. The criteria used in drawing boundaries of the three categories are based on existing land ownership, land use and ecological imperatives. Thus, while developed and inhabited areas are for the most part excluded, the extension of important natural features or ecosystems onto private wildlands necessitates that the latter be included. A notable example is the Dolly Sods Wilderness extension along Cabin Mountain (1), encompassing the northern Canaan Valley and associated corridors and buffers, a design with an intent to protect from and purge ski condominium development which threatens the entire watershed. The proposed Wilderness Areas would necessitate closure of a number of Forest System roads, examples being FR 19 on the edge of the existing Dolly Sods Wilderness, FR 112 southwest of Spruce Knob and FR 86 along the Williams River.

Corridors would be managed in much the same way as Wilderness, allowing the forest to revert to old growth under natural disturbance regimes as much as possible. As many corridor roads as possible would be closed. The standards of roads kept open would be scaled back, with reduced width, speed limit and break in forest canopy. Within the buffer zones land disturbing activities would be discouraged and existing developments phased out where possible.

The northern Monongahela and vicinity includes an extraordinary conjunction of habitats and biologic communities to be protected under the proposed system. The system would build on the Dolly Sods and Otter Creek Wildernesses. It would extend Dolly Sods along the heath barren plateau of Cabin Mountain and northwestward to include the extensive wetlands of the northern Canaan Valley, where a riverine complex forms an ecotone with recovering hardwood-conifer forest. Westward from the Canaan Valley a corridor extends along the Blackwater River, a beautiful stream darkened by natural organic pigments.[4] This corridor connects to the Canaan Mountain block (2) and from there to the Otter Creek Wilderness which has been expanded to include the critical riparian zones along Glady Fork and an area west of the present boundary.

Southward a broad corridor lies along Laurel Fork and extends to a greatly expanded Laurel Fork North (Laur. F. N.) and South Wilderness (LF. S.) units. To the east a short corridor links the proposed Roaring Plains (3) and Spruce Mountain Units.

East of the Allegheny Front in the spectacular North Fork Range of the Valley and Ridge Province a 30 mile Wilderness/Corridor unit extends from near Petersburg southwestward to the Virginia line where it joins the proposed Laurel Fork Wilderness of the George Washington National Forest (4). From there a seven mile wide corridor extends northward to the proposed 35,000-acre block of the expanded Laurel Fork South Wilderness centered on Blister Swamp (5). The latter is the site of a disjunct northern plant community including Balsam Fir[5], which should be top priority for addition to the Forest. From this area a corridor extends to the vicinity of Cheat Bridge (6), a botanical region made famous by the endemic Long-stalked Holly (*Ilex collina*) and Asa Gray's botanical sweep. In this vicinity, at Blister Run, is one of the planet's southernmost stands of Balsam Fir, which is here reproducing well because deer have abundant alternative browse. This corridor is designed to access two large blocks of proposed Wilderness southwest of Route 250 divided by a railway along Shavers Fork (7). Encompassing the recently acquired 40,000-acre Mower Tract addition to the Monongahela, these blocks straddle peaks over 4500 ft. in elevation.

From Cheat Mountain a corridor turns sharply west connecting it to the proposed Gauly Mountain Wilderness block (8) which is separated only by a power line right-of-way from the largest possible Wilderness in the Forest, the 100,000-acre plus Cranberry Wilderness expansion (9).

The Cranberry block and surroundings include a variety of forest ecosytems ranging from lush mixed mesophyte at lower elevations to pure spruce above 4000 feet. They are known for their abundant glades, as exemplified by the famous Cranberry Botanical Area which lies just outside the existing Cranberry Wilderness. Lying at 3400 feet elevation, it is home to many of the rare and disjunct flora and fauna previously mentioned. However, in common with other areas, it no longer contains Canada Yew. As a result of deer browsing, little or no yew survives in the Yew Mountains or along Yew Creek!

The Cranberry lies in the highest part of the dissected Allegheny Plateau, which has an extension southwestward of Route 39 in the Cherry River drainage (10). In excess of 50,000 acres, this block consists entirely of private land within the proclamation boundary and is threatened by proposed coal-fired power plants, mines and transmission lines. It is imperative that it be protected, preferably by addition to the Forest.

From the Cherry River block a broad corridor (11) has been extended open-endedly toward the New River Gorge. With their buffer zones, these areas have a potential of more than 200,000 acres of wildlands divided by only one major highway.

Southeast of the Cranberry-Cherry River complex and the Greenbrier River a salient (12) of the Monongahela extends 30 miles along the Virginia State line in the transition zone between mixed mesophyte and oak-chestnut forest to the east. Most of this forest which, as along Anthony Creek, contains rich mixed mesophyte stands, has been incorporated into nine newly proposed Wilderness Areas. One of these areas, north of Route 39, includes part of the George Washington National Forest (13) and thus forges a wilderness link toward the east.

SUMMARY AND COURSE OF ACTION

The Monongahela National Forest and the highlands of which it forms a part have impressive ecological credentials. In many Eastern forests biodiversity tends to the cryptic, concealed to the untrained eye in the apparent uniformity of lush deciduous foliage. But in this region diversity is resplendent in contrasting deciduous forest, conifer, glade and other facies that attract an equally diverse fauna. But all this is under threat or actual assault by the perpetrators of an endless variety of despoliation schemes. Heading the list is road-building, with the worst being the infamous "Corridor H" proposal to split the northern part of the Forest with an interstate highway. Road-building is closely followed in destructiveness by power plant and transmission line schemes, one of which would defile the here-proposed Cherry River Wilderness south of Route 39 as well as the Cranberry Wilderness. Other threats come from ongoing ski condominium development, particularly on Cabin Mountain and the Canaan Valley. Finally, forming an ever present backdrop of steady degradation are the misdirected U.S. Forest Service and the State management practices. These multiple debasements not only impact the highlands but are in many ways transmitted to remote habitats, from the tropics to the Arctic, through their effects on migrating species. Only ecological restoration and restructuring based on large wilderness can mitigate this deterioration.

A Wilderness / Corridor System as fully developed as this would of necessity be integrated with the regional human culture in a bioregional model (Lytwak, 1991). Perhaps the best known example of such integration in practice, albeit in its initial stage, is Guanacaste National Park in Costa Rica. As conceived by the biologist Daniel Janzen

(Allen, 1988) the primary mission at Guanacaste is the restoration of a tract of tropical dry forest but serving the secondary function of a "living classroom" with the intimate involvement of local human inhabitants in day to day operations. Thus, an ecological dimension is given to schooling and employment. Although human cultures in West Virginia and Costa Rica are not directly comparable, they are — like modern cultures everywhere— severed from their ecological roots and generally ignorant of the impact of the machine culture on Nature. Consequently the Monongahela Preserve may with equal justification serve as a living classroom. Such a system, consisting of large blocks of unfragmented habitat tending toward maturity and approximating natural disturbance regimes, presents unusual opportunities for scientific baselines against which to measure anthropogenic degradation.

Although the ultimate justification for a Wilderness / Corridor System must be ecological and ethical, economic concerns also need to be addressed if the system is to succeed. As in the Guanacaste example, employment opportunities would be created for local inhabitants. Some of this employment would be ecological restoration; while more would result from accommodating and guiding tourists, students, scientists and other research personnel. New businesses and employment would be created by privatization and moving concentrated recreation facilities, such as developed campsites, from public to private lands. Zoning regulations would maintain standards comparable to the public facilities vacated or supplanted.

WHAT WILDERNESS PROPONENTS ARE DOING

Proponents of wilderness are writing letters to: the Supervisor, Monongahela National Forest (200 Sycamore St., Elkins, West Virginia 26241); Governor Gaston Caperton (State Capitol of West Virginia, Charleston, West Virginia 25305); Representatives (U.S. House of Representatives, Washington, D.C. 20515); and Senators (U.S. Senate Building, Washington, D.C. 20510). They are asking that the Monongahela National Forest be planned as a Wilderness / Corridor System to restore and protect its biodiversity and evolutionary potential and to allow for the migration of species as required by global warming. In addition, they are telling the governor to scrap any Corridor H highway and to ban mineral development in the region.

ACKNOWLEDGEMENTS

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FOOTNOTES

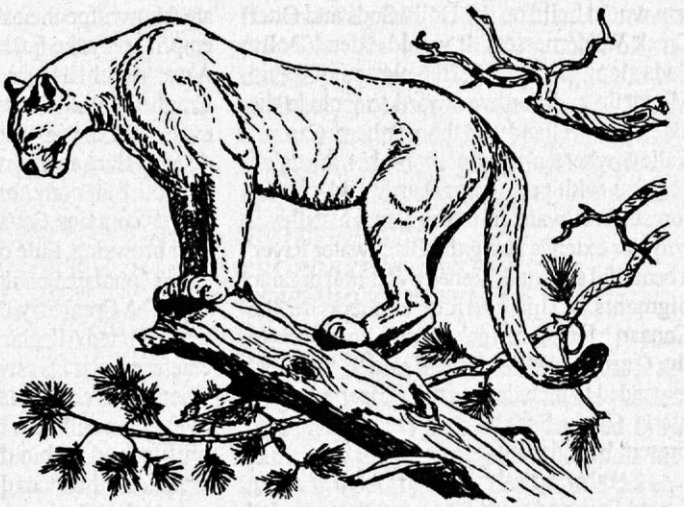
1) As pointed out by Jeff Elliott (Manuscript) even the Wilderness/Corridor System has severe inadequacies and may fail its assigned function. Continuous wilderness may be the only successful scheme!

2) A useful guide here is Flora of West Virginia (second edition) by Strausbaugh and Core (1977).

3) Monongahela foresters find the yew situation embarrassing and have failed to list it as a sensitive species in their Forest Plan even though it is far more sensitive than most they do list.

4) Unfortunately the immediate vicinity of this stream, which is owned by the Monongahela Power Company, is being severely degraded by ORV bubbas.

5) This community, which is severely degraded by deer browsing, clearly reveals the population dynamics of changing White-tailed Deer and Beaver occupancy during the last hundred years.



Dr. Dioxin on the Toxic Trail

Enter the Valley of the Shadow

I don't know how I got here, but this is definitely The Valley of the Shadow. Repeat: Valley of the Shadow. And, Good Book assertions notwithstanding, I fear plenty of evil! Lurking behind every crevice and limb, behind the silvery shards of the new crescent moon.

Since I last reported:

1) A jury in Mississippi finds Georgia Pacific guilty of nuisance for said corporation's discharge of dioxin into the Leaf and Pascagoula Rivers.

2) Same jury awards the plaintiffs $90,000 each for fear *of future illness*: cancer.

3) Same jury adds a cool 3 million in the form of punitive damages. After the hush subsides, the grim reality of the verdict settles in on one of the nation's largest pulp and paper manufacturers. Show-time in Dixie!

4) Lawyers in Texas file yet another suit versus the paper industry; only this time they name the American Paper Institute—the umbrella organization used to shield the entire industry from anti-trust violations, government regs, negative press, etc.

You have been the subject of an elaborate and vicious fraud for many moons. Your very fingers have betrayed you. Your nose, your private parts. You and your friends have been dosing yourselves with 2,3,7,8 Tetrachlorodibenzo-p-dioxin. TCDD. Dioxin. The silent killer: a colorless, lethal rogue of science. Praise the enlightenment! The industrial revolution, indeed!

For those non-lawyers out there, I spare you the details of precedent, procedure and protocol. Suffice it to say that no one had actually won a fear award against an evil paper company... until that fateful day in January.

The lawyer in the case for the defense was a man called "Paladin." Really: Dark hair, moustache, freaky green suits, a slow and deliberate walk, the deepest voice in these United States. Eugene Partain. Brought in especially to slam dunk nasty dioxin suits out of existence.

Has Paladin heard about a rival gang of plaintiff lawyers who keep a picture of him on their dart board? Probably. Word travels fast in southern Mississippi.

FEAR. Of future illness. So simple, yet so elusive. Thousands upon thousands of Americans frequently consume fish taken out of the nation's waterways. Many of these rivers double as receiving waters for pulp and paper mills. These mills enjoy the rare privilege of dumping up to 50 million gallons per day into US waters (all legal, folks...regulated by Uncle Sam and the states). Now, you fans of the Doctor already know what's in that pulp and paper discharge. . .yup: dioxin—the world's most toxic man-made chemical!

Many of us are consuming something that Nature tried like Hell to keep us from in the first place. Evolution had no use for organochlorine molecules. It took Homo erectus asphaltus to put that shit in the pot. But I digress. . .

The editors want the Doctor to elaborate on the effects of dioxin upon wildlife. This requires the sort of research that only money can buy. On my current budget, made up of measly donations and friendly handouts, I can only offer the following remarks: even in extremely low doses, dioxin has the potential to wreck one's entire day. The stuff reacts with enzymes, DNA, cellular receptors, and who knows what. In short, it can cause cleft palate, digestive disorders, feminization of males, masculinization of females (embryo), inhibited sexual function in adults (exposed in placenta), learning disorders, immunodeficiencies, maybe cancer, and certainly a bad attitude.

The smaller the subject, the greater the impact. Plug that into the equation where wildlife is concerned. Imagine a 2 ounce bream or bass. Maybe a growing catfish. An eagle's egg.

The Doctor returns from another site, the Florida Panhandle's Fenholloway River. It is a 50 million gallon per day victim. Its waters run into the Gulf of Mexico. These waters are naturally dark; but do not be deceived: the Fenholloway now runs the color of licorice. For its entire length. Brought to you by the good folks at Proctor & Gamble.

The Fenholloway is more than the sum of its parts. In fact, the ebony stream flows in unseen manners: underground, into the aquifer, through hundreds of limestone sink holes, under homes, farms, and eventually into drinking wells. Many of these wells are declared "off-limits" by the Florida State government. Stories of damaged skin and hair are not unusual in that area of the Panhandle. Sickness is a topic of much conversation in them parts. It is a sad if common scenario on the Toxic Trail.

The Doctor watches a long, sleek alligator work its way through a giant sink hole. There is evidence of fish therein: mudfish. They roll in the dark water, breaking the surface regularly. Feeding time. The gator simply cruises, in no apparent hurry. One can only wonder at this fabulous critter's blood serum levels of dioxin and furans.

The locals talk about the disappearance of wildlife in and around the Fenholloway. Of course, the wholesale clearcutting of pine forests might be a contributing factor, in conjunction with the pollution of the waters. Studies are in the wings, but they will be funded and conducted by the State.

The Vice President is in town! Hooray for Quayle! Dan is on a fundraising mission; he is covering the South hoping to insure that the likes of Duke and Buchanan don't steal the Bush League's Republicans, including the plant manager of the very Georgia Pacific mill just popped for 3 million dollars. Yes, the man who volunteered to drink a glass of the mill's effluent, straight from a slimy holding pond, in front of a bemused and humored jury. They found against him several days later.

Quayle and friends meet in the State capitol. They chat about lawsuit fever and White House relief. The Doctor knew it was only a matter of time before King George sent in the Palace Guards.

The Doctor wasn't invited to the summit in Jackson with the Guv and Georgia Pacific. It would've been a golden opportunity to test out my new gadget: Pepper Gas. Highly concentrated oil of cayenne peppers compressed into a tiny travel can. Twenty foot range with a slight shotgun spread at about 15 feet. Perfect for disabling one's opponents for up to 30 minutes. The Doctor burns the road. He travels at night.

Another State line rolls beneath the wheels. Soon it will be morning. America will crawl from beneath the sheets to greet another Corn Flake sort of day. Folks will rinse the night away with contaminated well water. Corporate eunuchs will ride the elevators to their respective floors, eager to jumpstart America's legacy of growth.

—Dr. D

The Practical Relevance of Deep Ecology

by David Johns

As proponents of Deep Ecology and Biocentrism have begun to define both a vision for the future and a critique of the existing human relationship with the rest of nature, they have often been the subject of criticism from the Third World and from leftists in the developed world concerned with Third World issues. They are commonly charged with failing to adequately take into account the complexity of the human social dynamic involved in destruction of the environment; ignoring that human societies are under the control of elites who benefit from the degradation of nature while most people suffer; failing to recognize that much degradation in the Third World is directly attributable to an international political-economy dominated by the rich countries; and proposing misanthropic solutions which would exacerbate further the problems of the poor. Critics have charged that biocentrism has essentially North American roots and is therefore elitist, and that biocentrism focuses narrowly on the issue of wilderness preservation to the exclusion of human problems. Some have called deep ecology/biocentrism irrelevant to the most important problems facing the world, namely overconsumption, overpopulation, militarism and related problems.

These criticisms need to be addressed. Movements for biosphere preservation, to be relevant, must address issues within a global framework. That can only be done in conjunction with other movements around the globe. Only through a genuine amalgamation of the various and specific historical experiences can we chart a new direction(s) for human society. Cross cultural criticisms are extremely valuable because they help clarify assumptions of other traditions or cultures.

WILDERNESS: ORIGINS AND VALUES

Deep ecology has been criticized for equating environmental protection with wilderness preservation and for failing to recognize the impact of its commitment to wilderness in the Third World. Preservation of wilderness is viewed as a North American idea and therefore suspect.

Deep ecology is obviously rooted in the culture of those who espouse it; that is true of every movement. The very process of transcendence or dialectical working through assumes a history. But to point out the origins of a particular historical experience does not invalidate it.

There is no question that the circumstances of development in the United States — including the pattern of settlement over the huge geographical area available — have helped shape U.S. deep ecologists' response to environmental degradation. In the face of its rapid destruction, it was possible to see clearly what was being lost and what remained to be saved. And we were rich enough to be able to afford it. In this last respect the wilderness may "fit in" our consumer society's cultural categories as another commodity. Notwithstanding this seeming incorporation of wilderness into the existing order, in most respects it does not "fit." From the very beginning and increasingly, the wilderness system, wildlife refuges, and old-growth forests have been attacked by those who say they interfere with an economy based on endless growth.

The real issue, however, is whether a position that calls for returning large areas of the Earth to wilderness is wrong-headed in substance. Related is the question of how humans should interact with those portions of the biosphere not preserved as wilderness.

The deep ecological support for wilderness is predicated upon an important fact and related value: the Earth can support a limited amount of biomass, and the more of it is composed of humans or turned to human use, the less is available for other life; humans do not have the right to so alter the composition of the biomass that we damage, in Leopold's words,"the integrity, stability and beauty" of the ecosystem. The basis for this value may lie in the experience of self-actualization—identification with nature as the real community of which one is a part. Whether it is termed a transcendence of alienation in its various forms or healing a crippled heart, the thrust is that human life is no more valuable than any other form of life, life being broadly construed to include plants, animals, ecosystems, rivers, mountains, the earth.

Flowing from this understanding is the recognition that in much of the world almost any human impact damages the biosphere. In many ecosystems human livelihood — beyond very minimal numbers and very limited technology — is simply not compatible with maintaining the integrity of the biosphere. Integrity here means wilderness, that is "self-willed land," self-regulating, not transformed by human attempts to control it. Loss of integrity is obvious when one looks at the fate of other large mammals. Ecosystems must normally be healthy to support them. Their disappearance is an indication of degradation. Grizzly Bears, Orangutans, Tigers, elephants and many other species cannot easily coexist with humans in large numbers or with very exploitative technologies. Many ecosystems cannot easily accommodate significant human presence without serious deterioration in diversity and balance. Recognition of other species, of ecosystems and the Earth as valuable in and of themselves, individually and collectively, apart from their usefulness to humans, means that in practice much of the Earth cannot be used for permanent human settlement.

Existing devastation and the spread of humans into new areas makes the task of protecting areas still in their natural state urgent. Returning large areas to wilderness is only slightly less urgent.

While preservation of wilderness may seem to be the overriding focus of deep ecology, deep ecologists recognize that humans have their place in nature as well. Where it is appropriate for humans to settle, the issue of

how to combine livelihood with ecosystem integrity is a major emphasis. Reestablishment of real community, embedded in the local ecosystem, is a priority of the deep ecology movement. It may be a valid criticism that much of the thinking in this area is fuzzy or naive, but wilderness is not the only goal of deep ecologists. Given the understanding of human/rest-of-nature relationships that deep ecologists espouse — that to be effective in allowing nature to heal itself one must also heal one's own self and community — it is odd to suggest they are unconcerned with human community.

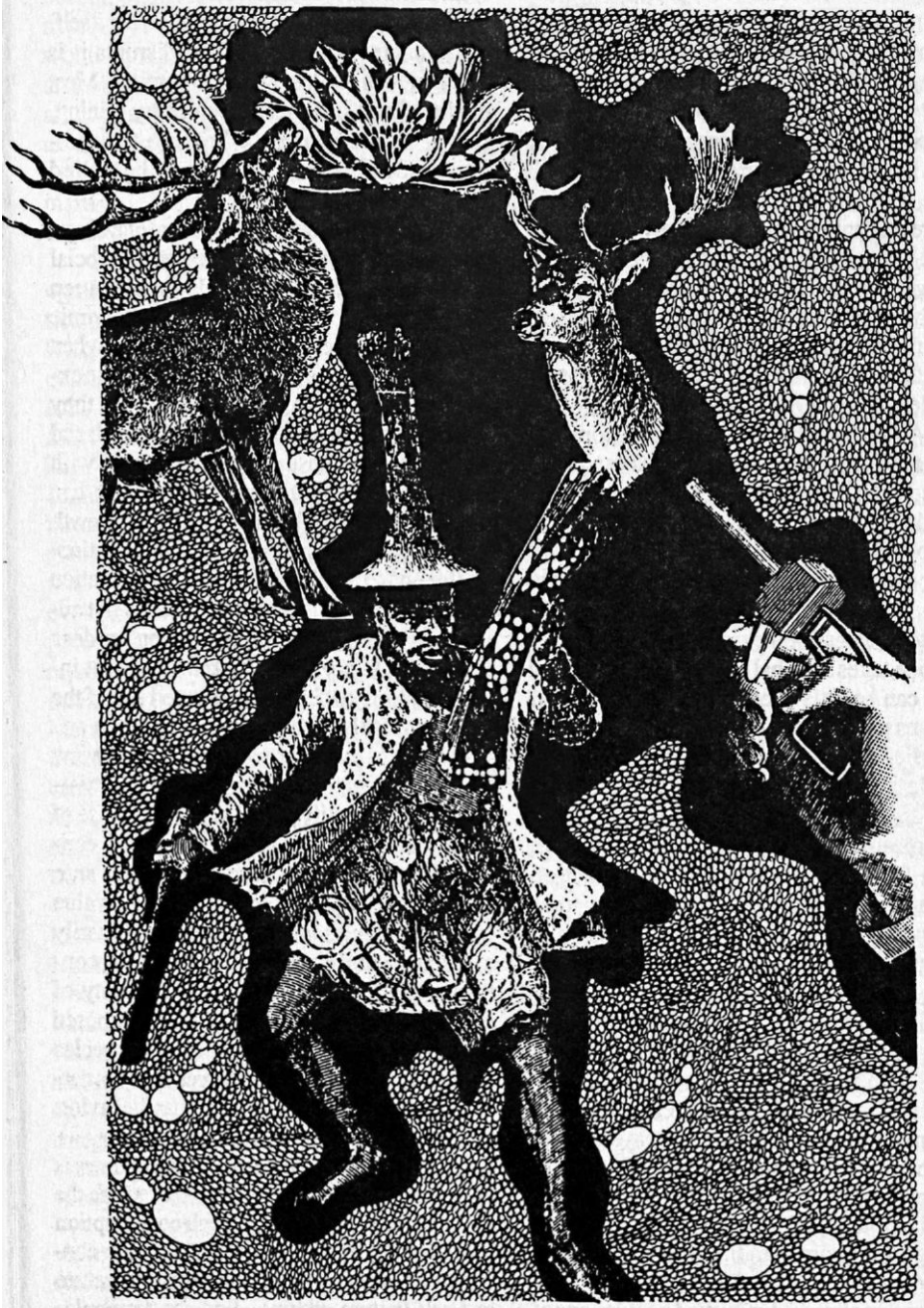
SOURCES OF ENVIRONMENTAL DEGRADATION

Another criticism made of deep ecology is that it focuses on humans in general as the problem, obscuring the real causes of environmental degradation, namely overconsumption and militarization and the underlying social forces that produce these. There is some merit to such criticism but it is usually overstated. Some environmentalists do see the problem as simply too many people behaving stupidly, without any regard for the nature of the system in which people live and the fact that it victimizes most people as well as nature.

Most proponents of deep ecology, however, recognize the great inequality that exists in the world with regard to consumption, and the great differences in the existing power of various groups to shape a society's relationship with nature. Deep ecology advocates acknowledge that most people are victimizing (of nature) victims (of the social order); and that problems must address the issues of class, gender, and ethnicity. Deep ecologists recognize that all forms of domination are linked, as is evidenced in the ongoing debate between deep ecology and social ecology, between deep ecology and eco-feminism, between deep ecology and marxism and other socialisms. The question is really one of emphasis and priority: do we focus on the threat to Earth as a whole or to a part of it (humans); where do we bring ourselves to bear on the juggernaut carrying out such destruction.

The nature of the linkages between various forms of domination is certainly not settled, but deep ecology may be distinct in believing that the resolution of equity issues among humans will not automatically result in an end to human destruction of the biosphere. One can envision a society without class distinctions, without patriarchy, and with cultural autonomy, that still attempts to manage the rest of nature in utilitarian fashion with resulting deterioration of the biosphere. Such a society would probably be less destructive because much of the technology of the last 300 years is incompatible with a truly egalitarian society and much of the alienation that distorts the expression of human energy into schemes of control would not exist. But the end of domination in human relations is not enough to protect the larger biotic community. Only behavior shaped by a biocentric view can do that.

For example, deep ecologists would point out that in terms of the integrity of an ecosystem, it makes little difference whether an old-growth forest is destroyed to build one house for a North American or fifty simple structures in the Third World. From a strictly human standpoint the latter is much more justifiable than the former. Deep ecologists widely agree that fewer humans (and especially less extensive occupation of the globe) *and* equitable and drastically curtailed consumption are essential to restoring the balance of the planet. Overpopulation remains a sensitive issue and I will return to it below.



Jim Nollman

While those of us engaged in political activity in North America are used to confronting the issue of jobs versus environment, it is important to understand that in the Third World "jobs" often equates with actual survival. Sparing old-growth in the US within the existing economic structure may cause hardship for a few loggers. Sparing tropical forests within the existing economic structure may mean immediate hunger for many landless peasants. (Clearing tropical forests may mean eventual hunger as well, depending on the quality of the land cleared.) Critics of deep ecology argue that efforts to protect wilderness in the Third World cost the poor; that this approach is just one more example of imperialism — the same imperialism that pushes the poor and others into the wilderness in the first place. Wilderness proponents do need to heed this criticism.

Wilderness is needed in the Third World as much as it is in Europe and other long-settled parts of the globe; but it is necessary to understand that the structure of imperialism often makes the manner in which wilderness is protected in the Third World unjust from a human standpoint. Environmentalists must begin to take this into account. How? First, by understanding how imperialism created and continues to feed much of the dynamic that threatens ecosystems in the Third World, from the Amazon to Malaysia; by understanding how countries that have broken or are attempting to break from their historical place in the existing structure find themselves, in an effort to survive, adopting environmentally destructive economic strategies; and by understanding how the wealth extracted from the Third World makes possible the culture of consumption in the First World.

Second, based upon the understanding just set out, we must acknowledge the limits of what can be achieved to protect the environment within the framework of a system based on endless material growth and extreme socio-economic inequality. Only by pushing beyond the limits of what is acceptable to the existing political-economic order can constraints on ecological-political choices be transcended.

Finally, we must recognize that we cannot alter the existing biocidal order without broad-based support. Only with an understanding of human social relations can we develop successful strategies for protecting the Earth's diversity. To move beyond the existing order, we need to understand who our potential allies are, as well as what the obstacles are. The poor, we must remember, go to the rainforest to farm because they have been driven off land they formerly cultivated by the wealthy, who can make higher profits producing cash crops for the international market. If we treat the poor as the problem, rather than the system that constrains their choices, we will fail. We must forge alliances with those who oppose the existing order — albeit on the basis of its injury to the poor, to women, to oppressed ethnic groups. The work of EPOCA [Environmental Project On Central America] in Nicaraguan reforestation efforts and in Central America generally, and the Rainforest Action Network and Greenpeace campaigns directed at the IMF [International Monetary Fund] and World Bank, are examples of environmental action with at least some of the necessary elements.

In the short term — given the continued existence of an international political system committed to growth and great inequality, given an international state system in which those who would resist such domination must adapt to it to survive — how do we resolve conflicts between particular groups of humans, often the most oppressed, and other species? Even if wilderness advocates do attempt to ensure that preservation measures are not taken at the expense of the oppressed, they will not always be able to protect both the environment and the poor. There is no getting around these uncomfortable questions and previous attempts to address them are not adequately developed.

Arne Naess has suggested that conflicts between humans and other species can be resolved by balancing the competing interests based upon how "near and vital" the interests are to the species involved. Given the large numbers of Homo sapiens and their extensive settlement, it is difficult to see how this would lead to a redress of the current imbalance unless one takes a global perspective. Globally there can be little question, for example, that humans need to give way to Tigers, Chimps, Grizzlies and other species. With five billion people and only small populations of other species, restoring ecosystems to diversity can only mean movement in one direction: more room for other species. But the impact on humans of making room for other creatures will not affect all humans equally. Specific humans will have to make way. How are the costs to be spread?

If one takes a strictly local perspective, trying to balance the interests of a local human population with the interests of a local non-human population, an assessment of competing interests gives a result less favorable to non-human life. If one accepts extensive human presence as given, human interests in their existing livelihood must be weighed without taking into account significant human numbers elsewhere or lack of others elsewhere. The pressure on already diminished populations of other species would continue to grow.

Overconsumption

In what ways, then, is a biocentric system of values meaningful in dealing with overconsumption and militarization? Let's begin with overconsumption. The very meaning of overconsumption differs depending upon whether one takes a bio- or anthropocentric view. A biocentric view, by giving moral consideration to other species and ecosystems, sharply limits human consumption — not only as individuals or groups, but as a species, i.e., it implies a limit on human numbers — much more than an anthropocentric view which sees value in nature only insofar as it is useful to humans.

If non-human nature is valued for itself, then human consumption that disrupts it is wrong: it constitutes overconsumption. Most modern forms of agriculture, forestry, mining, energy extraction and use, housing, transportation and the like clearly can be called overconsumption.

In a human-centered system of values, overconsumption is primarily seen as a social problem, a problem of distribution between wealthy and poor, a problem of economic ownership. Overconsumption occurs when some consume more than they need at the expense of those who do not have what they need. Generally speaking, material growth and rising levels of consumption are equated with quality-of-life improvement; the poor can become better off through economic growth and/or through more egalitarian distribution. To this end technology and social organization need to be applied. Such a view does not admit to any finite limit on consumption nor does it consider injury to the biosphere except insofar as it may affect the continued use of the biosphere for human benefit.

Even "weak anthropocentrism" — a view that is sensitive to long range sustainability — can and does justify monoculture, high use of energy, massive reclamation projects, conversion of self-regulating ecosystems into agricultural land and so on. Such a value system continues to view nature as primarily a resource and only places limits on consumption so as to maintain sustainability of exploitation. In contrast, constraints imposed by regarding the ecosystem and other species as valuable in and of themselves sharply narrow the range of appropriate human behavior: if it injures the biosphere, don't do it.

The distinction between the two views is seen to be much deeper when we examine the roots and social function of high consumption levels. On a psychological level, much consumption is a result of alienation, from nature and self (nature within). Endless accumulation and the distractions it offers are essential

features of developed societies and of upper classes elsewhere in the world. Such attempts to substitute possessions for empowerment, sense of place, and authentic relationships are never satisfactory. A hunger for more remains.

On a social level, consumption is used by elites to manage large segments of the population. Give people enough stuff and they forget their pain and powerlessness. The poor make do with the promise of some distant level of consumption and in the meantime turn to other forms of distraction, often drugs qua drugs.

Dominant Western and liberal capitalist views do not acknowledge such a thing as overconsumption. To liberalism, high levels of consumption are viewed as a measure of the success of our civilization and individuals within it, representing the triumph of control and technique, of humans over nature. Liberalism embraces dualism, hierarchy, atomism, all the machinery of control; nature is fodder, the "other," something to be mastered and managed. Man (intentional masculine) is the centerpiece of the universe.

Many human-centered theories do recognize the roles that high levels of consumption play in many societies. The marxisms of Reich, Marcuse, Gorz and others are concerned with how high consumption both results from and further feeds alienation. But most marxist views remain wedded to some kind of control over nature and thus embrace dualism as well as open-ended material growth through progress in technology and social organization. Marxism espouses an unlimited faith in human intelligence and rationality: the evolution of human consciousness will keep pace with any problems. But marxism does reject the view of the world as essentially atomized. As Ollman has ably demonstrated, Marx saw things as constituted by their relationships and the field of relationships. One cannot change nature without changing oneself nor change an element in a system without changing the system. A profound ecological truth is recognized in such a perspective.

Much radical feminist theory rejects all institutionalized hierarchy. According to many feminists, the social problem is not so much who has power, but power or domination itself. Relationships and community are essential values in this understanding. Both feminists and those concerned with domination based on ethnic differences have shown how the category of "the other" runs throughout civilization, justifying oppression and exploitation of anything that falls within it.

Thus, several anthropocentric worldviews do object to Cartesian dualism and liberal atomism. But nature and other species remain excluded from the community either explicitly or by silence. One is left with the gulf between humanity and nature, and with an ungrounded faith in the human mission to manage the planet.

Some anarchist, marxist and feminist theory does suggest that part of realizing one's fullest humanity, i.e., part of the process of transcending alienation, involves embracing one's place in nature. With these views, non-alienated being may require recognizing the natural as well as the human community as valuable. However, where one simply values the human interest in non-alienation, dualism and anthropocentrism remain, and serve as a theoretical foundation for structures of control.

This is not to say feminist, anarchist or other critical social theory is fundamentally incompatible with biocentrism; but insofar as such theories accept the assumption that the rest of nature exists solely for humanity's use, they fail to address a central form of domination. If species hierarchy is justified, then hierarchy is justified. Thus much of what such critiques abhor follows from any human-centered view.

Biocentrism draws a clear line. To reject the human/nature dualism is to reject the "triumph" of the enlightenment attempt to control nature. It is to reject the triumph of knowledge and technique and analysis over earth wisdom, understanding and connectedness. It is to reject the focus on things rather than relationships. By rejecting these and valuing nature in and of itself, a biocentric view limits human consumption more fundamentally than any anthropocentric view can; it does so by thoroughly rejecting the roots of such consumption. In its place biocentrism values the web of life, as well as its parts, of which we are one.

Militarism

As with overconsumption we might ask what system of values would constrain militarism more: human or biosphere centered? By recognizing the value of nature and other species apart from their usefulness to humans, a significant constraint is imposed on the conduct of warfare and more importantly the economic activity essential to preparation for war. Indeed, the consumption of "resources" to create and maintain the industrial capacity geared to arms production — for whatever purpose — assaults the biosphere, even more than war itself. All human-centered value systems necessarily fall prey to the easy rationalization of militarism.

Many human centered value systems, religious and secular, are critical of militarization; but all are largely ineffective. The failure comes in part from the wedding of values to structures of power — church or state — that depend upon force for their survival. Insofar as pacifist values are taken up by those "outside" these structures, they provide some check. But because they are human-centered — the point of opposing militarization is to end human waste and suffering — it is easy to neutralize them by appeal to other human values, other forms of suffering even worse than war or the costs of deterrence. The other great weakness is that much pacifist thinking does not address adequately the roots of militarism, something I shall attempt to do below.

If one values nature in and of itself, then human goals and needs are placed within the context of a larger community. The value placed on the integrity of that community militates heavily against any human-centered rationalization for exploitation. A biocentric view limits the conversion of biomass to human use. Such a view poses a threat to the survival of particular social systems and even the historical system of social systems; but it does not pose a threat to the survival of the species, as some would argue. Quite the opposite — the threat to both us and the planet comes from this system of systems.

Because modern militarism is particularly virulent, attempts to understand this blight are often limited to the modern period. Certainly the combination of enlightenment arrogance with science and technology, embedded in the international political economy resulting from the European expansion, has produced a dangerous world. But we must look deeper into human history to grasp the underlying dynamic of militarism. Though it has reached new proportions, militarism is an essential feature of something very old: civilization. It is inseparable from social systems based upon hierarchy (class, gender and ethnic), control of nature, and denial of self. It is an essential feature of societies where the state exists, where the state attempts to substitute itself for authentic human community, and where limited conflict between communities has been replaced by the institutionalized conflict of center and periphery and of competing centers. The history of civilization, beginning with its emergence in the Neolithic, is the story of the human attempt to control nature through technology and social organization. This attempt to control nature splits us from it and becomes the driving force behind a social development that includes patriarchy, class domination, statism and militarism.

Though most (but by no means all) human-centered value systems eschew militarism, they almost all hold civilization as a crowning achievement. Some value systems praise the military spirit. Most condemn it as a necessary evil; i.e., they justify it even as they condemn it. The point here is that civilization is based upon and constituted by relationships

of domination that necessarily produce the conflict and inequality which make militarism inevitable. Human-centered critics maintain a fervent faith in the human mission to manage, in the human ability to disentangle what is inextricably linked. They speak from within the perspective of civilization, and cannot see the need to transcend the precarious ground on which they (we) teeter.

Critical theory shares much in common with liberal theory in this area. Some marxist analysis of the genesis of modern militarism is sound. The notion that many human ills would be solved with the end of class society is also appealing. But the end of class is not the end of the state nor of domination, and hence not the end of social systems that produce militarism. (Nor is the end of capitalism the end of class.) The control of nature and of social and cultural evolution are values deeply embedded in most marxism. So although Marxism has developed useful models for understanding social transformation, the assumptions, perspective and content of the transformative vision are very much within the human- centered tradition.

Some feminism gets much closer to the source of the problem in its critique of hierarchy generally, and particularly its understanding of the centrality of patriarchy to militarism and to producing humans amenable to domination. At times, however, feminist theory falls into a kind of intra-specific dualism, i.e., human males are the problem (at the same time claiming that females created agriculture, which became the economic foundation for the emergence of hierarchy), ignoring that systems adapt to and alter the environment, and individuals adapt to (even while they resist) the roles created by the system's division of labor. Even where this dualism is not at issue, most feminism, like marxism, remains human centered. Feminist values such as community, spontaneity, and integration of emotion and intellect militate against the worst features of mainstream human-centered values, but still fail to take account of our flawed relationship with nature, which underlies the social structures that produce militarism.

Marxism, feminism and other critical social theory have contributed to understanding the dynamic of our civilization, but they tend to miss the point that if nonhuman life is not valued for itself, then life is not valued for itself. Any system of values that does not transcend nature-as-other cannot limit destruction of the biosphere as effectively as one that embraces all life as intrinsically valuable. Nor can such a value system help to heal the fundamental split in the human psyche which makes possible civilization and militarism.

Biocentrism offers a direction for human society based on finding our place *in* nature. Such a transformation, if effected world-wide, would be as fundamental as the Neolithic or industrial revolutions.

Overpopulation

The debate over human population is particularly passionate and wide ranging. My purpose here is to explicate the differences a biocentric approach makes to ecosystem degradation. Even as it limited overconsumption, a biocentric approach would result in reduced human numbers. For biocentrists, human reproduction is not an absolute right, but is constrained by the overall value accorded to ecosystem diversity and integrity. Thus from a biocentric view what is important is that dams kill rivers, whatever the human purpose behind them: whether to irrigate 10,000 subsistence farms or a single agribusiness enterprise growing corn for hog feed.

Anthropocentric approaches to population vary, but none offers significant biosphere protection. Die-hard enlightenment groupies argue there is no such problem as overpopulation. They believe we will always find ways to support human numbers without destroying the life-support system of the planet. Others see environmental degradation not as a result of population per se but of the level and type of consumption, as if human numbers made no difference. They see existing human numbers as manageable with egalitarian consumption, implying much reduced levels in the developed world. While this might reduce the overall impact, how much is questionable; and with continued population growth that difference could easily be eaten up again. Still others, mostly in the developed world, are concerned about overpopulation in the Third World because it threatens limited resources which those in the developed world would like to continue to consume disproportionately to protect their lifestyles.

Certainly all the above approaches might allow the preservation of wilderness for human needs, ranging from solitude to biological sustainability. But the narrow protection they offer is inadequate to preserve ecosystem integrity. And under the press of increasing numbers, preservation and long-term concerns are put aside, and an unending series of "fixes" is pursued. Rivers are dammed and "replaced" with fish hatcheries and recreation areas.

The only anthropocentric approach to population that is wary of large numbers is that thread of the anarchist tradition which recognizes that democracy and freedom, autonomous collective and individual action, are only possible in a human-scale, face to face community. But this is an argument against large concentrations of people, not necessarily against the overall size of the human population. Such a notion could simply lead to turning the planet into one large countryside of villages, with little room for wilderness. It is also questionable whether the planet could support five and a half billion people in villages, i.e., without the highly organized structures and technologies that are based on human domination of other humans. (William Catton and others have argued persuasively that even with high energy economies we cannot sustain existing numbers; the structures that support — and exploit — them are not sustainable, built as they are on phantom carrying capacity. Moreover these economies have so degraded the Earth that real, i.e. long-term, carrying capacity has been reduced.)

The notion that population concentrations limit human autonomy, i.e. freedom of collective and individual action in a wide variety of ways, needs further exploration. Clearly the large existing human populations are an integral part of the hierarchical order of industrial society. Human history suggests that large human populations make hierarchy inevitable. A powerful implication of this is that large human populations may so restrict human perceptions and ability to act that devolutionist strategies are inevitably frustrated. The revolutionary process in the modern period is a good analogy. While the rhetoric of revolution has touched the human yearning for both liberation and bread, the outcome of revolution has invariably meant stronger centralized institutions and more hierarchy (and greater exploitation of the earth). Recent human history lends itself to the conclusion that attempts to reform large (in terms of population density) hierarchical societies don't result in less hierarchy, notwithstanding stated goals. Large human numbers may make it impossible to implement policies needed to allow Earth to heal, i.e. policies that reduce population, consumption, etc.

Throughout human history egalitarian and nature-embedded societies have been conquered or destroyed by more "advanced", hierarchical societies. In the world today, any society can protect nature only at its own peril. To do so, it must resist the enormous pressure of a world economic system driven by greed. And resistance itself requires resources.

Deep ecologists recognize that the negative human impact on the rest of nature is attributable to particular forms of social structure, and that human numbers are shaped by such structures as well as by biological factors. Social structure influences, if not determines, cultural beliefs concerning birth, the desirability of children and so on, as well

as affecting more directly the need for children to work, provide for their parents, etc. Structure affects relative human health, i.e. both birth rates and death rates. Changed structures do result in changed population numbers, density, etc.

But while structure clearly shapes population, population also shapes structure. The emergence of human hierarchy and its evolution are in significant part responses to population pressure.

Mark Nathan Cohen has argued that when migration for dealing with increased numbers is no longer possible, one alternative is more intense exploitation of the limited area available. More intense exploitation involves technology and social organization based on increased division of labor, social differentiation, and ultimately hierarchy and domination. The means developed to exploit and control nature involve the control of people by an elite. The structures and technologies resulting from adaptation to population pressure (and other factors), in turn both allow and require larger populations, greater growth, which in turn tends to lead to breakdown or more intense forms of exploitation based on greater hierarchy and differentiation. This is not merely a vicious circle but a downward spiral.

Thus, large human numbers not only convert great amounts of Earth's biomass to human use, they also contribute to the proliferation of structures of control. These structures, in turn, make it difficult to organize for significant reform—which both human liberation and ecological health require. It is difficult to overcome the inertia of socialization, and even if large numbers could be awakened, they might not be able to effect change. Not only because of the violent resistance of the political-economic hierarchy, but because reform programs would only work with populations small enough to not need extensive economic and political institutions to survive.

A life-centered or planet-centered value system requires that we transcend the split with nature within our own psyches and in our material relationships: how we consume and alter the biosphere. Far fewer humans; far lower levels of consumption for many, much improved levels for others; the re-creation of authentic communities that reintegrate the human into nature — these are a few of the implications of such an ethic.

In contrast, a human-centered approach focuses on wiser if not greater human control. In its more progressive forms we hear words like 'stewardship' rather than 'ownership'. But underlying the concept of stewardship of resources, as well as the concept of ownership of resources, is the notion we are not only unique (every species and ecosystem is, as even humanists would admit), but better. In short, the same arrogance, the same split that has brought us to the current crisis.

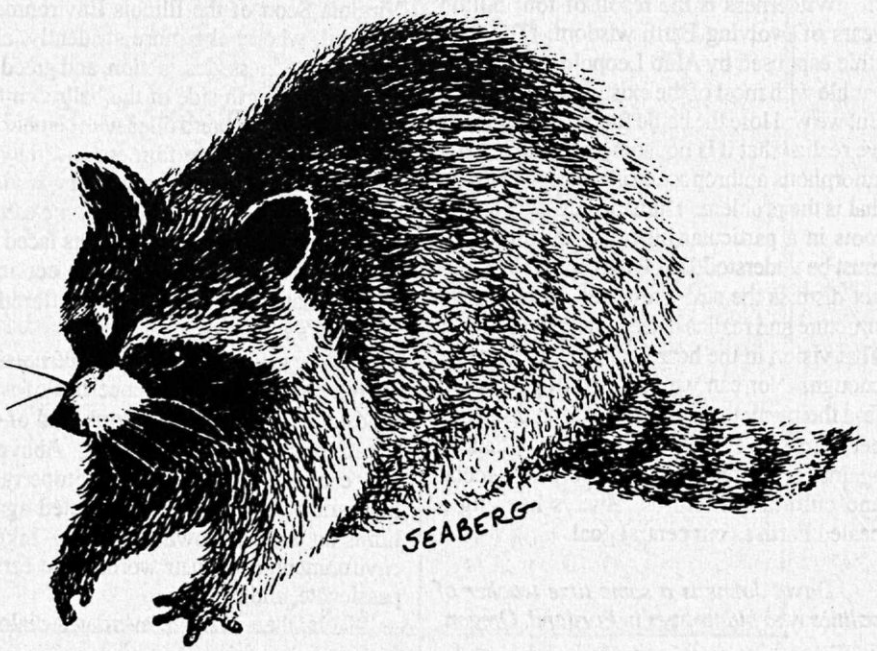
VALUES AND CULTURE

All value systems are part of a broader cultural framework that mediates human behavior by shaping personality and thought. Culture organizes human experiences and gives it meaning. Biocentric values are no exception — they are part of a larger cultural framework, albeit an emergent one which includes an understanding of the role of culture generally as well as the critique of particular cultures.

To point to the Neolithic as the origin of the culture of control is not enough. A biocentric view places these events in a larger context. It is necessary to understand how the capacity for culture itself and the resulting plasticity in human behavior, thought and emotion, and our ability to learn and pass on learning (attitudes and world views as well as technical or social information), enables us to divide ourselves. This capacity for culture allowed human populations threatened with localized overshoot in the Neolithic to increase the human carrying capacity by altering both their behavior and the environment substantially. The split itself was probably never very obvious, partly because changes were cumulative over a long time. Moreover, the very capacity for culture allows us to deny the estrangement, even requires such denial for both psychological and social reasons. And the emerging social dynamic of hierarchy distributes the costs and benefits of the new adaptive strategies unequally, favoring the decision makers and shapers of a society's values.

Culture, then, allows us to trade our place in nature for larger human numbers spread over the entire planet, converting large amounts of the biosphere to our purposes, so long as we are willing to pay the price of the various forms of domination and alienation. The plasticity with which evolution has endowed us allows us to create alienating and biocidal sociocultural systems, but does not require it; such systems are not natural in the sense of necessary or in the sense of being in tune with our deepest nature. (We should not forget that while cancer is part of nature, it kills its host.) There are other cultural possibilities, including biocentric ones. Indeed, for most of the time humans have been around we have lived in communities that included the rest of nature. We can do so again, this time with full knowledge of the alternatives and their price. To limit our biocidal possibilities is not unnatural, as Baird Callicott quite rightly argues, because cultural systems always limit behavior. Culture is always prescriptive.

Deep ecology does not deny or seek to end human cultural evolution, but to see that human cultural evolution does not end or impoverish biological evolution. Deep ecology calls for human cultures that are respective of the biosphere, for cultural evolution within a broader biospheric evolution, an evolution in which humans are a part, not would-be directors. We are not wise enough to be directors; true wisdom is the recognition of place and process. So it is not human cultural evolution



that deep ecologists see as the problem, but the particular paths taken over the last several thousand years. There are alternatives to the carnage, both of the biosphere and other cultures, that civilization brings.

To say that much of what we call civilization must somehow be fundamentally transformed is to say that the human social and cultural dynamic founded on and constituted by various relationships of domination must be overcome. It may represent a kind of return to the past, but in the service of the future. For the last several thousand years our species has behaved much like one might expect adolescents from a severely dysfunctional family to act. We must go back to where things went wrong — to the origins of our estrangement — and pick up from there. In doing so we would make use of all that has occurred in the interim. We have already paid dearly for the lessons.

The roots of biocentrism are deep and its emergence in modern form is a result of both the resilience of earth wisdom and the current crisis — just as surely as human centered values and cultural systems are a result of the Neolithic crisis.

By accepting biocentric limits on our behavior we undermine the wall we erected between ourselves and nature and the resulting culture of domination. In doing so we accept constraints on overconsumption, militarism and human numbers that no human centered system of values could impose. Domination and hierarchy, the attempts to control that give rise to high levels of consumption and militarism, will be unshakable problems until we recognize we cannot substitute our intellect for nature.

ALLIANCES

Wilderness is the result of four billion years of evolving Earth wisdom. The land ethic espoused by Aldo Leopold is not compatible with most of the existing human order. But we will lose the battle for the planet unless we realize that it is not some generalized and amorphous anthropocentrism or egocentrism that is the problem. Human alienation has its roots in a particular historical dynamic that must be understood to be overcome. We cannot dismiss the struggles over human social structure and realize a deep ecological vision. That vision in the hearts of a few will not be enough. Nor can we wait for all persons to find their way through their unrootedness. In between is a strategy of pursuing alliances against common economic, political, social and cultural structures, always keeping a healed Earth as our central goal.

David Johns is a some time teacher of politics who plants trees in Portland, Oregon.

Land Ethics

The Language of Owning

by Eric T. Freyfogle

Last fall, when the yellows and oranges began to creep onto the Illinois plains, a weary caravan of state lawmakers pulled into the college town where I teach. They came to hear what the people had to say about wetlands and whether the state ought to protect them.

Illinois's landscape once boasted expanses of wet meadows and wooded floodplains, lands that for millennia added richness and stability to the tallgrass prairies and the oak-hickory forests. These days only scattered wetlands remain. Six wet acres out of 7 have been drained or filled, or so we're told by the US Fish and Wildlife Service. Environmental leaders put the figure higher, at something like 10 acres out of every 11.

Many at the wetlands hearings wanted to talk about ecology. Local environmentalist Bruce Hannon spoke from the head and from the heart as he related the Illinois version of the standard wetland tale—the tale of water quality, wildlife habitat, silt-removal, and abundant beauty. Hannon was followed by Virginia Scott of the Illinois Environmental Council, who spoke more stridently, about short-sightedness, destruction, and greed.

On the north side of the ballroom floor the first four rows were filled with somber men in suits. These were farmers and they had come because the state's remaining wetlands are mostly in farmers' hands. Some came as prosperous grain harvesters; others faced hard times and knew personally the economic storms that have bruised and battered the Midwest's small towns.

These men were there to speak, not about ecology and interdependence but of world foodstocks, of centennial farms, and of confiscation-without-compensation. Above all, they came to talk about private property, and how and why it must be protected against limits on what landowners can do. Like the environmentalists, their words were earnest, passionate, and clear.

This, then, was the evening's dialogue, words about ecology followed by words about private property. The lawmakers, it seemed, were in luck, for they could agree with everyone. The state could protect wetlands, but only when the endless budget crunch left money to buy the land.

Twenty years ago a hearing like this would have fostered sharp debate on the value of marshes and floodplains. Back then wetlands were worthless until drained or filled. But on this crisp September evening in central Illinois, no farmer stood up to discredit the now-clear lessons of ecology. The language of interdependence has spread too wide. The issue was no longer one of science, it was about land ownership and the many things that private ownership means.

At one time, public lands seemed to offer the key to a healthy Earth strategy. Long before the Wilderness Act of 1964, lovers of wild areas were pushing hard to protect our nation's forests, grazing lands, and other public spaces. But it is clear now that a sound Earth requires more than just well maintained public fragments, more than islands of health surrounded by an ailing countryside. The push for land health is turning toward private land, the kind of land that Illinois farmers own and put to hard annual use.

When Illinois farmers talk of private property, they draw upon an age-old vocabulary and tradition. To America's founders private land offered protection against an overreaching state. Property served as a source of strength to resist intrusions on liberty, a source of independence in the face of venality and vested interest.

Today our culture carries on this 18th century ideology. Our inherited sense of property sticks with us, and its fiber is strong enough to resist prodding into the ecological age. As we move to protect the Earth, one of our biggest tasks will be to grab hold of this concept of property and give it a vigorous shake. So long as private ownership means

the right to use, alter, and destroy at will, ecosystem health can be little more than a dream.

In reality, the farmers who spoke that September night used wetlands merely as example. As they spoke of wetlands they aired their fears about the future. They so much as asked: If the owner of a wetland can be told not to drain it, if a farmer cannot control his fields, what then is left of private property's might? And if the pillar of private ownership begins to topple, how can our independence remain?

Toward the end of the wetland hearing I offered a few words about ownership. Property, I said, has always been a malleable, evolving institution, something the community ought to regularly reshape to reflect its knowledge and needs. It is time to revise the rights of ownership to respect an acre's natural setting; it is time to develop land-use limits that foster lasting land health.

After the hearing, the farm family seated in front of me turned back in anger and frustration. The father asked, "Are you going to let the state move someone into an empty room in your house?" His college-aged son added, "Haven't you read about starvation in the Soviet Union—don't you know that this is what state planning brings?"

At the time I could merely protest—this wasn't what I was talking about. But it was the message that much of the audience heard. To this farm family the issue of the night seemed clear. Either the state would dictate how the land was used, or the owner would do so.

It would be easy to dismiss this critique as the emotionally charged rhetoric of the ecologically uninformed. But my strong sense is that it would be unwise and unfair to do so.

The environmental movement does press hard against our long-held sense of what private ownership is all about. And those who cherish private property, in kind and in symbol, do have good reason to fear. The gathering message of environmentalism is that private ownership rights today go much too far, and that the time has come to redraw the line between owner and community. For too long, land use has been a sphere of private domination, subject only to the privileged self-interest of the owner of the day. What the owner does must become the business of us all, and economic gain must take back seat to ecological stability.

The confrontation, then, is real, and will likely become more intense. But if today's new ethic challenges the landowners' domain, the challenge does have its limits and does leave much untouched. As environmentalists talk more overtly about new meanings of ownership, they'll need to make clear what they do **not** challenge as well as what they do. They'll need to offer a new, more appealing version of ownership, a version that promotes not just ecological health, but independence and privacy too.

In the new version of ownership that I imagine, I don't see the state telling farmers what to do in any positive way. What I do see are obligations to owning that place limits on how an acre can be used—negative restraints that protect the future of our home. I see a property scheme that expects an owner to use the Earth in ways that add to ecological health and stability. I see ownership rights that depend on ecological setting, rights that respect the equality of owner A and owner B without assuming that A's land can be used in the same manner as B's.

Within these new ownership limits, however, the owner's privacy and primacy can still firmly reign, and we'll do well, I sense, to let this message spread wide. When land is ecologically suited for various uses, the owner should decide the when, the what, the who, and the how. And if owners one day will have few rights to exclude their nonhuman co-tenants, let us all allow them to post no-trespassing signs to keep other humans at bay.

In the meetings, hearings, and editorials that need to flow endlessly, advocates of ecosystem health must create a new language of ownership. And they must put it to use, to draw issue with those still guided by property's rich past. Ecology alone could not—and will not—carry the night.

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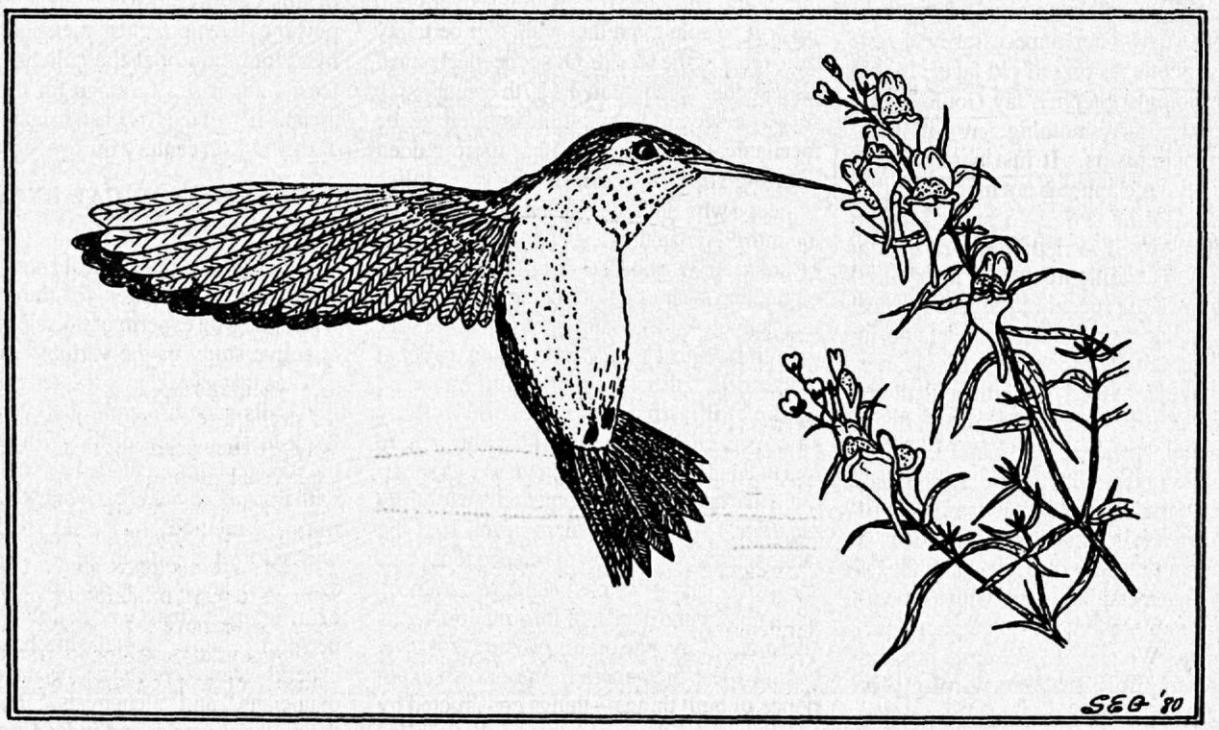


The Mechanical and the Organic:

On the Impact of Metaphor in Science

by David Abram

ed. note: A longer version of this essay appears in *Scientists on Gaia*, edited by Stephen Schneider, published by MIT Press in1991. Apparently, the publishers found it highly controversial, and ran with it a disclaimer. —JD

Many scientists and theorists claim that the Gaia Hypothesis is merely a fancy name for a set of interactions, between organisms and their presumably inorganic environment, that have long been known to science. Every high school student knows that the oxygen content of our atmospheric environment depends upon the photosynthetic activity of plants. The Gaia Hypothesis, according to such researchers, offers nothing substantive. It is simply a new—and unnecessarily obfuscating—way of speaking of old facts. In the words of biologist Stephen Jay Gould: "The Gaia Hypothesis says nothing new—it offers no new mechanisms. It just changes the metaphor. But metaphor is not mechanism!"[1]

What Gould failed to state is that "mechanism" itself is nothing more than a metaphor. It is an important one, to be sure. Indeed the whole process of modern science seems to get under way with this metaphor. In 1644 the brilliant philosopher René Descartes wrote "I have described the earth, and all the visible world, as if it were a machine."[2] In his various writings, Descartes, developing a notion already suggested by other philosophers, effectively inaugurated that tradition of thought we call "mechanism," or, as it was known at that time, the "mechanical philosophy." And his metaphor is still with us today.

Let us explore how this metaphor operates upon us. What are the assumptions, explicit and implicit, that we wittingly or unwittingly buy when we accept the premise that "the visible world" and, specifically, the Earth, is best understood as an intricate and complex machine?

THE MIND OF A METAPHOR

First, the "mechanical philosophy" suggests that matter itself is ultimately inert, without any life or creativity of its own. The great worth of the machine metaphor is that it implies that the material world is, at least in principle, entirely predictable. According to this metaphor, the material world operates, like any machine, according to fixed and unvarying rules; laws that have been built into the machine from the start. It has no spontaneity of its own. As a clock ticks away with complete uniformity until it runs down, so the material world cannot itself alter the laws that are built into it. The laws of a mechanical world are preset and constant; if we can discover them we will be able to predict with utter certainty the events of the world. Or so the mechanical philosophers thought in the 17th century.

The second assumption implicit in the mechanical metaphor is rather more hidden than the first. A machine always implies someone who built the machine—a maker, an inventor. A machine does not, in the manner of an embryo, generate itself. Clocks, carriages, and steam-engines do not take form of themselves—if they did, they would be very wild and magical entities indeed, and we could not ascribe to them the fixity, uniformity and predictability that we associate with any strictly mechanical object. If we view nature as a machine, then we tacitly view it as something that has been built, something made *from outside*. This is still evident in much of the language that we use in our science today: we speak of behavior that has been "programmed" into an animal's genes, of information that is "hardwired" into the brain. As mechanists we borrow these metaphors from our own experience of built things—things constructed by humans—and then we pretend that the inventor or builder (or the programmer) does not come along with the metaphor. But, of course, it does. If the material world is like a machine, then this world must have been constructed from outside.

This implication, I would claim, is precisely why the mechanical philosophy triumphed in the 17th and 18th centuries, to become part of the very fabric of conventional science. Mechanism gained ascendancy not because it was a necessary adjunct of scientific practice, but because it disarmed the objections of the Church, the dominant social and political institution of the time. The mechanical philosophy became a central facet of the scientific world-view precisely because it implied the existence of a maker (a divine inventor) and thus made possible an alliance between science and the Church. But in order to make sense of this claim (and to better understand the power of the mechanical metaphor today) we must look briefly at the cultural forces and tensions that set the stage for the historical ascendancy of the "mechanical philosophy" in 17th and 18th century Europe.

A BRIEF HISTORICAL EXCURSUS

We moderns tend to assume that the adoption of the mechanical metaphor was a necessary precondition for the growth and flourishing of experimental science. Yet an attentive study of the various conflicts and debates that gave rise to the scientific revolution calls such assumptions into question.[3] Until the latter half of the 17th century, the tradition of experimentation was not associated with the mechanical philosophy. On the contrary, the method of careful experimentation was associated with those who practiced it, those who developed and refined it to the level of an art, individuals who had a very different perspective from that of the mechanists. These experimenters were commonly called "natural magicians," and "alchemists." They viewed the material world, and indeed matter itself,

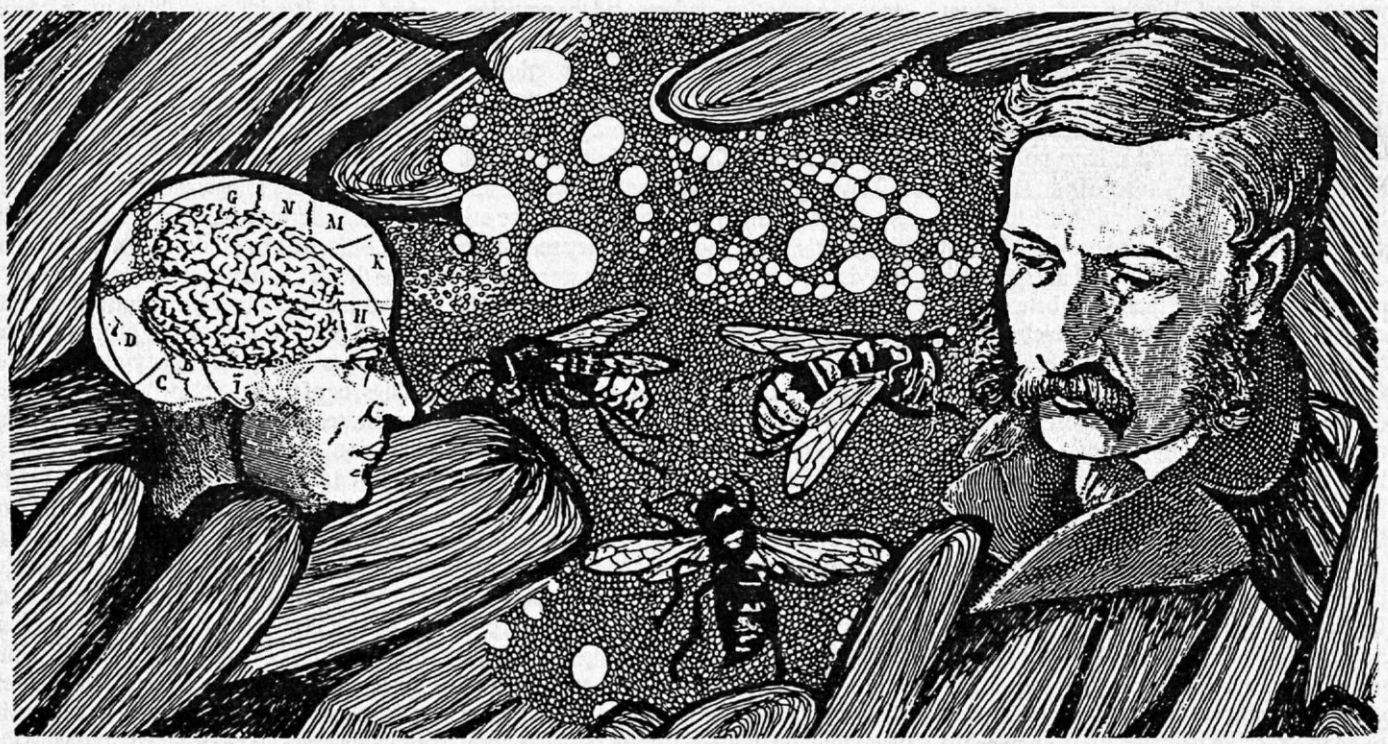
as a locus of subtle powers and immanent forces, a dynamic network of invisible sympathies and antipathies. For the Renaissance natural magician Marcilio Ficino (1433-1499, founder of the Florentine Academy, and the first translator of Plato's works into Latin), for the Hermetic natural magicians Giordano Bruno (1548-1600) and Tommasso Campanella (1568-1639), for the brilliant physician and alchemist Paracelsus (1493-1541), and, indeed, for the entire alchemical tradition, material nature was perceived as alive, as a complex, living organism with which the investigator—the natural magician, or scientist—was in relation. ("It is an error," wrote Campanella, "to think that the world does not feel just because it does not have legs, eyes, and hands.") The experimental method was developed and honed as the medium of this relation, as a practice of dialogue between oneself and animate nature. Experimentation was here a form of participation, a technique of communication or communion which, when successful, effected a transformation not just in the structure of the material experimented upon but in the structure of the experimenter himself.[4]

Many of the great discoveries that we associate with the scientific revolution and, indeed, many of the scientists themselves, took their inspiration from this participatory tradition of natural magic: one need only mention Nicholas Copernicus, who wrote of the sun as the visible God, quoting the legendary Egyptian magician Hermes Trismegistis; Johannes Kepler, whose mother was imprisoned and nearly executed for practicing witchcraft—on the evidence of Kepler's own writings; William Gilbert, the great student of magnetism, which he termed "coition" as if it were a type of sexual intercourse that matter has with itself, and who, in his book *De Magnete*, published in 1600 (the year that Bruno was burned at the stake), wrote of the whole Earth as a living body with its own impulse for self-preservation! And, of course, we must mention Francis Bacon, the "father" of experimental science, who saw his scientific method as a refinement of the tradition of natural magic, and who wrote that through his work the term "magic," which "has long been used in a bad sense, will again be restored to its ancient and honorable meaning."[5]

How is it that we have forgotten this intimate link between experimental science and natural magic? Why was this link with magic so obscured by the subsequent tradition of natural science? Why, for instance, did Isaac Newton, arguably one of the greatest of all natural magicians, find it necessary to hide and even publicly deny the vast alchemical researches that occupied him throughout his life?

Clearly, the Church in the 16th and 17th centuries felt itself threatened by this powerful tradition which held that the material world was *a source of itself*, this tradition—with roots in the high culture of Renaissance neoplatonism, as well as in the diverse folk knowledge of the peasant countryside—which spoke of the enveloping Earth as a living being, a living matrix of spiritual powers and receptivities. Such a way of speaking threatened the theological doctrine that matter itself is passive and barren, and that the corporeal realm of nature is a fallen, sinful realm, necessarily separated from its divine source. (I refer here not to Christian doctrine in general, but to the institutionalized Church of the 16th and 17th centuries—a period, let us remember, that saw hundreds of thousands of persons, most of them women, tortured and executed as "witches" by the ecclesiastical and lay authorities.)

The *true* source, according to the Church, was radically external to nature, outside of the earthly domain. The teachings of natural magic, however, with their constant reference to immanent powers, implied that the divine miracles reported in the Old and the New Testaments might be explained by subtle principles entirely *internal* to material nature. This was heresy—heresy of the first order!—since it enabled one to doubt the very agency and existence of the God outside nature. Clearly then, if natural experimentation was to become a respectable or even a permissible practice, it would have to find a new rhetoric for itself. It would have to shed its origins in the magical and participatory world-view and take on a new way of speaking more in line



Jim Nollman

with Church doctrine.

It was "mechanism," or the "mechanical philosophy," that provided this new and much safer way of speaking. For again, a metaphorical machine entails a metaphorical builder, a creator. Like the Church, the mechanical philosophy involved a denigration of corporeal matter, not exactly as fallen, sinful and demonic, but as barren, inert, and ultimately dead.

Here, then, was a perfect cosmology for the experimental scientists to adopt—one that would allow them to continue to investigate nature without fear of being persecuted, or executed, for heresy. The mechanical metaphor made possible an alliance between 17th century science and the Church. And thus mechanism became a central tenet of the scientific world-view.[6]

MECHANISM AND HUMAN PRIVILEGE

We are now in a position to discern the third, and most powerful, assumption implicit in the mechanical metaphor. The only true machines of which we have direct experience are those invented by humans. Hence, if the world really functions as a complex machine, then the one who built that machine must be very much like us. There is, in other words, an implied correspondence between humans and the one who built or programmed the vast, complicated machine of the world. We are, after all, made in his image. If the material Earth is a created machine, it falls to us—since we are not just created, but creators in our own right—to figure out how the machine works.

The mechanical metaphor, then, not only makes it rather simple for us to operationalize the world, by presenting nature as an assemblage of working parts that have no internal relation to each other—a set of parts that can be readily taken apart or put back together without undo damage; it also provides us with a neat justification for any and all such manipulations. The correspondence between the creative human mind and that which created the mechanical universe (between humans and God) ensures that the human researcher has a divine mandate to operate upon or to manipulate earthly nature in any manner that he or she sees fit. The inertness of matter, the lack of sentience in all that is not human, absolves the researcher of any guilt regarding the apparent pain he or she may happen to inflict upon animals or ecosystems (such pain, Descartes taught us, is entirely an illusion, for automatons cannot really feel anything).[7]

The mechanical world-view thus implicates us in a relation to the world which is that of an inventor, an operator, or an engineer to his machine. (The very notion of "genetic *engineering*" can have sense only in a culture that maintains a mechanical view of nature.) When the natural world is conceived as a machine, the human mind necessarily retains a god-like position outside of that world. It is this privileged position, and the license it gives us for the possession, mastery, and control of nature, that makes us so reluctant to drop the mechanical metaphor today. If mechanism rose to prominence in the 17th century due to its compatibility with the belief in a divine creator, it remains in prominence today largely due to the deification of human powers that it promotes.[8]

THE PHENOMENOLOGY OF PERCEPTION

But this deification, this human privilege, comes at the expense of our perceptual experience. If, at any moment, we suspend our theoretical awareness in order to attend to our sensory experience of the world around us (to our experience not as disembodied intellects but as intelligent, sensing animals), we find that we are not outside the world, but entirely *within* it. We are thoroughly encompassed by the physical world, immersed in its depths. Hence our *sensory* relation to the world is hardly that of a spectator to an object. As sensing animals, we are *never* disinterested onlookers but participants in a dynamic, shifting and ambiguous field.

Maurice Merleau-Ponty, the French phenomenologist and philosopher who has perhaps most carefully analyzed the experience of perception, underscored the participatory nature of this experience by calling attention to the obvious but easily overlooked fact that our *hand*, with which we touch the world, is itself a touchable thing, and thus is entirely a part of the tactile field it explores. Likewise the eyes, with which we see the world, are themselves visible. They are entirely *within* the visible world they see—they are visible things, like a tree, or a stone, or the sky. For Merleau-Ponty, to see the world is also, at the same time, to experience oneself as visible, to feel oneself seen. To touch the world is at the same time to feel oneself touched by the world. Clearly, a wholly immaterial mind could neither see nor touch things, could not experience anything at all. We can experience things, can touch, hear, and taste things, only because, as bodies, we are a part of the sensible field, and have *our own* textures, sounds, and tastes. We can perceive things at all only because we are entirely a part of the sensible world that we perceive. We might just as well say that we are organs of that world, and that the world is perceiving itself through us.[9]

Here the main point to get from Merleau-Ponty is that, from the perspective of our embodied, animal awareness, perception is always experienced as an interactive, reciprocal participation. The event of perception is never instantaneous—it has always a duration, and in that duration there is always movement, a questioning and responding, a subtle attuning of the eyes to that which they see, or of the ears to what is heard, and thus we enter into a relationship with the things we perceive.

When, for instance, a particular stone on the beach catches my eye, I may respond to this solicitation by bending to pick it up. I may thereby discover that the stone is larger than I had at first thought—I now find that much of its bulk had been hidden beneath the sand. In order to heft it my body shifts its stance, legs and feet planting themselves a bit more solidly in the sand as a I raise the stone to eye level. Now, as one hand moves over its surface, my fingers must adjust themselves to the particular texture of that surface; they must find the right rhythm, the right way to touch it if the stone is to disclose its subtle furrows and patterns. Likewise, only as my eyes find the right way to focus and question its surface will the stone begin to reveal to me the secrets of its mineral composition. As my body adjusts itself to the stone, the stone begins to speak its mute language, to subtly instruct and inform my senses. And the more I linger with this stone, the more I will learn. My experience, then, is a reciprocal interaction, a mutual engagement of the stone by my body and of my body by the stone. And so it is with everything we perceive, constantly, continually—the trees that surround our home, the clouds that catch our gaze, the streams we wade through. Perception is always an active engagement with what one perceives. As such, our direct perception always discloses things and the world as ambiguous, animate presences with which we find ourselves in a sort of communication. That this is our native, human experience of things is attested by the discourse of virtually all indigenous, oral, tribal peoples, whose languages simply refuse any designation of things, or of the sensible world, as ultimately inanimate. If a thing has a power to "call my attention" or to "capture my gaze," it can hardly be thought of as inert. "If the moon was not alive, you would no longer see it," I was told by an old tribal shaman in the Mexican desert. By which he meant to say, I think, that simply to perceive a phenomenon is already to be in an active relation with that phenomenon, and yet how could one be in a dynamic relationship with something if it was entirely inanimate, without any potency or spontaneity of its own? How indeed? By implying that matter is utterly passive and inert, mechanism

denies our perceptual experience.

The scientist who holds to a fundamentally mechanical view of the natural world must suspend his or her sensory participation with things. He strives to picture the world from the viewpoint of an external spectator. He conceives of the Earth as a system of objective relations laid out before his gaze, but he does not include the gaze, his own seeing, within the system. Denying his sensory involvement in that which he seeks to understand, he is left with a purely mental relation to what is only an abstract image.

Likewise with any *particular* object or organism that the mechanist studies. There as well, she must assume the position of a disinterested onlooker. She must suppress all personal involvement in the object; any trace of subjectivity must be purged from her account. But this is an impossible ideal, for there is always some interest or circumstance that leads us to study one phenomenon rather than another, and this necessarily conditions what we look for and what we discover. We can deny, but we cannot escape being involved in whatever we perceive. Hence, we may claim that the sensible world is ultimately inert or inanimate, *but we can never wholly experience it as such.* We can, however, attempt to *render* the sensible world inanimate, either by *killing* that which we study, or by *deadening* our sensory experience. Thus our denial of participation is ultimately manifest as a particular *form* of participation, but one that does violence to our bodies and to the Earth.

Mechanism, then, is a way of speaking that denies the inherently reciprocal nature of perceptual experience. Hence, it constricts and stifles the senses; they are no longer free to openly engage things like oak trees, bird-song, and the movement of waves. We grow more and more oblivious to the animate Earth as our body becomes closed in upon itself; our direct intercourse with the sensible world is inhibited. Mechanism sublimates our carnal relationship with the Earth into a strictly mental relation, not to the world, but to the abstract image of a finished blueprint.

This mentalistic epistemology, with its fear of direct relationship and its intolerance of ambiguity, is the mark, I suggest, of an immature or adolescent science. Although it sporadically fosters grandiose feelings of power and godlike mastery over nature, science as mechanism is inherently unstable, since it is founded upon a denial of the very conditions that make science possible. Such a science cannot last—it must either obliterate the world in a final apotheosis of denial, or else give way to another mode of science: one that affirms our living bond with the world that surrounds us.

TOWARD AN ECOLOGICAL EPISTEMOLOGY

The Gaia Hypothesis may well signal the emergence of just such a mature science—a science that seeks not to *control* the world but to *participate* with the world, not to operate upon nature, but to *co-operate with* nature. If the chemical composition of the air we are breathing is, at this very moment, being actively monitored and modulated by all the Earth's organisms acting in concert, as a single, coherent, living metabolism, then the material world that surrounds us is not, in any sense, inert or inanimate. Nor are these trees or even these boulders entirely passive and inert. For material nature can no longer be perceived as a collection of detachable working parts—it is not a created machine but rather a vast, self-generative, living physiology, open and responsive to changing circumstances.

Of course, we may still attempt to speak of Gaia in purely mechanical terms, or try to conceive of Gaia as a strictly objective set of processes, straining thus to hold our science within the old mechanical paradigm. We may be reluctant to give up the dream of a finished objectivity, and of the fixed reality to which it would correspond. Nevertheless, Gaia will never fit neatly within the discourse of mechanism. A mechanism is entirely determined; it acts, as we have seen, according to a set of predictable rules that it did not itself generate. Yet it is precisely such a formulation that Gaia, as an autopoietic or self-generating system, resists. We may say that Gaia is a machine, or a set of mechanisms, that is building itself. But then we will have given up, perhaps without realizing it, that part of the metaphor that makes mechanism so compelling. That is, a machine that generates itself could never be wholly predictable. For it must improvise itself as it goes, creatively. (We have no guarantee, for instance, that the so-called "mechanisms" that Gaia employs to regulate the salinity of the oceans, or to limit the influx of ultraviolet radiation into the atmosphere, are precisely the same that Gaia will be employing two centuries from now.) Gaia, as a self-organizing entity, is no more and no less predictable than a living organism, and we might as well acknowledge the fact.

And we are entirely inside of, circumscribed by this organic entity. For the Gaia Hypothesis indicates that the atmosphere in which we live is a dynamic extension of the planetary surface, a functioning organ of the animate Earth.

The new emphasis it places on the atmosphere of this world may be the most radical aspect of the Gaia Hypothesis. For it implies that before we can begin to recognize the Earth as a self-sustaining organic presence, we must reacquaint ourselves with the very medium within which we move. The air can no longer be confused with mere negative presence or the absence of solid things; henceforth the air is itself a density mysterious indeed for its invisibility, but a thick and tactile presence nonetheless. We are immersed in its depths as surely as fish are immersed in the sea. It is the medium, the silent interlocutor of all our musings and moods. We simply cannot exist without its support and nourishment, without its active participation in whatever we do.

In concert with other animals, with the plants, and with the microbes, we are an active part of the Earth's atmosphere, constantly circulating the breath of this planet through our bodies and brains, exchanging certain vital gases for others, and thus monitoring and maintaining the delicate makeup of the medium.

So simply by breathing we are participating in the life of the biosphere. But not just by breathing! When we consider the biosphere not as a machine, but as an animate, self-sustaining entity, then it becomes apparent that everything we see, everything we hear, every experience of smelling and tasting and touching is informing our bodies regarding the internal state of this other, vaster physiology. Sensory perception, then, discloses itself as a form of communication between an organism and the animate Earth. (And this can be the case even when we are observing ourselves, noticing a headache that we feel, or the commotion in our stomach caused by contaminated water. For we are a part of Gaia. If the biosphere that encompasses us is a coherent entity, then introspection, listening to our own bodies, can become a way of listening and attuning to the Earth.) Perception is a communication, or even a *communion* between ourselves and the living world. We have seen that, phenomenologically, this is precisely the way that we commonly experience perception—as an interaction, an intertwining between ourselves and what we perceive. The Gaia Hypothesis enables, quite literally, *a return to our senses.* We become aware, once again, of our breathing bodies, and of the bodily world around us. We are drawn out of that ideal, platonic domain of thoughts and theories back into this realm that we corporeally inhabit, this land that we share with the other animals, and the plants, and the microbial entities who vibrate and spin within our cells and the cells of the spider. Our senses loosen themselves from the mechanical constraints imposed by an outmoded language—they begin to participate, once again, in the ongoing life of the land around us.

CONCLUSION

We are now in a position to succinctly contrast the epistemology of mechanism with the epistemological implications of Gaia. The mechanical model of the world entails a mentalistic epistemology, the assumption that the most precise knowledge of things is a detached, intellectual apprehension purged of all subjective, situated, or bodily involvement. It is an abstract, disembodied knowledge. In contrast, the Gaian understanding of the world—that which speaks of the encompassing Earth as a living physiology—entails an embodied, participatory epistemology. As the Earth is no longer viewed as a machine, so the human body is no longer a mechanical object housing an immaterial mind, but is rather a sensitive, expressive, thinking physiology—a microcosm of the autopoietic Earth. It is henceforth not as a detached mind, but as a thoughtful body that I can come to know the world, participating in its processes, feeling my life resonate with its life. Knowledge, in this sense, is always carnal knowledge—a wisdom born of the body's attunement to that which it studies, and to the Earth.

Finally, we may wonder what science would come to look like if such an epistemology were to take hold and spread throughout the human community. It is likely, I believe, that scientists would soon lose interest in the pursuit of a finished blueprint of nature, in favor of discovering ways to better the relationship *between* humankind and the rest of the biosphere, and ways to rectify current problems caused by the neglect of that relationship. I have written of a science that seeks not to control nature but to communicate with nature. Experimentation might come to be recognized, once again, as a discipline or art of communication between the scientist and that which he or she studies.

Indeed, many scientists are already familiar with the experience of a deep communication or communion with what they study, although current scientific rhetoric makes it difficult to admit, much less articulate, such experience. The taboos against participation are much harsher in some scientific disciplines than in others. Physicists, from Heisenberg to Bohm, have generally been much freer to openly affirm such experiences than have biologists, and many have done so. Yet the freedom many physicists enjoy to speak of participatory or even mystical modes of awareness, rests upon the fact that the objects of their study remain *transcendent* to the world of our immediate experience. In other words, to mystically "participate" with subatomic quanta (in the manner of Heisenberg's recent interpreters), or to feel oneself conjoin and participate with the ultimate origin of the universe (as do adherents of the strong version of the "Anthropic Principle") does not force science, or society, to alter their assumptions regarding the determinate, mechanical character of the world accessible to our unaided senses, and so does not directly threaten our assumed human right to control and to manipulate the natural world of our everyday experience. However, biologists, ecologists, and climatologists study this very world—the world that we can directly perceive—and they are for this reason in a more precarious position politically. They cannot readily acknowledge, much less discuss scientifically, their felt participation or rapport with the entities they study, whether insects or forests, for this would directly jeopardize our assumed human privilege and the many cultural practices currently justified by that assumption.

However, in a genuinely Gaian science, or in a genuinely ecological community of scientists, it would be manifestly evident that one is always involved in that which one studies. The effort, then, would no longer be made to avoid or to repress this involvement, but rather to clarify and to refine it. Scientists, in other words, might begin to openly develop and cultivate their personal rapport with what they study as a means of deepening their scientific insight.

Biologist Barbara McClintok, who was awarded the Nobel Prize in 1984 for her discovery, decades earlier, of genetic transposition, exemplifies the epistemology implied by a Gaian science. She insists that a genuine scientist must have "a feeling for the organism"—and not only for "living" organisms but "for any object that fully claims our attention."[10] McClintok describes a rather magical shift in her orientation that enabled her to identify chromosomes she had previously been unable to distinguish. It is the shift to a participatory epistemology: "I found that the more I worked with them, the bigger and bigger the chromosomes got, and when I was really working with them, I wasn't outside, I was down there. I was part of the system. I was right down there with them and everything got big. I even was able to see the internal parts of the chromosomes ... I actually felt as if I was right down there and these were my friends. As you look at these things, they become a part of you. And you forget yourself."[11]

As Barbara McClintok came to perceive herself inside of the living system she was studying, so the Gaia Hypothesis situates all of us *inside of* this world that we share with the plants and the animals and the stones. The things around us are no longer inert. They are our co-participants in the evolution of a knowledge and a science that belongs to humankind no more, and no less, than it belongs to the Earth.

NOTES

1) Gould's comments on Gaia were made during a lecture on evolution at the State University of New York at Stony Brook, in the spring of 1987.

2) René Descartes, *Principles of Philosophy*, part IV, principle CLXXXVIII; in *The Philosophical Works of Descartes*, translated by Haldane and Ross (Cambridge University Press, 1931).

3) For an excellent and finely documented historical overview of these controversies, see Brian Easlea's *Witch-hunting, Magic and the New Philosophy: An Introduction to Debates of the Scientific Revolution, 1450-1750* (Humanities Press, 1980).

4) Campenella is quoted in Easlea, p. 105. A fine discussion of alchemy may be found in Frances Yates, *Giordano Bruno and the Hermetic Tradition* (Vintage Press, 1969). See also the discussion of alchemy in relation to early modern science in Evelyn Fox Kellar, *Reflections on Gender and Science* (Yale University Press).

5) From Bacon's *Of the Dignity and Advancement of Learning*, cited in Easlea, p. 128. See also P. Rossi, Francis Bacon: *From Magic to Science*, translated by S. Rabinovitch (Routledge, 1968).

6) On this reading mechanistic science went hand in hand with a Christian metaphysics. The schism that we have come to assume today between the scientists and the theologians, or between science and religion, only really began with the publication and dissemination of the *Origin of Species*. For Darwin was beginning to speak of a sort of creative power inherent in nature itself; he wrote of a *natural* selection—a selective power *internal* to nature. Of course, by using the metaphor of selection he was still propagating a metaphysics somewhat similar to that of the Church (in which he had been steeped as a young man): "Selecting" is the kind of thing that an anthropomorphic divinity does; and we can see from newspaper articles of the time that many readers interpreted Darwin's use of the term "selection" as a sort of indirect argument for the existence of God. Darwin's correspondence indicates that he remained somewhat attached to the idea of a transcendental divinity; it may well be that Darwin's use of the term "selection," with all its associations of humanlike will or *choice*, helped him to reconcile his revolutionary theory with his religious beliefs. (See Robert M. Young, *Darwin's Metaphor*, 1985, Cambridge University Press, pp. 79-125.) Nevertheless, Darwin's work was the first to imply a creativity inherent in nature itself, and this was a blow to the Church ... We now are beginning to discern that if the so-called environment "selects" the organisms that inhabit it, so those organisms also "selectively" influence that environment; perhaps, then, given

this more open, circular causality, "selection" is not such a useful term. The interaction is a much more reciprocal phenomenon than that suggested by the metaphor of selection—it is more a sort of dialogue wherein the environment puts questions to the organism and the organism, in responding to those questions, poses new questions to the environment—to which that environment, in turn, responds with further questions. It is precisely this sort of open dialectic, this mutual participation between the organism and the Earth, that the Gaia Hypothesis is beginning to thematize and articulate.

7) Descartes's major follower, Nicholas Malebranche, wrote that (non-human) animals "eat without pleasure, they cry without pain, they grow without knowing it; they desire nothing, they fear nothing, they know nothing" (Easlea, p. 128). The mechanical philosophy was an oft-cited justification for the vivisection experiments that began to proliferate in the 17th century (and that continue in numerous laboratories today).

8) The subtle alliance between mainstream science and institutionalized Christianity is still with us, however. It is exemplified today in the Vatican's collaboration with the Max Planck Institute, the University of Arizona, and other research institutions in the effort to build a "state of the art" astronomical observatory atop Mt. Graham in Arizona. Besides jeopardizing a rare "sky-island" ecosystem, construction of the telescope complex will likely mean the extinction of the Mt. Graham Red Squirrel, a species of shy creatures whose numbers have already dwindled to a scant 140-200 individuals. In keeping with the human-centered assumptions embedded in the mechanistic worldview, both the Vatican and Big Science are eager to peer beyond the earthly realm in order to penetrate the mysteries of the farthest heavens, even when it entails further destruction of the life and mystery of *this* world.

9) Maurice Merleau-Ponty, *The Visible and the Invisible*, edited by Claude Lefort, translated by Alphonso Lingis (Northwestern University Press, 1968). See also Merleau-Ponty's seminal text, *The Phenomenology of Perception*, translated by Colin Smith (Routledge and Kegan Paul, 1962).

10) Evelyn Fox Keller, *Reflections on Gender and Science* (Yale University Press), p. 166.

11) Cited in Keller, p. 165.

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Horseshoe Mesa

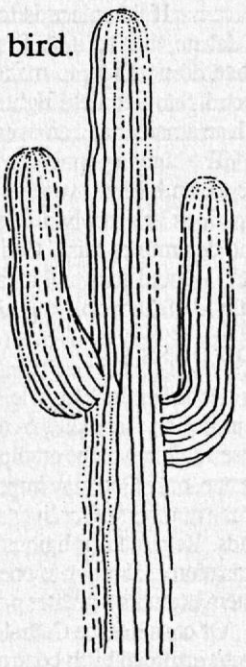
We stood at the rim
packs not yet part of our selves
we not yet part of the Canyon.
A dusting of snow underfoot
in the shadows of sandstone walls.
We picked our steps, down, steeply.

That evening at the river, aqua and white,
driven between sandbar and black cliff-face,
amber in the sun's decline.

In Tucson I pause, think hard
not of formulas and plot
but of a man, dead,
how he rose like a gas, a cluster of molecules
dispersing as it rose, a final exhalation
like our smaller, daily breaths.

Dawn, Horseshoe Mesa, a red butte there,
my pack, our tent, orange and blue below.
The wind, its cool breath rifles my hair
and it's no longer me
it's us all and there's no longer anything to wait for
and there's nothing to wish back again.
I breathe out and far below:
the river, the white throat of a bird.

—Gungle, Nagoya Japan



Population Problems

Responses and Non-responses to Overpopulation

by Jim Nollman

Although human overpopulation is one of the foremost issues of our time, it is also one of the least engaging to people possessed of imaginative ideas. Trying to deal with it is simply too thankless a task in the short term, involving, as it does, bucking our culture's most cherished notions about religion, freedom, death, sex, morality, and science. Otherwise thoughtful and caring people shun the population debate entirely. This general trend of avoidance and denial is one of the greatest intellectual tragedies of our time.

The debate needs to be reframed: although obvious, this remains a daunting task. Just to begin, we need to find some means to strip away the layers of cultural taboo and existential uncertainty that cause people to uphold the silence. Somehow we must proceed, though, because, ultimately, all the rest of the so-called environmental agenda hinges upon the human race's ability to solve this root problem. If this piece is to add anything to the debate, then let it be, first, that I choose to utilize no numbers to make my points; and second, that I confess right up front to being both an amateur and an overpopulator.

The human population may double from five to ten billion over the next thirty years. Questions arise: when is enough, enough? Who determines this? God? Statistics? Nature? I would answer that, at least at present, all three of them do.

GOD DOES IT

Consider, for example, the orthodox religious notion that exalts human beings as the chosen children of the omnipotent God. In this scheme, only God may impose restrictions on human numbers. Our lives are entirely in His hands. Regard the religious Right's utter condemnation of abortion as one way such a belief system nurtures a greater population.

Or consider the Catholic Pope who condemns artificial birth control, and whose following is strongest in those very countries where overpopulation is most onerous and where contraception offers a cheap solution. In a world where patterns connect, the anthropocentric Church emerges as a de facto promoter of malnourishment and environmental degradation in the Third World. The Church teaches those poor souls who overpopulate this world by not opting for birth control, that they are the only ones who get rewarded by going to heaven. So the poor learn to perpetuate their own pain by clothing it in the garb of salvation.

Put another way, the Church teaches its faithful that human beings have a responsibility to take no responsibility whatsoever for the devastation the human race is currently rendering upon God's planet. Let's name the first population theory: the God Does It Theory.

THE NUMBERS DON'T LIE

Population dynamicists agree that there are limits to human growth. They also seem to agree that the size of that critical mass can be determined through a precise reading of statistics.

A growing majority of statisticians read the signals emanating from all over the planet and conclude that our species has already surpassed the critical mass. These signals include (to name just a few) the rising cost of housing in Peoria Illinois, families turning to home gardens, mass starvation of children in Africa, the inability of forests to keep up with the demand for wood products, the popularity of rap music, condor extermination in North America, accelerated flooding in Bangladesh, suicide and skin cancer among adolescents, estimates of the number of days before US demand would exhaust the oil supply within the Arctic National Wildlife Refuge, and the Greenhouse Effect affecting everything everywhere.

Although population dynamics is based on the objective modeling of data, its very subjective utilization by the readers of those models often dilutes its authority, and allows opponents to contain its impact. A meta-model emerges that, first, acknowledges this subjective/objective tension, and second, tosses in the McLuanesque idea that the very medium of statistics is also its most obvious message. Statistics can be regarded as a set of numerical opinions or indicators that point out something important about the belief system of the statistician. There will always be other statisticians capable of patterning very similar sets of statistical signals to reach very different conclusions about the holding capacity of the planet.

With so many statistical parameters available, a consensus about what any of them signify is rarely attained. Moreover, our own democratic process demands to drive the vehicle of consensus. Where consensus is not found, democracies bog down, and action is rarely taken. This is why, no matter which numbers you use to construct your statistical highway, no one ever trusts them enough to drive on it. It is a Cheshire cat kind of highway where all the signs keep changing.

Population control is the strongest medicine that any government could ever prescribe to its citizens, requiring politicians to legislate control over sexual, religious, and social mores. It suggests a degree of mobilization never attempted by our own government except, possibly, during war.

All to say that legislative activities geared to curb overpopulation will not occur in the United States until an emergency situation creates a desperation factor capable of negating the orthodox strictures imposed by religion, sex, and culture. In the modern world, only China seems to have finally reached that unblessed state of grace. Unfortunately, the example of China also hints that only a totalitarian state can impose real strictures on established religion, sex, and culture. It begs the question: what comes first, the desperation factor or a totalitarian government capable of dealing with it?

Paradoxically, statistics offer a crutch for politicians to justify not acting. No one in power will insist upon unilateral political action until some fundamental consensus is reached among the experts. The experts pretend to be objective, while actually relying heavily upon statistical opinions which rarely breed consensus. Meanwhile, actual people possessed of an intuitive understanding about the impending disaster that looms over us will never be given an equal voice with the experts. Intuition and wisdom are simply not given the same power as hard data.

This paradox seems so central to this statistics view that we do best to name the second strategy: the Numbers Don't Lie Theory.

SOMEONE ELSO WILL TELL US WHAT TO DO

When the Numbers Don't Lie Theory and the God Does It Theory are seen side-by-side, they seem to describe what has long been known as the separation of church and state. However, because this perceived separation actually describes a unified front of non-action, the two theories might also be understood as one theory. Indeed, both views subscribe to an underlying belief that, like so many other remedies we seek, the answers will eventually be provided through external means. It doesn't make much difference whether God or statistics keeps us from controlling population: in both cases, population control is never perceived as our own human responsibility. If we wait until the desperation factor is attained, somebody or something else will tell us when we can and when we cannot have more than two children per couple. How this will actually be manifest is currently predicted in horrific science fiction terms—the stuff of "1984" and "Brave New World." Nowhere is limiting family size presented as a positive, life-affirming step.

This third, unified theory might best be called: the Someone Else Will Tell Us What to Do Theory.

While human beings continue to invent all sorts of reasons not to act, nature never fails to assert itself itself through such ongoing natural acts as mass starvation and plague. Consider the myth of the lemming. When these rodents reproduce beyond the environment's ability to sustain them, some observers believe, they commence a mass migration that eventually ends when enough of them get eaten or drown. The population plummets. Lemming behavior is sometimes described as an instinctual embracement of mass suicide. Others say the migration (a result of territorial encroachment), not the suicide, is instinctual.

Either way, people agree that the lemmings have a behavior for dealing with their own population surges. It does not seem preposterous to compare it to our own human predilection for war as a means to decide territorial conflicts. Should we, then, view war as a natural population control manifested by desperate humans? This is by no means an original idea, yet to most people it sounds utterly heretical. Perhaps more heretical still, we might alter national perceptions of war as a conflict between nations by renaming our own Department of Defense (which was until fairly recently known as the department of war): the Department of Population Control.

THE NATURAL LAW ADVOCATES

This leads, of course, to a nearly insuperable moral question that always stultifies the discussion about human overpopulation. It goes something like this: how does one speak about the dilemma of overpopulation without running the risk of sounding like a Hitler? Bring up the subject and any solution you suggest starts to smack of a final solution. What had seemed a positive, life-enhancing proposition for our children's children, begins to sound instead like a call for the next holocaust. Any writer who promotes AIDS or famine or World War III as "nature's solution" to overpopulation is universally chided. Who dares to offer guidelines describing whom the rest of us must turn our backs on?

Both Garrett Hardin and Dave Foreman trod this shaky but crucial ground a few years ago. Here's the basic argument: Instead of utilizing all of humanity's technology to save every human life, let us instead permit natural disasters to run their course. After all, a natural disaster is a process and a message from nature to contain population growth. Starvation in Africa? Largely caused by environmental degradation leading to drought and desertification. An AIDS epidemic? Any sexually transmitted disease is obviously a message about birth rates. The spread of AIDS is an example of the same natural selection that applies to every other animal in nature so why not to humans as well?

Unfortunately, when the concept of natural selection is applied to human society, it too easily transmutes into a synonym for bigotry. After all, survival of the fittest also signifies death of the weakest, meaning that there exists a morality above human societal ethics that actually promotes tyranny against the downtrodden. This view is known as social Darwinism.

A clarification seems in order before we proceed. Very few of either the promoters or detractors of Natural Law deny that plague and famine are nature's methods for controlling population. In other words, the issue here is not whether unimpeded nature will take its toll, but rather, whether or not human society should reign in its own technological powers and defer to this natural law. Is it unethical to sit back and do nothing in the face of natural selection?

The detractors argue that humans are not wild animals, and whatever befalls the human species is as much a social and political issue as it is natural. Famine, for example, may indeed strike the weakest, but the weakest are also the victims of a colonialism that totally disrupted formerly self-sufficient indigenous cultures. We always find it easy to punish the native, who lives out of sight, for a problem that Western culture caused. Aren't we Westerners, then, morally obligated to own up to our colonial legacy, past and present, by airlifting food?

And AIDS? Modern culture has been presented with a disease that spreads by the transfer of human juices: especially blood and sperm. Significantly, those most prone to the disease include drug addicts who share needles, and individuals who share sexual partners with many others, most notably homosexuals. Doesn't compassion dictate that we help them?

So far, the Natural Law advocates have won very few converts to their side. The interpretation (and more often, the misinterpretation) of the radical credo too often makes them appear callous, promoters of mass starvation and pandemic. The political Left chastises them for bigotry, because a hands-off attitude toward disease and starvation primarily affects the human disenfranchised. The political and religious Right chastises them for both cruelty and naivety. Didn't God create "mankind" to have dominion over nature?

Unfortunately, this vilification from both the Left and the Right, makes it exceedingly difficult to sort out whether the ideas of the Natural Law advocates are fascist and horrific or too bold, too sober, and too organic for the times we live in. As the debate continues to unfold, the actual platform of the Natural Law advocates continues to be obscured in favor of simplistic revilement. Many of the printed reactions reflect the deepest emotions of a culture caught in an elaborate ritual of denial. For example, some mainstream environmentalists refuse to acknowledge that the more violent solutions to overpopulation may actually be the most natural and ecological solutions. To connect mass starvation with planetary preservation does not fit the planet-saving image promoted through fundraising brochures. No one wants to appear in collusion with such ideas.

If nothing else, let us all recognize that it takes some bravery for the Natural Law advocates to go so far out on an intellectual limb. I view their gloomy ideas as an emotional harbinger of one very possible future. These currently abhorrent thoughts are not going to vanish.

Are we all deluding ourselves into believing that, somehow, someone else will come up with a solution to overpopulation that is not based on desperation and violence? It is a difficult question which is exacerbated by the view, in our culture at least, that dying is not a natural and agreeable conclusion to living.

The critics of Natural Law sincerely preach social justice, new technology, medi-

INTERSPECIES COMMUNICATION

273 Hidden Meadow Lane, Friday Harbor, WA 98250

Jim Nollman's organization, Interspecies Communication (IC), was formed in 1978 to promote a better understanding of what is communicated between human beings and other animals. Through its publications, network, and especially its field projects, IC strives to create processes and instill values that help re-establish ecological balance and respect for the integrity of all life forms on this planet. We are best known for our musical communication work with various species of whales and dolphins in the wild.

IC does not practice science, nor has the work of the organization ever been overly concerned about cracking some "code" of non-human language. We are not missionaries preaching eco-mysticism, new age or otherwise. Instead, our projects sponsor conceptual artists, musicians, and people with a well-developed deep ecology ethic, because the interface between humans and animals is in dire need of some new modes of problem solving. We are essentially populists engaged in the work of whipping these currently radical ideas and methods of deep ecology into an imaginative form more accessible to the general public. Sometimes our work ends up entertaining everybody. Other times we irritate the powers that be. We have been known to play the environmentalist, the artist, the scientist, and the jester.

IC explores the interface between species in any way that promotes mutual respect, and in any way that makes metaphors and media within the human sphere. Not surprisingly, getting as close to wild animals as we do, IC also serves in the crucial role of *witness* to the tragic demise of species. This act of witnessing usually proves to be our most important function.

cal responsibility, and even peace in our time; but they fail to come to grips with the simple fact that these are all symptomatic remedies which do nothing whatsoever to confront overpopulation itself. For example, while we cheer the rock stars who insist upon remedying starvation in Ethiopia, let us never forget that much of the Sub-Sahel has become uninhabitable. Many more will die when the relief workers and the camera crews turn their attention elsewhere.

Hopefully, the heat generated by the Natural Law advocates will make the rest of us realize that the population issue cuts more deeply than we have yet been willing to recognize. When we acknowledge social ills as symptoms of overpopulation, it sometimes produces a frightening apprehension of the problem. For example, if we regard the current drug epidemic as a function of overpopulation, it transforms itself into our society's subconscious means of eradicating those least fit for survival. Meanwhile, the desperation factor continues to grow within our culture, causing more drug-related problems. As this process quickens, deepens, our current cures (the so-called war on drugs) appear ever more like placebos.

WHO OVERPOPULATES?

Remember *A Night at the Opera*, when Groucho Marx keeps inviting passersby to join his overcrowded stateroom party? The scene is considered a classic of movie comedy, and the audience in the movie theatre always ends up laughing as they watch this striking ode to overpopulation unfold before their eyes.

But who is the audience in the real world of population dynamics? When I get smug about it, I sometimes believe that I could be one of them, a person who observes what is going on from "outside" of the stateroom. But if so, where is this "outside" inhabited by this "audience"? Is it in the United States where one still finds five acre zoning plats? Certainly parts of the US offer solace from the dam already breaking in places such as India, Sub-Sahel Africa, the east coast of Japan. But solace is not safety. Nor does complacency stop the tide. Beware thinking you're in the audience. It doesn't exist.

Given that the Natural Law advocates have been categorized as doomsayers, one might justly conclude that pessimistic ideas about dealing with overpopulation will not go very far in our society. Our culture possesses too many entrenched ideas about the noble purpose of human life. And again too much denial surrounds the fact of death. Somehow, we must make the objective of a stable world population the ultimate optimistic goal of our lifetime. But how?

We face the problem better if we accept our lives and our species evolution in simple natural terms. We need to devise new and positive images that bring human beings back into the loop of nature. And though people in high places will continue to assert that technology and medicine are humanity's greatest achievements, we must begin to teach our children that technology is, at best, a mixed blessing. Paint it as it is: the first cause of the environmental crisis.

We must teach our children that famine and disease are, indeed, complex events. The debate about how we address human suffering in the face of overpopulation is a debate about choices and it needs to be aired as such. We humans have not only devised the means to solve famine, but also have chosen a moral dictate to have to solve it. It is our choice. In recognizing it as a choice, we start to deal with our own denial.

How might medical ethics be transformed, once we admit that every proposed solution to human overpopulation must butt up against the brick wall of human dying. A shift in perception about death is absolutely essential if we hope to manifest a shift in perception about our own place within nature. Our denial of death is the reason why, when some free thinker wonders aloud if famine or disease or war might be a natural process of mortal beings, many of us hear it as bigotry. That negative reaction reflects a deep-seated taboo in Western culture against accepting and, yes, even advocating death as a part of life. When do we stop killing the messenger?

AN ECOLOGY OF LIFESTYLE

Psychologists warn us that language reflects perception; meaning that we might begin the process of transforming our perceptions by first transforming our language to fit the looming reality. For a simple example, how many people are "enough?" Some experts believe that the world can accommodate 4 times as many humans as it does now. Others think in terms of 8 times fewer people. What will it be: 20 billion or 500 million? Less? In terms of language reflecting perception, these numbers define this very nebulous word, "enough," as it pertains to population limits. The same people who decide such numbers also end up defining the word "enough."

Which leads to another vague word: "lifestyle." Any lifestyle that permits us to live and die as part of nature is probably best regarded as an ecology of lifestyle. Such a blessed perception of place teaches us that the population crisis begins and ends inside each one of us. We get connected when we act connected.

An ecology of lifestyle asks its bearers to feel the earth and then willingly control their own child-bearing prowess. Tell all your newlywed friends to make the conscious choice to have no more than two children. This makes good sense, if for no other reason than it is probably the only non-violent solution for dealing with human overpopulation. Remind your friends and especially your enemies to have at most two children. Simplistic? Certainly. Naive? I hope not.

But how does one present our freedom-loving culture with an image and a method for imposing strictures upon lovers in order to stop them from having more than two babies? How do we achieve that crazy state of grace without inflicting penalties on them if they fail?

Actually, as more and more people become acutely aware of their own place within nature, the solution begins to assert itself. A new perception about self and community—a new choice in lifestyle—is the solution. In other words, people possessed of an intuitive understanding about the impending disaster will no longer rely on politicians or orthodox religion to provide guidelines for action.

This is an optimistic message, and already the requisite change in mood is taking hold in many parts of the world. This optimism will continue to win converts because, among other reasons, zero population growth is a far more attainable goal than containing starvation in Africa. It is an eminently more desirable solution than heeding the Natural Law advocates who advise us to do nothing to stop it. Yet let us all thank the Natural Law advocates for putting this important idea on the table for everyone else to confront.

On that note, I propose a fourth population theory that combines the spiritual, the political and the natural. It includes our changing attitudes toward death and our changing attitudes toward this planet. Some call this fourth theory deep or spiritual ecology. Either way, it is primarily an ecology of lifestyle. The term "lifestyle" has much power simply because it is morally neutral. It accrues no value judgments on its own behalf. There is nothing deep to make others feel shallow: nothing spiritual to make others turn skeptical.

One caveat: to paraphrase physicist Max Planck, a shift in cultural consciousness can never take hold until the bearers of the old paradigm have died. Perseverance furthers. Teach your children. And good luck.

Jim Nollman is the founder of Interspecies Communication (273 Hidden Meadow Lane, Friday Harbor, WA 98250). He lives in the Pacific Northwest when not cavorting with cetaceans.

Population Problems

A Different Kind of Disaster

Lessons of the Chicago Flood

by Franklin Rosemont

The Great Flood of '92 has changed the image of a city. Almost anywhere today, when you mention Chicago, people go "glug-glug-glug" instead of "rat-tat-tat." More important, the Flood turned the eyes of the world on a river that is an alarming symbol—and an alarm-signal—of all that's wrong with humankind's relation to Nature.

The Chicago River is unquestionably one of the most mistreated waterways on this mistreated planet. For more than 150 years it has been manipulated, abused and tortured by legions of engineers, developers and city-planners. Its thirty-odd miles have been burdened with more than fifty bridges. Wrenched from its banks, rearranged, shoved aside, straightened and deepened, the Chicago was even forced to run backward.

This last was no easy feat; starting in 1890, it took thousands of workers ten years to do the trick. First they had to build a series of locks to isolate sections of the river, gradually raising the water level so that, in the end, the water flowed away from the mouth of Lake Michigan. Fortunately, this outrageous stunt did not become a fad. According to the *Tribune*, the Chicago "remains the only major river in the world that flows the wrong way."

Long before 1890, however, and long after, the River was used as a canal, garbage dump and sewer. In the 1980s it retained such a high concentration of hazardous polychlorinated biphenyls (PCBs) that even Reagan's Environmental Protection Agency designated it "toxic." More recently, after two decades of fruitful agitation and education by radical environmentalists, the River's wounds showed some promise of healing, and it was upgraded to merely "polluted."

Adding insult to uncountable injuries, every March the River is dyed bright green by the City Council, in the name of the notorious legendary herpephobe, St. Patrick. Sad but true, this is as close as those who pretend to run the city ever get to "green politics."

Despite the horrors inflicted on it, however, the Chicago River has never ceased to be a thing of beauty. Gloriously glistening, its serpentine meanderings through the metropolis are a constant reminder that the natural world persists even in the industrial urban chaos of carbon-monoxidized obsolescence and wall-to-wall cement.

For centuries the Potowatomi seem to have gotten along with the River just fine, but most of the early European "explorers"—the motorcycle gangs of the pre-motorcycle age—found it "intractable." For them, the River's two branches—the north, which ran through dense forest, and the south, a vast and constantly changing marsh—were just obstacles. Sure that China with its fabulous riches was just around the corner, these would-be "conquerers" got out as fast as they could. Not until the middle of the nineteenth century, when Chicago became the biggest boomtown in the land, did hard times fall on the River.

Those who represented the needs of industry and urban expansion found the Chicago an endless source of "problems," but it was valuable for trade and transportation. The City Fathers treated the River according to tradi-

tional patriarchal etiquette, punishing it for its transgressions against civilized law 'n' disorder.

On 13 April 1992, the River rebelled. A construction firm hired by the city had replaced some old pilings, unaware that the section of the river they were working in happened to be *above* some of the sixty miles of tunnels that underlie the city's central business district. The new pilings pierced one of the underground tunnels, and the Flood was on.

"I knew there were big problems," said the Superintendent of Police, "when we got reports of fish in basements." And here I thought today's cops were deficient in the art of deduction!

Actually, the leak had been noted as early as February, but not until water was "pouring" into the Merchandise Mart at 5:57 a.m. on the 13th did the "powers that be" realize that "something should be done." Which confirms the old adage, "Nothing is less likely to produce good results than a memo on a bureaucrat's desk."

This was the biggest flood in the city's history, but hardly anyone really saw it: It was invisible and underground. Its effects, however, were everywhere and unmistakable. The River filled the entire labyrinth of subterranean tunnels—in which the city's major electrical systems are located—as well as the huge subbasements of the big government buildings and department stores. Several blocks of downtown buildings, starting with City Hall, were evacuated. Every shop and restaurant on State Street, long celebrated as one of the busiest streets in the world, were closed. Commonwealth Edison turned the electricity off. The subway was shut down. Telephones didn't work. Stoplights were out.

Someone called the Chicago Flood "a different kind of disaster," and not just because the streets were dry. One unusual thing about it was that no one was killed or seriously injured. Indeed, aside from a few politicians, businessmen, and the directors of the Board of Trade, everyone seemed to have a wonderful time. Even the major media—which usually misses everything important—noted the prevailing "carnival" atmosphere. Thanks to the flood, 250,000 downtown workers got an extra day or more off, with pay. On the first day, many downtown buses let passengers ride free. Hundreds of the homeless got gourmet meals. (With their refrigerators off, downtown restaurants found it cheaper to give food away than to pay to have it removed.)

"This isn't funny," Mayor Daley advised the population, but few seemed to agree. As the floodwaters continued to rise, flood jokes filled the air—all at the city's expense. "The River with the hole in it" was the hero of the hour. Chicago's pompous motto, "The City that Works," became "The City that Leaks." In the strange war between the City and the River, most people were on the side of the River.

In the past half-decade, with restoration efforts that at best could be called half-hearted and preposterously underfunded, at least seventeen species of fish—including gizzard shad, bluegill and pumpkinseed sunfish—have returned to these waters in which, for years, only carp had managed to hold out. Along the shore, largely birdless for years, ducks and geese have been nesting as their forebears had for eons before certain other two-legged creatures began accumulating capital and other garbage. This suggests how much could be done if all dumping in the River was stopped and restoration of the River was taken up with something approximating seriousness.

That the River too has its rights, that it is vastly more important than the Board of Trade, that its freedom and well-being are a precondition for our own: such plain and simple truths are, alas, still regarded as visionary—if not utterly mad—by the rulers of this Midwestern Myopia.

Meanwhile, the Chicago River has spoken. Woe unto those who heed it not!

Franklin Rosemont's latest book is Juice Is Stranger Than Friction: Selected Writings of T-Bone Slim, *published by Charles H. Kerr in Chicago.*

Population Problems

An Ecofeminist's Quandary

by Kelpie Wilson

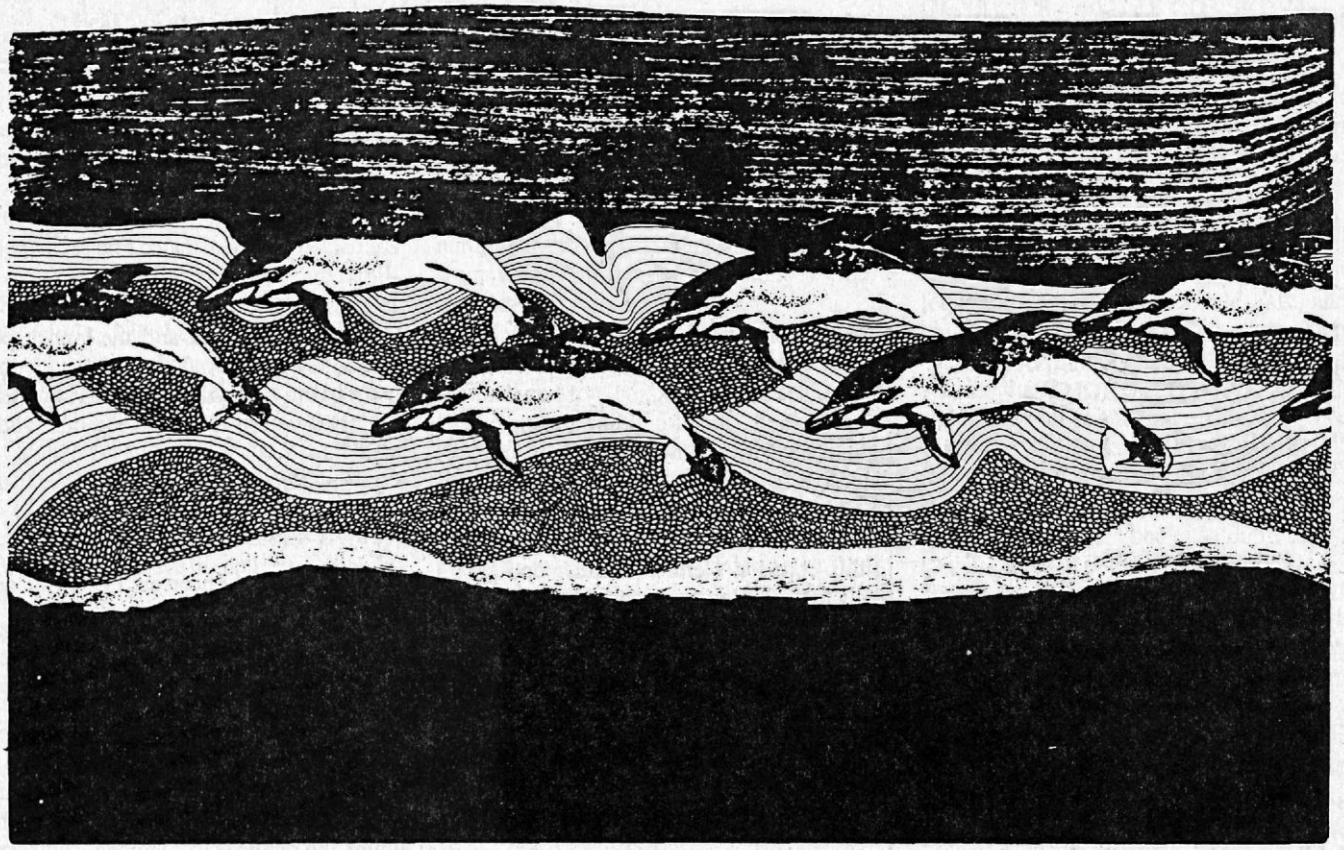
As a life-long environmentalist and pro-choice feminist, I am astounded to find myself involved in a landmark court case that appears to pit my two beliefs against each other, and to find myself receiving support from anti-abortion forces. The issue is whether or not an Earth First! blockade of a logging show in the National Forests has the same legal standing as the Operation Rescue blockade of an abortion clinic. Oral arguments on our case were heard by the Oregon Supreme Court on May 4.

In July of 1987, six of us were arrested for chaining ourselves to a logging yarder at an old-growth timber sale in the Siskiyou National Forest. We were protesting the logging of the last stands of ancient forest. Our protest was completely non-violent. We held up the logging for one day; the loggers went right back to work and eventually cut every tree in that stand. The six of us served two weeks in jail and paid $3350 in restitution and fines. Four of us were beaten up in jail by neo-nazis because one of us was a black woman. Then, to top it all off, we were sued for $50,000 in punitive damages by Huffman & Wright Logging, the contractor that owned the yarder.

Our defense rested on our constitutionally protected right to freedom of expression, a right that would be violated by the assessment of punitive damages. But in 1988, a Roseburg jury found that we must pay $25,000 in punitives. Last fall the Oregon Court of Appeals denied our appeal, ruling that our act of trespass on Huffman & Wright's yarder made us liable for punitive damages, effectively sidestepping the issue of freedom of expression.

In the case of Lovejoy Surgical Center vs. Miller, an abortion clinic has sued Operation Rescue protesters for punitive damages to keep them from blockading their clients. The defendants have filed a "friend of the court" brief in our behalf, in the hopes that a precedent will be set in our case that will apply to them. Lovejoy Surgical Center has filed a brief *against* us.

On the surface, it would appear that these are two parallel cases. One group is willing to blockade loggers to save trees and the other is willing to blockade women to save fetuses. Both groups claim to be involved in first



amendment-protected free expression. In order to distinguish the two cases before the law, one could ask about the fundamental rights involved. Isn't a woman's right to control her own body more important and more fundamental than a logging contractor's right to take timber from public lands?

But by the nature of first amendment cases, the content of the protest may not be taken into consideration. Instead, one must examine the form of the protest to determine whether or not it is constitutionally protected expressive conduct. The U.S. Supreme Court has a test for expressive conduct. The test is, was there an intent by the protesters to portray a particular message to the public?

When we chained ourselves to the yarder, we knew we had no chance of actually stopping that particular logging operation. Our intent was to get the media to drive many miles into the backcountry on bad logging roads so that pictures of the destruction going on there would get out to the American public. Ultimately, the Sapphire Six protest together with other colorful and non-violent Earth First! protests have been successful in communicating the message of ancient forest destruction to the American public.

When applying the Supreme Court test to Operation Rescue protests, however, the result is not so clear. By appearing day after day at the same clinic, blockading and harassConstitution. The Constitution needs to be amended to give women equal rights, rights that do not extend to fetuses.

Another urgent constitutional question is beginning to be raised throughout the land, and it concerns the land. Some property owners are organizing opposition to environmental regulations, claiming that limiting their development of their property constitutes a "taking" of that property. In reality, when filling in a wetland destroys wildlife that many people value, the property owners are taking away a resource that belongs to everyone. Private property rights have too much protection in the Constitution. Several ways have been suggested to correct this situation and extend constitutional protection to the land. One is the "deep ecology" approach; we could give other life forms basic rights in some sort of constitutional "Endangered Species Act." Another way, the "communist" way, would be to do away with private property altogether and make all land use decisions for the common good of the people and the environment. A third, "capitalist" way is often proposed that would attach a dollar value to clean air, spotted owls, soil microorganisms, etc. This is the approach that gives us "pollution rights" for companies to sell or trade.

But "rights" are ultimately based on "values." Our society is deeply divided on questions of basic values, and many of the deepest divisions are brought out by both the timber and abortion issues. Both anti-abortion and pro-timber industry groups like to speak in terms of humans vs. other species. The anti-abortion bumper sticker: "Be a Hero, Save a Whale; Save a Baby, Go to Jail" sounds a lot like the pro-timber "Save a Logger; Eat an Owl." In a way, they are implicitly recognizing the carrying capacity limitation of the Earth. More humans on the planet means less room for owls, whales and other species. In fact, if current trends continue, our grandchildren may live on a planet inhabited by less than half of the present species.

Environmentalists tend to value quality of human life over quantity of human life. As biologist Garrett Hardin says, "God does not give a prize for the most people." If there are too many of us, we will never find a way to live sustainably on this planet. Safe, legal abortion is an essential component of family planning services. We must remember that the Earth herself is a mother to us all. While all of her children have a right to exist, too many of any one kind will overburden her. Just like a human mother, too many children will stress her and destroy her ability to be a good mother to any of us. And, when Ma gets pissed, the Constitution is going to be as significant as a chewing gum wrapper on the floor of your room.

Book Reviews

Readings

THE JACKSON HOLE ELK HERD—INTENSIVE WILDLIFE MANAGEMENT IN NORTH AMERICA

by Mark S. Boyce; 1990 Cambridge University Press, New York. 306 pages with appendixes and references. $75.

Mark Boyce, a professor of zoology at the University of Wyoming, has spent years studying the Jackson Hole Elk herd which winters near Jackson, Wyoming adjacent to Grand Teton National Park. Management of this herd of more than 10,000 Elk has long been controversial and exemplifies problems associated with hunting, logging, livestock grazing, subdivisions and oil exploration. Instead of aggressively purchasing winter range in the Jackson Hole area years ago, the state of Wyoming chose to begin a winter feeding program. The program is expensive and creates conditions conducive to disease transmission, with large concentrations of animals in small areas. Boyce believes that the benefits associated with continued feeding outweigh the costs, although he admits that this solution is less desirable than having a wild, free-roaming, self-sufficient Elk population.

Boyce discusses the pros and cons of winter feeding, conflicts with other land uses such as livestock grazing, and the controversial hunting of Elk in Grand Teton National Park — one of the few national parks in the world where hunting is permitted. Hunters killed more than 700 Elk inside the Park in 1990. The book details how Elk numbers are "managed" to maximize hunter opportunity and perhaps secondarily to provide wildlife viewing.

According to the author there used to be fewer Elk in Grand Teton National Park. Elk shifted their migrations west into the Park in response to heavy hunting along their traditional migration route which passes south from Yellowstone Park through the Teton Wilderness and Mt. Leidy Highlands into the Jackson Hole and Gros Ventre River drainages. A significant change occurred after the paving of a major highway between Jackson and Dubois, which cut across the heart of the migration corridor. Likewise, road-building into the Mount Leidy Highlands, on the Bridger-Teton National Forest, to permit logging and oil and gas development, increased hunter pressure.

This is a classic example of how habitat fragmentation by road-building and increased human activities can significantly impact wildlife behavior. One obvious solution would be to close all secondary roads and access points, and to severely restrict or stop hunting in this corridor. Neither of these options is likely to be implemented soon.

Wyoming Game and Fish's logic is circular. The reason we must hunt Elk in Grand Teton National Park, we are told, is that there are too many Elk on the National Elk Refuge in winter. In order to keep Elk numbers in balance with available feed, we have no choice but to kill thousands annually — hunting is the preferred method of population control. However, the reason we need to kill thousands annually is because the normal winter mortality in the Jackson herd has been significantly reduced since the Elk are fed hay on the refuge and elsewhere on wintering grounds. Another reason given to justify winter feeding is that domestic livestock grazed on public lands each summer reduce forage available for Elk in winter.

There are other solutions: Expand winter range by purchasing private ranch holdings in the area, reintroduce predators including the Gray Wolf, stop the winter feeding program, eliminate livestock grazing on all habitat utilized by Elk, close all hunter access roads and reduce or stop hunting in Elk migration routes. Some of these recommendations are being implemented to a limited degree. Some private inholdings have been purchased. Wolves may be reintroduced. It is clear from reading the book's conclusions that the author would not necessarily object to most of these recommendations. However, if you accept the premise that these are unrealistic alternatives, then you come to the conclusions that drive the annual National Park hunt.

Perhaps the best reason to read this book has to do with what management of the Jackson Hole Elk herd may portend for the future of wildlife everywhere if we are not careful. In reality, management of the Jackson Hole Elk herd does not differ significantly from livestock ranching, and the consequences are a domestication of Elk and the landscape in which they live. A more visionary approach to both land and wildlife preservation is essential if we are to truly keep our wildlife "wild."

—Reviewed by George Wuerthner

SISTERS OF THE EARTH

edited by Lorraine Anderson; 1991; Vintage Books (Random House); 464pp. $13.

Most well known "nature writers" are men, a fact that may reflect both their greater ease of access to the outdoors and society's proclivity to accept them as authorities. Women, if they figure at all in such writings, are peripheral; the tacit assumption by both author and public is that women's wilderness experiences can be subsumed under the heading "Man and Nature."

Lorraine Anderson was perplexed and disturbed at the dearth of available women's writing about nature. She admired such authors as Thoreau and Abbey and concurred with their conclusions but believed that, in order to achieve diversity and balance, women's voices must be heard. *Sisters of the Earth*, her collection of women's prose and poetry about nature, is the result.

Anderson states in her preface that she doubts there is a woman's view of nature. "Women, like men," she contends, "are individuals, each with a slightly different perspective, conditioned by innate sensibility and experience. It now seems to me that there are as many women's views of nature as there are women."

There are indeed. *Sisters of the Earth* may be read on several levels: as natural history and conservation, ecophilosophy, women's history, or, simply, compelling literature. Contributions span the centuries from the first European settlement of North America to the present. They include early descriptions of presumably limitless Eastern forests and current warnings about pollution and species loss.

We are reminded that the women of another era whose works are excerpted here were staunch conservationists as well as suffragettes and abolitionists. Celia Laighton Thaxter was

9 - becoming feral

involved in the Audubon Society. Susan Fenimore Cooper's *Rural Hours* influenced Thoreau. Anna Comstock, a key figure in the nature study movement of the late 1800s, wrote three college textbooks on insects and taught nature study at Cornell.

Anderson's selections, from a wide diversity of authors and literary forms, reflect women's lives on a continent where wilderness is an ever-present influence. Some are familiar: Susan Griffin condemning the taming of all that is wild, Elizabeth Dodson Gray reiterating connections between despoliation of nature and degradation of women, Rachel Carson's classic *Silent Spring*. To these are added delightful surprises. One such is nine year old Opal Whiteley whose writing is so lyrical that when her diary (from which the selection is chosen) was published in 1920, critics refused to believe the author was a child. Ursula LeGuin, Alice Walker, Mary Austin, Barbara Mor, Margaret Murie and Meridel le Sueur are included. To some of us, Emily Dickinson, Gene Stratton-Porter and Laura Ingalls Wilder are old friends. Indigenous women are well represented. Linda Hogan, Brooke Medicine Eagle and others tell of their rituals and ancient ways of knowing.

Many contributors describe their affinity with a special place; Mabel Dodge Luhan writes of Taos and mysterious Blue Lake; Edith Warner, autumn in the Jemez foothills; Anne Zwinger, the Green River and canyonlands; Wila Cather, the ever changing beauty of desert and mesa. They emphasize the importance of time spent alone in wilderness, attuned to ecological rhythms; to "seed time and rock time." (p. 43)

Spiritual closeness implies no sentimental anthropomorphism; quite the contrary. These women are keen observers and accurate recorders of natural phenomena. Death and predation are accepted. "If I have learned nothing more . . . I have thoroughly learned to keep hands off the processes of nature," affirms Laura Lee Davidson. (p. 191). Some of the selections are from scientific studies or diaries kept during such field work as Lois Crisler's study of a wolf pack in Alaska's Brooks Range, or Theodora Stanwell-Fletcher's collecting flora and fauna for B.C.'s Provincial Museum in that province's remote Driftwood Valley.

These women are prepared to sacrifice physical comfort. "For the pleasure of living outdoors," insists Edna Brush Perkins, "you are willing to have your eyes smart from the smoke of the camp fire, and to be wet and cold and to fight mosquitoes and flies." (p. 140) And, like Gretel Ehrlich, they relinquish security. "Wildness has no conditions, no sure routes, no peaks or goals . . . . it is a many-pointed truth." (p. 116)

Anderson is skeptical of claims that women, as a group, are innately closer to nature than men. She asserts that traditional gender socialization, by emphasizing caring and nurturing as female qualities, has relegated us to the domestic sphere; the antithesis of everything wild and free. The obverse of the nurturing woman is the domesticating woman, from whom most men and many women ceaselessly try to escape.

There are no domesticating women in this anthology. Sue Hubbell reflects the feelings of many of us when she muses, "I wonder if I am becoming feral. Wild things and wild places pull me more strongly than they did a few years ago and domesticity . . . not at all. It is a good time to be grown up women with individuality . . . we have lived long enough and seen enough to understand in a more than intellectual way that we will die and so we have learned to live as though we are mortal. Time for us will have an end. That is why I have stopped sleeping inside. A house is too small, too confining. I want the whole world and the stars, too." (p. 136)

Such women accept danger as an integral part of wilderness. China Galland relates in *Running Lava Falls*, "The tension this morning is like a wired fence sparking at the slightest touch. Today we run Lava Falls. (Water flow is about fifteen hundred cubic feet per second, giving Lava a solid ten rating on the scale of difficulty for rapids. . . .) . . .The mist that covers much of our day to day life is burned off in the heat of the apparent risks we are taking."

A common theme in *Sisters of the Earth* is that humans, male and female, threaten the existence of other species; that it is our duty to make room for them. Dorothy Richards accepts the inevitable conclusion: "To accommodate ourselves to beavers and a variety of other creatures, we must learn to 'think small' in the realm of human population." (p. 354)

Sisters of the Earth reminds us that women possess the qualities of endurance, courage, foresight, strength and observation necessary to appreciate wilderness and survive there; that women on this continent have passionately defended wild places. It is a book for everyone who, forced to choose between humans and herons, preferred herons.

—Reviewed by Trudy Frisk, field researcher in island biogeography and wolf reintroduction, founder of women's spirituality Circle.

GENETICS And THE CONSERVATION OF RARE PLANTS

edited by Donald A. Falk and Kent Holsinger; 1991; Oxford University Press, 200 Madison Ave, NY, NY 10016; 282 pp., $49.95 hardcover.

Genetics and the Conservation of Rare Plants is a collection of papers by leading botanists, edited by the founder of the Center for Plant Conservation, Donald Falk, and a biology professor, Kent Holsinger. Before attempting to review this book, I should emphasize that I am not a scientist. At the first sight of test tubes and bunsen burners back in college days, I fled biology and have regretted it ever since. I chose not to ask a scientist to review this book because I wanted to answer the question, "Is this book useful for the conservationist without scientific training?" I can now unequivocally respond in the affirmative (that means I can answer yes, in case any of you fled biology at the first sight of bloated verbiage).

A fundamental lesson to be drawn from this much-needed book is that it's too late to save all remaining species simply by saving habitat. Humans have so diminished the populations and genetic diversity of countless species, and the ecological processes upon which they depend, that saving what's left will require intensive studies and active rescue efforts, as well as habitat protection and restoration. Unfortunately, according to editor Donald Falk, all these measures cost money, money for conservation is very limited, and thus a system of triage will be needed: setting priorities that will mean survival for some taxa and extinction of others. (p. 213)

Many of the lessons and principles of conservation biology, and especially island biogeography, are intuitively obvious. To maximize preservation of biodiversity, we must maximize preservation of wild habitat, for instance. Other lessons, however, particularly those most pertinent to rare plants, become apparent only after detailed studies. Some of us may tire of hearing scientists, bewailing our vast ignorance, call for ever more studies; but this book makes clear that without greater knowledge of the life histories and habitat needs of imperiled plants, many will go extinct. Though not an excuse for delaying action, calls for more studies (unless they emanate from the mouths of politicians) should be heeded.

As an inducement to read for yourself *Conservation of Rare Plants*, I'll list below a few lessons gleaned therefrom, and interpreted by a non-scientist. As you consider the relevance of these lessons for your conservation work, keep in mind that 780 of this country's

20,000 plant species and varieties are thought to be in danger of extinction within a decade, only 25% of these are listed or proposed for listing under the Endangered Species Act, endangerment rates are similar in other parts of the world, many plant species have been reduced to a few individuals in the wild, and some plant species survive only in captivity.

Plant conservation is an extremely complex task when in situ conservation (protection of wildlife in its natural habitat) is no longer sufficient. Ex situ (off-site, usually captive) preservation and subsequent reintroduction is complicated by the mind-boggling array of survival strategies employed by plants. Some plants are harmed by inbreeding, some are harmed by outbreeding, some are so site-specific that outcrosses beyond a few meters can be detrimental...

With many plants, biologists don't even know whether genetic variations within or between populations are adaptive. When they are, long-term survival of the species may depend upon these variations, and botanists attempting to save rare plants in botanical gardens will need to arrange crosses accordingly.(27-28)

Paradoxically, preserving population genetic distinctness may sometimes conflict with preserving the species. In such cases, species preservation should take priority.(29)

Small populations in captivity may be inbred without suffering inbreeding depression until reintroduced to the wild. This is because plants in captivity are artificially sheltered from environmental stresses.(30)

Some plants have such high genetic variability based on edaphic factors (soil pH, nutrient availability, moisture content, etc.) that distinct soil races are recognized. Other plant species may show little variation even across great distances.(32)

Population viability analyses for plants cannot be strictly modeled on those for animals, which have been the subjects of most PVAs done thus far. For many plant PVAs, space considerations will be much less important than for animal PVAs. Environmental stochasticity may outweigh genetic stochasticity more often in plants than in animals, since many plants have adapted to rarity and inbreeding. (56-61)

For many tropical trees, though, preserve size is a major consideration. Reasons include the extremely low population density of many tropical tree species (often less than 1 individual per hectare) and their dependence on animal pollinators (e.g., bats) which may themselves require large areas. (66)

Bees are important pollinators of some plants, and their demise can adversely affect taxa requiring cross-fertilization for seed production. Pesticides harm bees and bee populations may take years to recover after spraying. Livestock grazing reduces the number of nest sites for bee taxa that nest in abandoned rodent burrows. (98)

With some species, populations have diverged into distinct ecotypes, between which gene flow can result in ill-adapted offspring. Such gene flow can occur in ex situ sites if samples have been taken from different populations.(111)

Among tropical plant species, recalcitrant seeds are more common than orthodox seeds. Species that produce recalcitrant seeds will be hard to preserve ex situ, since the seeds do not remain viable when dried for storage. (135-6)

Planting with nonlocals can contaminate the gene pool of rare species. Artificial reforestation can thus be detrimental.(156)

Formerly common, widespread taxa may be particularly vulnerable to genetic problems that arise as habitat is reduced. Plants that have not evolved under situations of rarity may be less stable than those that are naturally rare. (158)

Genetic threats to population viability are likely when population drops to a few hundred individuals. Populations large enough to absorb problems of demographic stochasticity (random fluctuation in birth and death rates) will be large enough to alleviate genetic problems as well. (205)

So in a sense we come full circle: *Conservation of Rare Plants* quickly makes the reader realize that habitat preservation alone will no longer be enough — research and rescue (R&R) are also essential — but then reminds us that, nonetheless, intact habitat is the *sine qua non* of saving biodiversity.

Before ending, a few suggestions on how to use Falk's book might be helpful. For this is a book all conservationists should read, but not without recognizing that some of the terminology is obscure. (Try "hypervariable sequences," "restriction-fragment-length polymorphisms," and "biparental inbreeding" as conversation starters sometime.)

For the (to be politically correct) biologically challenged, like me, the graphs, charts, and formulas are too arcane. Concentrate instead on the beginning and end parts of each chapter. The first four chapters and chapters 10-14 are the most accessible.

For biology professors, this book could form a core around which to develop a curriculum in genetics or botany. Using this book while teaching the otherwise intangible facts of genetics would show students why this subject matters and how it can be applied.

For research scientists, *Conservation of Rare Plants* should serve as inspiration to expand efforts to make politicians and the public understand why more ecological research — along with habitat protection and restoration — really is needed. Perhaps more than any other group, biologists will determine how many plants are saved from extinction through the lessons conveyed in this critically important book.

—Reviewed by John Davis

INTRODUCCION AL ESTUDIO DE LA NATURALEZA: Una visión desde el trópico

by Julián Monge Nájera; Universidad Estatal a Distancia, San José, COSTA RICA; 1991; 255+xxviii pp., $15 (approx.)

Costa Rica has become an environmental success story, a model for the rest of Latin America, and a mecca for ecotourists from around the world. Environmental magazines, textbooks, and slick calendars are full of the glories of Costa Rican nature. Despite years of expensive scientific field projects, vast debt swaps, and a veritable flood of publishing about Costa Rica, however, average Costa Rican citizens until last year would have found it almost impossible to read about the biodiversity or learn about the environmental problems of their country in their own language. Try to imagine how you could keep your environmental commitment alive if your only sources of information were all written in the Cyrillic alphabet. Those magazines, books, and eco-bric-a-brac, readily available at your local bookstore, are written by and for North Americans. Here in the United States, attractive and accurate science books written for the general public are so common that we forget that in much of the tropical world such books are as rare as spotted owls.

Julián Monge, a young biologist at the University of Costa Rica and the editor of *Revista Biologia Tropical*, has written a book that will go a long way toward filling that void. *Introducción al Estudio de la Naturaleza* is intended as a basic biology textbook for what in our system would be called "continuing education" students: people who want to learn outside of the traditional university classroom setting. This requires a text that not only provides information but holds the reader's interest. In this, Monge's book succeeds admirably. The text covers not only the full range of subjects of traditional biology and basic ecology courses but also covers recent scientific news events (e.g. Chernobyl, the cold fusion fizzle, Creationism, RU486). The text is up to date and, for the most part, accurate

(the only inaccuracies I found were a photo of the pubic louse mislabeled as a head louse, and the definitions of r- and K- selected species reversed). Monge has wisely eschewed the glossy full-color format that would have put the price of the book out of reach of his intended audience. The book is entirely in Spanish. The grammar is uncomplicated, the vocabulary is relatively idiom-free, and the technical language has many English cognates.

The first half of the book concentrates on basic biological and ecological science while the second half deals with environmental issues. General biology texts frequently offer little more than a rehash of previously published biology texts; however, Monge uses his tropical experience to give a fresh view to the standard topics that every general biology book must cover. From an outsider's perspective, the most interesting part of the first half of the book is some long overdue publicity that Monge gives to his Costa Rican scientific colleagues, who often work long underfunded hours in the shadow of high-powered Gringo Biology at OTS and CATIE. Given my own biases toward invertebrates in general and insects in particular, I was interested to see that Costa Ricans have been making contributions to knowledge of such diverse topics as fig wasps, calico butterflies, and insects of volcanically acid streams. There is also, of course, Clodomiro Picado's pioneering work on the insect fauna of bromeliads. In his introduction, Monge includes a brief history of Costa Rican naturalists, beginning with von Frantzius in the early 1800s. Becoming familiar with Costa Rican researchers and their projects is not only common courtesy for the scientist planning a visit, it is also rapidly becoming a financial necessity with granting agencies now demanding local collaboration as a condition for funding overseas scientific projects.

In the second half of *Introducción*, Monge discusses the numerous and grave environmental problems confronting Costa Rica. While destruction of forests and biodiversity has been getting the international publicity, of more immediate concern to Monge and many other Costa Ricans are the dangerous levels of air and water pollution found in many areas of the country. To veterans of environmental struggles in the US, Monge's catalogue of the squandering of natural resources, public ignorance, individual and corporate greed (both local and multinational) will be depressingly familiar. Monge neither ignores nor overemphasizes the role US activities are having on Costa Rica's environment, in contrast to some other Latin American environmental writers who tend to see only those problems caused by multinational corporations and Yankee politicians. In many respects, Costa Rica today is like the US on Earth Day One: a land of serious problems but with a citizenry increasingly alarmed and insistent that action to clean up the environment become a national priority.

There is one odd—and important—gap in Monge's otherwise comprehensive treatment of environmental problems: the impact of population growth. There is a general reluctance to confront this issue in Latin America, even in the growing environmental movement. This may be due, in part, to decades of hearing about the evils of overpopulation from overconsuming gringos. In *Introducción*, population issues aren't exactly ignored (a sidebar discusses birth control methods with an openness that would not be permitted in many sex education programs here in the States) but they are treated in a diffuse manner that is a puzzling contrast to the generally concise and frank discussions of other issues. In another sidebar on population, some statistics are given but with the apparent intent of showing that Costa Rica's growth rate is not so bad, comparatively speaking. Yet the statistics Monge does give paint a population picture for Costa Rica that is far from reassuring. Costa Rica has a birth rate of 2.9% and a mortality rate of .4%, leaving a 2.5% rate of increase. That works out to a doubling time of 28 years, which in turn means that the problems of pollution and environmental degradation that Monge ably documents elsewhere will also double within three decades. In that same time, the government, already in serious financial difficulties, would have to double its environmental funding just to maintain the current level of protection—a level that Monge and almost everyone else agree is totally inadequate.

The solutions to the environmental crisis offered in *Introducción* lean heavily toward the sustainable development and "rational use" models. If this strikes *Wild Earth* readers as outmoded utilitarianism, it should be noted that this is also the advice Costa Ricans have been hearing recently from First World Big Science and Big Environmentalism. Last summer I attended an international workshop on biodiversity in which speaker after speaker (all big-name scientists) declared that biodiversity was doomed unless someone could make money from it. [A few weeks later in an interesting coincidence—maybe—*La Nacion*, the country's leading newspaper, carried what was possibly the first report about Earth First! to reach Costa Rica.] However, Monge's chief emphasis is on the need for more and better environmental education in Costa Rica, and on this point there can be no disagreement. Fortunately, since publication of *Introducción*, Costa Rican environmental education has already taken a giant step forward.

Even with my quibbles over the treatment of population and emphasis on the "wise use" philosophy, I found *Introducción*...an impressive piece of work which will undoubtedly become a standard environmental reference for Latin America. Its usefulness transcends its regional emphasis: I am now using it as a reference for teaching an environmental class in a central New York college. In the process of filling the need for a concise environmental text for Costa Rica, Monge has also given the rest of us a valuable guide to what Costa Ricans think about environmental issues, what they have done and what they need to do. Anyone with a serious interest in Costa Rica or Central America in general should read *Introducción al Estudio de la Naturaleza.*

—Reviewed by R. Wills Flowers, Florida A&M University, Tallahassee, Florida.

THE AGE OF MISSING INFORMATION

by Bill McKibben; Random House, 201 E 50th St, New York, 10022; 1992; $21; 250p.

Bill McKibben has written a book that could move the mainstream. *The Age of Missing Information* is, in part, a critique of television skillfully written in a non-confrontational manner that will convince many of the Americans who will buy a Random House book but would not buy a small publisher's book and who would reject any radical critique of technology. To give an idea of the sorts of information we have lost in this age of television, Bill McKibben juxtaposes descriptions of his time in the wilderness near his home in the Adirondacks with *Koyaniskatsi*-like, stream-of-TV scenes, and then unveils a host of reasons why people ought to first recognize then reconsider their infatuation with TV.

Many writers have found many reasons to condemn TV; Jerry Mander, in particular, has penned some devastating critiques. Nonetheless, McKibben cites heretofore undescribed problems with TV and, more generally, with our growing estrangement from the natural world.

Particularly important, McKibben helps explain why even those who should know better, even the cognoscenti, remain under the influence of television. TV mocks itself even as it ridicules those who do not subscribe to the values—overconsumption and detachment from the natural world, principally—it disseminates. Moreover, TV has created its own culture and its own history, and most people in the developed world, as well as ever growing numbers in poorer nations, grow up immersed in this cultural context. "The Brady

Bunch" may be the most influential family of this century, and their values are nothing if not decadent.

Even if you've already escaped TV culture, even if you've imploded your local cathode ray tube, you'll find Bill McKibben's new book very valuable. Most important, though, give this book to your friends who still watch TV. It will help them find some of the missing information.

—Reviewed by John Davis

Uncle Tom's Cabin and *The Jungle* generated more popular demand for reform than any number of political tracts. Similarly, it may be that more people have been converted to ecocentric activism by Ed Abbey's novel *The Monkey Wrench Gang* than by any work of nonfiction.

It's not hard to understand why. People don't like to be preached at. Joe and Jane Six-Pack won't read polemical works, however ingenious or insightful. Make them laugh—or cry—and they just *might* listen to what you have to say.

ISHMAEL

by Daniel Quinn; 1992; Bantam Books; 226 pp.; $20.00, cloth.

VOICE OF THE PLANET

by Michael Tobias; 1990; Bantam Books; 388 pp.; $4.95, paper.

HOCUS POCUS

by Kurt Vonnegut; 1990; Berkeley Books; 302 pp. ; $5.99, paper.

Sooner or later, we eco-freaks will have to get hip to the fact that most people can be reached only through fables and parables. Charts, statistics, and projections may convince judges, but not many others. To try to persuade by reason or example alone is to write off most of the reading population, and for that reason we desperately need good eco-novels and eco-films to get across our message that the diversity of life on this planet is in deadly peril.

Everyone knows that didactic fiction like

There's no greater public education tool than a good novel or screenplay that catches fire. But didactic fiction is tricky; it's too often transparent in motive or lacking in impact. The secret is to hide a minefield inside a rousing good story.

Where are the successors to forceful novels like those mentioned above? I've been waiting a long time for another eco-novel worthy of *The Monkey Wrench Gang*. I don't demand great literature; I'll settle for a lot less than a new Tolstoy. Unfortunately, neither Daniel Quinn's *Ishmael* nor Michael Tobias's *Voice of the Planet* meets my expectations.

Ishmael, the winner of the Turner Tomorrow award for eco-fiction, chosen from 2500 submissions, excited a great deal of controversy among the judges for the reasons just mentioned. It's a sermon, a Socratic dialogue, not a story. In it a captive telepathic gorilla named Ishmael instructs the main character on his true place in nature. The gorilla offers insights like these:

"You're captives of a civilizational system that more or less compels you to go on destroying the world in order to live." (p.25)

"The premise of the Taker story is *the world belongs to man*. . . The premise of the Leaver story is *man belongs to the world*." (p. 243, emphasis in original. Quinn divides humankind into "Leavers"—primal peoples—and "Takers"—you and me and all such overdeveloped types.)

Here's something even better: "The world of the Takers is one vast prison, and except for a handful of Leavers scattered across the world, the entire human race is now inside that prison. . . What is crucial to your survival as a race is not the redistribution of power and wealth within the prison but rather the destruction of the prison itself." (pp. 254-255)

These are important truths, and they bear repeating. The author deserves his prize; *Ishmael* is competently written, insightful, and absolutely correct in its premise that ecological disaster is imminent if we don't let go of our mad need to dominate. But alas, the unconvinced won't read the book, and the convinced don't need it.

Voice of the Planet by Michael Tobias is another exercise in visionary ecology, likewise a Socratic dialogue in which Gaia Herself, through the medium of a computer screen, gets to play Socrates. The author knows that human overpopulation lies at the root of the ecological crisis. "The Earth is not about morality, right and wrong," says Gaia to her disillusioned scientist disciple. "It's about balancing numbers." (p.167)

Voice of the Planet is chock full of interesting information, but it's just too long and windy to pull it off. (It was turned into a boring and ill-fated TV series that played on TBS in 1991.)

What we need is someone with the artistry of a master like Kurt Vonnegut, who, in the midst of spinning a good yarn about a break from a Japanese-run prison in upstate New York, knocks off throwaway gems like these:

"Wanting every habitable planet to be inhabited [by humans] is like wanting everybody to have athlete's foot." (p.188)

"Just because some of us can read and write and do a little math, that doesn't mean we deserve to conquer the Universe." (p.302)

Pithy and finely polished detonations like these, hidden away in the context of a great read, are infinitely more persuasive than pages of carefully argued polemics. Vonnegut, it seems, is on to something important: Good eco-fiction, in order to be effective, probably should be disguised as something else.

Anybody out there working on the next *Monkey Wrench Gang*?

—Reviewed by Daniel Conner

THE FRAIL OCEAN/A BLUEPRINT FOR CHANGE IN THE 1990's AND BEYOND

Updated Edition by Wesley Marx (first published 1967); references and source listings, Index, $14.95 paper.

Wesley Marx's updated edition of *The Frail Ocean* is even more urgently needed than was his original version 25 years ago. Like Rachel Carson 5 years before, Marx issued dire warnings which have since proven all too true, as he verifies here. The oceans are much more vulnerable to overexploitation and pollution than fisheries officials have ever been willing to predict.

Marx, for instance, documents various population crashes among forage fish over the last few decades. Forage fish—the small fish, such as anchovies, sardines, herring, and menhaden, that feed on plankton—travel in huge schools; an adaptation that serves the populations well for surviving natural predation but makes them easy prey for trawlers (p.22).

Marx reminds us that we have not even saved the whales. The IWC-imposed whaling moratorium remains in effect, but Japan continues to kill hundreds of minke whales every year for "research" purposes, and whale critical habitats are far from secure. It's disconcerting to note that both the world's largest plant, the giant sequoia, and the world's largest animal, the blue whale, survive only in drastically reduced numbers, due to overkill and habitat encroachment. The blue whale now numbers less than 500, down from an original population of an estimated 250,000, and now faces a growing threat in the form of (former) Soviet and Japanese krill fishing boats in the Southern Ocean (44).

Even the celebrated recovery of the gray whale may not last. Owners of a giant salt production facility—funded in part by Japan—want to expand into prime breeding grounds of the gray whale in Baja's Scammon Lagoon. Doug Peacock also talks about Mexico's extraordinary, shallow, saline winter water of the gray whale in his similarly excellent book *Baja.*

Aside from the famous example of whaling, perhaps no trade better exemplifies the dangers of advancing technology than fishing. Fisheries crashes have generally resulted at least in part from increased sophistication of the technology employed. Marx explains how the diminishment of yellowfin tuna stocks in the Eastern Tropical Pacific followed the introduction of mechanized seining. So also did the much more publicized decline in numbers of spotted and spinner dolphins; which, for reasons still unclear, swim with the yellowfin schools (70-75).

Marx uses salmon to show the links between land and sea ecosystems and issues. Restoration of salmon that spawn in northern California's streams requires restoration of the overlogged watersheds in and around Redwood National Park as well as protection of the fish from drift-netters in the North Pacific (45-55,77).

As for solutions to the pollution, coastal development, overfishing and other problems that he describes, Marx calls for reducing and recycling waste, curtailing federal subsidies that encourage development on fragile coastlines, and ratifying and abiding by the Law of the Sea Convention and other international treaties to protect the oceans. Discouragingly, despite the warnings of Rachel Carson 30 years ago, and Wesley Marx 25 years ago, all of these problems are even more severe now than in decades past. This time, let's listen.

—Reviewed by John Davis.

SOWING THE WIND: REFLECTIONS ON THE EARTH'S ATMOSPHERE

by Louise B. Young; 1990; Prentice Hall Press, 15 Columbus Circle, NY, NY 10023; $17.95/hard; 200pp.

Louise B. Young can bring science alive in a way reminiscent of Rachel Carson. With a Master's Degree in Geophysical Sciences from the University of Chicago and training as a physicist, Young has written and edited numerous books on the earth sciences, including *The Blue Planet*, a widely lauded work. In *Sowing the Wind*, Young beautifully shows the links between geology, biology, meteorology, and the other natural sciences.

Young explains how the climate, ocean currents, landscapes, the sun and organisms interact. Nitrogen offers a striking example of this interrelatedness. Though nitrogen is the most abundant element in the atmosphere and — along with hydrogen, oxygen, and carbon — one of the primary elements of organisms, it is also the nutrient in shortest supply for most organisms, because most of it is in a form unavailable to them. Thankfully for life, there are two natural sources of usable nitrogen: lightning and microorganisms. The nitrogen-fixing microorganisms are the ones that attach themselves to the roots of certain plants — such as legumes, with which they share a symbiotic relationship, and without which our culture would lack pea soup.

Almost one would think after reading this fine book that Earth scientists are closer to developing a unified field theory than are physicists. One might even think that theory already exists, in nascent form, and goes by the appellation "the Gaia hypothesis." Though she doesn't say a lot about the Gaia hypothesis *per se*, much of what Young writes lends support to the ideas developed by Lynn Margulis and James Lovelock, who suggest that the planet functions like a self-regulating organism.

After summarizing what is known about how the atmosphere works, Young addresses four of the main threats to our atmosphere and biosphere: ozone depletion in the stratosphere; ozone accumulation in the lower troposphere; greenhouse gas accumulation in the atmosphere; and acid deposition. Interestingly, Louise Young seems more concerned by stratospheric ozone depletion than by the more widely publicized greenhouse effect.

Young warns that scientists should be wary of attributing recent years of inordinate warmth to the greenhouse effect before all the data are in, lest a few cold years cause the media and public to decide that the dire predictions were all for naught. That is, she counsels extreme caution in doom-saying so that the public will not decide that we need not heed scientists' warnings. She does not, however, suggest complacency. Notwithstanding the many unknowns in the climate shift hypotheses, we must, Young insists, begin immediately to reduce anthropogenic emissions of carbon dioxide, methane, CFCs (which also destroy upper atmosphere ozone) and other greenhouse gases. Unfortunately, what she suggests are the standard milquetoast measures that would reduce humanity's impact on the planet (mass transit, smaller cars, etc.) without fundamentally altering a civilization that many of us feel is incompatible with biodiversity.

Louise Young sees the ozone depletion crisis as more certain than global warming, yet easier to avert. Most nations — even the US, which has opposed CO2 emission limits — have agreed to begin reducing CFC emissions, and elimination of the production of CFCs and other ozone destroying gases could be achieved without seriously disrupting the global economy.

Two other related themes prominent in Young's outstanding book are thresholds and uncertainty. As we degrade the life support systems of this planet, we are beginning to cross thresholds, points of no return. For example some forests in Europe that seemed healthy until recent years quickly died or are dying, apparently as a result of acid rain and other factors finally overcoming the trees' defenses. (Even-aged management on short rotations is likely one of these factors, though its role is not generally publicized.) This raises the problem of uncertainty: even scientists don't know what thresholds we're about to cross, what irreversible effects our pollution

and impoverishment of the biosphere will have. To paraphrase a popular bumpersticker, excrement transpires.

Young concludes with an eloquent plea for humans to preserve a natural environment, one conducive to producing healthful people. "As these sights and sounds are replaced by cold stone and hard steel and plumes of acrid smoke, then these will become part of the child. A fabric woven of such coarse threads will make a harsher man."(p.185) In *Sowing the Wind*, Louise Young has planted a few more good seeds, which will bear fruit in the form of ecologically informed and inspired inhabitants.

—Reviewed by John Davis.

TREES OF LIFE: SAVING TROPICAL FORESTS AND THEIR BIOLOGICAL WEALTH

by Kenton Miller & Laura Tangley; 1991; Beacon Press; 200pp.; produced by World Resources Institute, 1709 New York Ave. NW, Washington, DC 20006.

World Resources Institute's latest in its Guides to the Environment series, *Trees of Life* is surprisingly forthright. A project of an organization that regularly cooperates with such development agencies as the World Bank and the United Nations Development Programme, this book nonetheless points to many of the real factors underlying rainforest destruction which such agencies are loath to acknowledge: maldistribution of wealth, exploitation by industrialized countries and multinational corporations, government corruption, overconsumption by developed world consumers; as well as overpopulation, misguided government policies, and unsustainable agriculture and logging.

This book offers brief but informative discussions of biodiversity and threats thereto in all the major rainforest regions. Especially valuable is the discussion of Central Africa's rainforests. Gabon and Zaire receive much less attention from rainforest advocates than Brazil and Malaysia, for instance, but have some of the largest intact rainforest landscapes remaining.

As with other publications involving big multinational institutions, this report is anthropocentric and often superficial, but it provides some worthwhile suggestions for saving forests, and much important information. Read *Trees of Life*, along with more provocative analyses of rainforest destruction such as *The Ecologist* and *Earth Island Journal* regularly offer.

—Reviewed by John Davis.

Other Recommended Titles

Cut and Run: Saying Goodbye to the Last Great Forests in the West

by Grace Herndon; 1991; Western Eye Press, POB 917, Telluride, CO 81435; 239 pp.

Herndon's book is useful as an introduction to the US Forest Service's timber policies. Following a section on "basics," the author treats policies in the West a state at a time.

Down to Earth Spirituality

by Al Fritsch, SJ; 1992; Sheed & Ward, POB 419492, Kansas City, MO 64141; 193pp; $9.95 paper.

This book will stimulate many Christians to join in the struggle to preserve Earth. Fritsch effectively juxtaposes passages from the Old and New Testaments with reflections on environmental problems and Earth consciousness, suggestions for action, and photographs by Warren Brunner.

Gaia Connections: An Introduction to Ecology, Ecoethics and Economics

by Alan S. Miller; 1991; Rowman & Littlefield; 301pp.; $17.95 paper.

In this synthesis Miller demonstrates science's continuous subservience to the "dominant political or economic power of the day," and the threats that molecular biology and biological determinism pose at present. Emphasizing linkages, he believes that environmentalists to succeed must form coalitions with movements fighting the range of "negative 'isms.'"

Inside the Environmental Movement: Meeting the Leadership Challenge

by Donald Snow; 1992; Island Press; 295pp; $19.95 paper.

Based on information that the Conservation Fund gathered in its Conservation Leadership Project, *Inside the Environmental Movement* relays a wealth of facts about the makeup and approaches of US environmental organizations. Readers can situate their own organizations in the spectrum. You may not agree with all of Snow's suggestions for leadership training, but the issues he raises need consideration.

Lessons from Nature: Learning to Live Sustainably on the Earth

by Daniel D. Chiras; 1992; Island Press; 289pp; $16 paper.

Give *Lessons from Nature* to friends and relatives who do not believe that lifestyle change is essential or possible. Chiras states far-reaching ideas, in tones that will not offend.

Living with the Land: Communities Restoring the Earth

edited by Christine Meyer and Faith Moosang; 1992; New Society Publishers, 4527 Springfield Ave., Philadelphia, PA 19143; 131pp; $9.95 paper.

This fourth book in *The New Catalyst*'s twice yearly Bioregional Series describes eighteen communities across the globe that use resources sustainably. The achievements of villages in Nigeria, a city in Brazil, and a tribal community in the Philippines are especially encouraging.

The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics

by Vandana Shiva; 1991; Zed Books, 165 First Ave., Atlantic Highlands, NJ 07716; 264pp.

Shiva, an Indian physicist, shows that the vaunted Green Revolution was a "technopolitical strategy" that destroyed people's relationship to nature and to one another. The violence in the Punjab, Shiva argues, has its roots not in religious conflict but in the substitution of technology for nature.

Women and the Environment

by Annabel Rodda; 1991; Zed Books, 165 First Ave., Atlantic Highlands, NJ 07716; 180pp; $15.95 paper, $49.95 hard.

Rodda discusses the effects of environmental degradation on women. Focused on the Third World, the book is one in a series developed by the Joint UN-NGO Group on Women and Development.

The Souls of Animals

by Gary Kowalski; 1991; Stillpoint Publishing, POB 640, Walpole, NH 03608; $8.95 paper, 114 pp.

Drawing on such varied sources as Willem de Kooning and Martin Buber, Kowalski confirms our impressions that "courage and daring, conscience and compassion, imagination and originality, fantasy and play—do not belong to our [human] kind alone." The slim paperback is appealingly written and illustrated with photographs by Art Wolfe.

—Reviewed by Mary Byrd Davis

Noteworthy Articles

A Look at Conservation Literature

by John Davis

PAW National Forest Handbook, 1992; available free but donations needed, PAW Net, POB 52A, Bondville, VT 05340. PAW's 501(c)3 non-profit organ, PAW Net (Preserve Appalachian Wilderness Network), has produced a workbook that will aid forest defenders throughout the US. It describes all manner of legal tactics to stop the Forest Service from felling our forests.

"Research Update" from the 1991 meeting in San Antonio, Texas, of the American Institute of Biological Sciences, by Julie Ann Miller, and from the Madison, Wisconsin, meeting of the Society for Conservation Biology, by Christine Mlot; ***BioScience***, 12-91, p.750-759. Several very important news items are reported from the AIBS and SCB conferences: Chaos theory may help explain evolution. Centuries must elapse before new Peruvian humid tropical forests adjacent to a meandering river can gain the species diversity of nearby mature forest; recovery of diversity is likely to be even slower in many other tropical forests. Efforts to eradicate prairie dogs in the US Southwest and northern Mexico have allowed an unnatural "proliferation of honey mesquite since the late 1800s." The Uncompahgre fritillary butterfly may soon become the first known species to go extinct due to anthropogenic global warming. White-tailed deer in Shenandoah National Park severely impact not only the plant life in oak-hickory forests as their populations soar, but also squirrels and other small mammals that feed on acorns, and ground-foraging birds. Dwarf mistletoe enhances bird diversity and abundance in Ponderosa pine forests of the Southwest; yet the Forest Service has waged efforts to eradicate this native parasite. The Endangered Species Act does not protect hybrids, yet "hybrid zones of plants can be rich repositories of insect and fungal diversity." Freshwater wildlife—most species of which are fish, invertebrates, plants, and bacteria—is being protected even less well than other biota types: *no stream-dwelling insects have been listed under the ESA*. (Is it a plot?!)

"The Wisconsin Tradition," by Gerald Lower Jr., Ph.D.; ***One Voice***, 1-2/92, p.1-2. Gerald Lower, Editor of the new and provocative *One Voice*, has written an essay on what he rightly calls "the Wisconsin tradition." Conservation luminaries who have studied or worked at the University of Wisconsin include John Muir, Frederick Jackson Turner, and Aldo Leopold. Read this bimonthly ($16/yr; Rt.2, Gays Mills, WI 54631) for a discussion of why Wisconsin has produced a disproportionate number of America's conservation and restoration leaders.

"The Business of Conservation," by David Ehrenfeld, "Influence of Selective Logging on Bird Species Diversity in a Guianan Rain Forest," by Jean-Marc Thiollay; ***Conservation Biology***, 3-92. *CB* is always packed with articles of import for conservationists, but some activists don't have time to read them all. So this time, pay special attention to David Ehrenfeld's warnings that supposedly "sustainable" uses of natural areas may not be, and to the article describing the severe effects of selective logging on birds in French Guiana (northeastern Amazonia). Margaret Kinnaird's article, "Competition for a Forest Palm: Use of *Phoenix reclinata* by Human and Nonhuman Primates," reinforces the theme that human extraction of rainforest products—even when it appears sustainable—may adversely affect some members of the biota.

Continuing the consideration of the tension between commerce and conservation, this issue's Diversity section has two fine articles: "Free Trade and Wildlife Trade" and "Ivory: Why the Ban Must Stay!" Debra Rose warns about the ecological costs of free trade, particularly with respect to the North American Free Trade Agreement being negotiated by the US, Mexico, and Canada. Andrew Dobson and Joyce Poole argue convincingly for continuation of the CITES ban on trade in ivory, which ban several southern African nations want to end.

"Mining Law Needs Major Reform," **Southern Utah Wilderness Alliance newsletter**, spring 1992. SUWA's newsletter is always filled with news of the BLM's mismanagement of its canyon and desert lands in southern Utah, and SUWA's efforts to force BLM to comply with the law. This article explains the infamous 1872 Mining Law and attempts to reform it. SUWA is one of the few groups calling for an end to the system established by the 1872 law that allows anyone to stake a mining claim on unreserved federal public lands. The big national environmental groups support legislation that would merely modify this "claim-location" system. Sadly, even SUWA stops short of calling for an end to all mining on public lands. To join the Southern Utah Wilderness Alliance, send $25 to SUWA, 1471 S 1100 East, Salt Lake City, UT 84105-2423.

"Landscape Mathematics," by Don Gayton, "Walpole Island," by Allen Woodcliffe & Marjorie Williams, "Lichens and Vanished Grassland," by Trevor Goward, "Canada's Eastern Prairie," by Colleen Darragh; ***Wildflower***, spring 1992, p.12-25. The latest issue of *Wildflower*, North America's Wild Flora Magazine ($30/yr; The Canadian Wildflower Society, 1848 Liverpool Rd, Box 110, Pickering, Ontario, Canada LIV 6M3), includes a fine set of articles on Canada's remnant grasslands: the Northern Great Plains of western Canada, mostly destroyed by agriculture; Walpole Island tallgrass prairie in southwest Ontario; bunchgrass lands in southern British Columbia, where cows are destroying the lichen crusts essential to the grassland's survival; and relic tallgrass prairie in southern Ontario's city of Windsor.

"The Dolphin Conference," by Jim Nollman; ***The Interspecies Newsletter***, spring 1992, p.1-4. Interspecies Communication's quarterly newsletter (273 Hidden Meadow Lane, Friday Harbor, WA 98250; $25 membership) this time discusses Western environmental groups' failure to understand Japanese attitudes toward cetaceans and thus failure to convince the Japanese to stop whaling. A quote here will hint at the importance of Nollman's observations: "... as long as Westerners criticised Japanese marine mammal policies,

the government would never quit. Never. This pessimistic conclusion because, within Japan, criticism evokes the strong reaction known as *saving face*.... Saving face also causes the Japanese Government to act as if the so-called 'problem' of whaling is largely a problem of containing foreign criticism."

"Learning to Burn: The New Fire Agenda," by Timothy Ingalsbee; ***Inner Voice***, 3-4/92, p.5-6. The latest issue of AFSEEE's journal focuses on a crucial but neglected subject: fire ecology. Ingalsbee's article explains how the Forest Service uses fire—(prescribed and natural)—or the lack thereof—(as a result of fire suppression)—to justify salvage timber sales, road-building, and other nefarious activities. See also in this issue the excellent article on "Rethinking the Role of Fire" by Stephen Pyne, author of *Fire in America*. To subscribe to *Inner Voice* , send $20 to the Association of Forest Service Employees for Environmental Ethics, POB 11615, Eugene, OR 97440.

"US Forest Service Research Natural Areas and Protection of Old Growth in the South," by Margaret Devall and Paul Ramp; ***Natural Areas Journal***, 4-92, p.75-85. *Natural Areas Journal* ($25/yr membership in Natural Areas Association, 320 S Third St, Rockford, IL 61104) frequently has articles on old-growth forest remnants in the East. This paper describes RNAs in the Mississippi River floodplain in Mississippi, the Ouachita Mountains in Arkansas, and the Cumberland Plateau in northern Alabama that contain original forest. Recognizing that existing RNAs are not large enough to maintain viable populations of all native species and natural disturbance regimes, the authors conclude that old-growth ecosystems could be maintained through an RNA system set in a broader context of protected forests.

"The Aeolian Biome: Ecosystems of the earth's extremes," by Lawrence Swan, ***BioScience***, 4-92, p.262-270. Next time you hear some conservationists say that "rocks & ice" is not habitat, thrust this article in their faces. Certainly, a Wilderness System comprised mainly of rocks and ice areas—as is the Wilderness System in this country—is grossly deficient. However, high altitude and high latitude areas do harbor biotas in need of protection. Wind—the aeolian factor—delivers insects, spiders, and other small organisms, as well as nutrients, to high peaks and polar areas, creating what may soon be recognized as the most widely and patchily distributed terrestrial biome.

"The Adirondacks," ***Natural History***; 5-92, p.24-62. *Natural History* commemorates the centennial of Adirondack Park with a fine special section on New York's 6 million acre state park. See especially "Born-Again Forest" by Edwin Ketchledge, "Climate Change in the Adirondacks" by Stephen Jackson, and "The Once and Future Wilderness" by the most eloquent new voice in the Adirondacks, Bill McKibben.

"Nature's Silent Sirens," by William Stolzenburg, "Portrait of a River," by Bruce Stutz; ***Nature Conservancy***, 5-6/92, p.8-24. Nature's silent sirens are butterflies, which are proving hard to restore even where native tallgrass prairie vegetation has been successfully restored. Different butterfly species have different life histories, and prescribed burns that benefit native grasses and some butterfly species may harm other butterfly species. Basically, the problem is lack of wild habitat: Butterflies adapted to fire patterns that allowed them to move to unburned areas; now, too little natural grassland remains, so even in Nature Conservancy preserves where native plants have been restored, the lepidopteran community may remain depauperate.

Likewise, the Delaware River is proving hard to keep alive despite being one if this country's few undammed large rivers. The Delaware watershed is home to 20 million people, yet The Nature Conservancy plans to protect 50 refuges therein, including bogs and glacial lakes in the Poconos of Pennsylvania and migratory shorebird staging areas along Delaware Bay.

"The Empty Forest," by Kent Redford; ***BioScience***, 6-92, p.412-422. If you don't like depressing articles, skip this one. The author shows that "many large animals are already ecologically extinct in vast areas of neotropical forest where the vegetation still appears intact." In much of South and Central America, commercial and subsistence hunting have reduced or eliminated many large animals—caimans, jaguars, ocelots, agoutis, monkeys, tapirs, raptors, sloths, and others—even where the forest seems healthy. Some of these large animals are keystone species—essential for seed dispersal or predation of smaller herbivores or other ecological functions that may go unfulfilled when populations of the large animals become ecologically extinct, which can happen long before they are genetically extinct.

See also in this issue "Sex, disease, and evolution—variations on a theme from JBS Haldane," by Sahotra Sarkar (p.448-453). Geneticist JBS Haldane (of beetle quote fame) suggested long ago, and modern geneticists are exploring the possibility, that sexual reproduction evolved and persists in part because it confers upon its beneficiaries genetic diversity not available to asexual organisms, diversity needed to resist parasites. Crudely put, sex is partly a response to parasites. So there it is: confirmation that pesticide companies are against diversity, life, and sex!

October 3, 1988

The clouds roll up the river
they cling to the ridges of the seven sisters
caressing their faces with fingers of silken
mist
so tender
the fog and the mountains
gently slipping grey
into the river
embracing, entangled,
drifting into the morning of winter

—Cindy Hill

Announcements

TALKING LEAVES: A JOURNAL OF DEEP ECOLOGY

Originally a bioregional journal of new spirituality, *Talking Leaves* has emerged as the only national periodical primarily focused on the philosophy and practice of deep ecology. Recognizing that effective environmental activism depends on a deep heart-connection to the living Earth, *Talking Leaves* strives to inspire that connection. The articles are written with passion, and graced by an abundance of mythopoetic illustrations. Scientifically-based Gaian Hypotheses overlap primal world-views as voiced by indigenous tribal elders from around the continent.

Contributors include: Bill Devall, Joanna Macy, John Seed, Terry Tempest Williams, Lone Wolf Circles, Starhawk, Elizabeth Dodson Gray, Susan Meeker Lowry, Barbara Mor, Jim Swan, Arne Naess, and Christopher Manes.

Talking Leaves was founded several years ago by editor/publisher Carolyn Moran. For *Talking Leaves* to financially survive the transition to a nationally distributed publication, it will require a rapid increase in subscriptions. Mention it to your friends. Get it into local libraries. Spread the word!

The committed volunteer staff welcome your submissions, including articles, poetry and artwork consistent with the principles of deep ecology.

Subscriptions are $18 per year or $30 for two years. Help is needed in acquiring support in the form of donations or grants. Send $2.50 for a sample copy. Contact: Talking Leaves, 1430 Willamette St., #367, Eugene, Oregon 97401. (503) 342-2974.

NEW VIDEO ON NATIONAL FORESTS

Our Vanishing Forests, a new one-hour video, exposes US Forest Service mismanagement. Hosted by Pulitzer Prize-winning author, N. Scott Momaday, the program reveals how government politics encourage overcutting our National Forests. The film examines 100 years of Forest Service practice to see where the Forest Service went astray. The program zeros in on the clash between environmental ethics and pork barrel politics that is being fought within the Forest Service and how citizen groups are fighting back. Our Vanishing Forests features Jeff DeBonis (AFSEEE), Brock Evans (National Audubon Society), Beth Howell (Siskiyou Project), George Atiyeh (Lighthawk), F. Dale Robertson (Chief, US Forest Service), Andy Kerr (ONRC), the Western North Carolina Alliance and Stumpy the Stump. Scientists Elliott Norse and Dave Perry explore biological diversity. Our Vanishing Forests is an excellent tool for education and organizing work. Copies are available from Public Interest Video Network (PIVN) at $29.95 for citizens and grassroots organizations and $59.95 for schools, libraries and other institutions. Write PIVN at 4704 Overbrook Road, Bethesda, MD 20816, or call 301-656-7244.

WILD HUNTERS

In the premier issue of *Wild Earth*, we ran a glowing review of Monte Hummel's report *A Conservation Strategy for Large Carnivores in Canada*. An expanded and illustrated version of this important work is now available in book form: *Wild Hunters: Predators in Peril*, by Monte Hummel and Sherry Pettigrew, with gorgeous illustrations by Canada's best known wildlife artist, Robert Bateman. *Wild Hunters* will likely serve as a model for carnivore conservation strategies throughout North America, and its subjects are the major native large carnivores of US territory too (Cougar, Gray Wolf, Wolverine, Black Bear, Grizzly Bear, Polar Bear), so it is as relevant for defenders south of the border as for those in Canada. This paperback can be obtained for $25 from WWF Canada, 90 Eglinton Ave. East, Suite 504, Toronto, Ontario M4P 2Z7. Monte Hummel's other WWF book, *Endangered Spaces*, can be obtained for $40 in hardback from the same.

TATSHENSHINI WILDERNESS QUEST

Western Canada Wilderness Committee (WCWC, 20 Water St, Vancouver, BC V6B 1A4) recently released a book to save the Tat. *Tatshenshini Wilderness Quest*, by Ken Madsen, depicts the Tatshenshin, Chilkat, Stikine, and Alsek watersheds through the eyes of concerned paddlers. This exciting book can be obtained for $15 from WCWC, and all proceeds go to save these wild rivers.

OHVs IN GREEN MOUTAIN NATIONAL FOREST

The US Forest Service is currently deliberating which trails in the Green Mountains will be designated for off-highway vehicle use (OHVs—includes ATVs, mountain bikes, pack, saddle and draft horses). Although the deadline for official comment has passed, the Forest Service is forming "working groups" comprised of interested citizens and Service employees to complete the ongoing OHV study.

To get on a working group or to send letters contact Ann Mates or Terry Hoffman, USDA Forest Service, POB 519, Rutland, VT 05702-0519; 803-773-0300. Remember they are not deciding whether or not OHVs are appropriate in the Forest but rather where they are appropriate and then adopting standards and guidelines for construction, maintenance and management of trails.

Lets manage to do without them.

For more information contact Mike Zweikelmaier, Two River Earth First!, POB 85, Sharon, VT 05065.

PEG MILLET—THE GENTLE WARRIOR

Recently denied parole under a dubious procedure, Peg Millet is an inspiration to those who would devote their lives to all that is wild. *The Gentle Warrior*, a compilation of songs from her demonstration days, explores the wounded beauty of this natural world. The tape is available by mail order for $12 (AZ residents add .80 for sales tax) from Jerome Headlands Press, PO Box N, Jerome, AZ 86331.

WALK FOR THE WILD SISKIYOUS, JULY 23-26

Come for a 3 day walk through the heartland of the North Kalmiopsis. We will walk down Burnt Ridge Road, which exists for the sole purpose of creating access to timber sales. We are demanding that this road be permanently closed to traffic and used as a hiker/biker access to the Siskiyou Forest. Burnt Ridge Road was built over the Bear Camp Trail, a historic Native American trail. We are working to restore this trail, stop all planned logging in the area, and protect this ancient forest as a World Heritage Site. For information contact: League of Wilderness Defenders (LOWD), 454 Willamette St. #218, Eugene, OR 97401, (503) 343-7305.

Mundane Matters

ABOUT SUBMISSIONS

Notwithstanding our aversion to the prevailing patriarchal paradigm, *Wild Earth* welcomes submissions. Poems should be sent directly to our Poetry Editors, Art Goodtimes (Box 1008, Telluride, CO 81435) and Gary Lawless (Gulf of Maine Books, 61 Maine St, Brunswick, ME 04011). Poets should realize that we receive hundreds more poems each quarter than we can publish. Articles and letters should be sent to the Editor at our main address (POB 492, Canton, NY 13617). They should be typed or neatly hand-written, double-spaced. Those who use a computer (heaven forbid) can help us by including a copy on disk. We use Macintosh but can convert from PCs ("personal [like hell] computers"). Writers who want their material returned should enclose a self-addressed stamped envelope.

Articles, if accepted, may be edited down for space or clarity, though if substantive changes are made, the author's approval will be sought. Articles with significant scientific content (e.g., most biodiversity reports and wilderness proposals) will be reviewed by our Science Editor for accuracy and clarity. Wilderness proposals will also be reviewed by our Executive Editor, and controversial or complicated pieces may be peer reviewed. Lengthy biologically-based articles generally should include literature citations.

Wild Earth occasionally reprints articles; but due to the surfeit of submissions we receive, reprints will usually be low priority. We generally welcome other periodicals to reprint articles from *Wild Earth*, provided they properly credit the articles.

In matters of style, we follow the *Chicago Manual of Style* loosely and Strunk's & White's *Elements of Style* religiously. Also we suggest that authors remember several basic rules when writing for *Wild Earth*, since we always have far more material than we can print and we expect our writers to be lucid, perspicacious, and ineffably winsome.

1. Eschew surplusage. (Twain)
2. Thou shalt not verbalize nouns. (Abbey, 1988)
3. Do not affect a breezy manner. (Strunk & White, 1959)
4. Watch your antecedents. (Davis, 1988)

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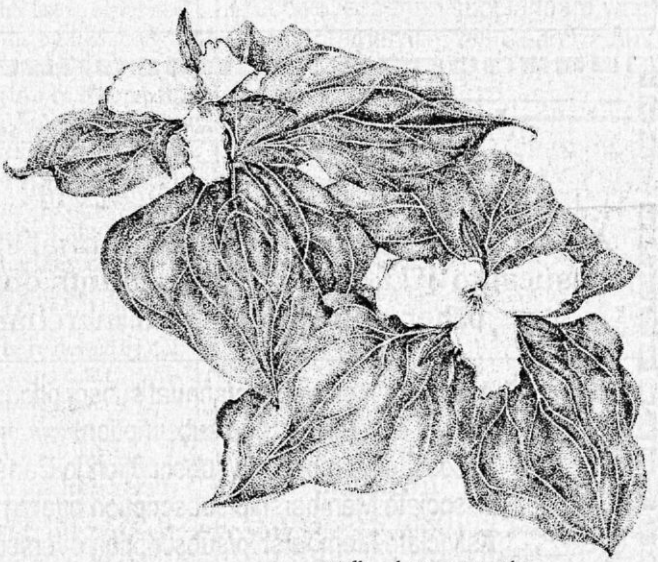

Trillium by Peggy Sue McRae

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WILD THOUGHTS.**

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Thomas Lyon
Christopher Manes
Chris Maser
Mollie Matteson
Roz McClellan
Bill McKibben
Farley Mowat
Gary Nabhan
Roderick Frazier Nash
Jim Nollman
Reed Noss
Tony Povilitis
Jamie Sayen
Gary Snyder
Capt. Paul Watson
Terry Tempest Williams
George Wuerthner
Buck Young
Margaret Hays Young
and many others.

A VISION OF ECOLOGICAL HEALTH

The work of restoring and preserving North America's biological diversity is not a job for the faint of heart. Courageous groups and individuals all over this continent are working toward such a vision—from Preserve Appalachian Wilderness to the Alliance for the Wild Rockies to the Greater Ecosystem Alliance—these regional wilderness advocates and many others are revitalizing this continent's conservation movement. They are the New Conservation Movement.

Wild Earth's mission of providing an independent voice for the New Conservation Movement and publishing wilderness recovery plans of The Wildlands Project is important work. Please support it through the Wild Earth Research Fund.* And please support your grassroots conservation organization in its vital work for biocentric change, for preservation of biodiversity, for recovery of **Wild Lands** and **Life**.

*** Contributions to the Wild Earth Research Fund are fully tax deductible to the extent allowed by law.**