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WILD EARTH

The Journal of the
Wildlands Project

FALL 2002

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Paul Hawken
Lyanda Lynn Haupt
Mike Fay
John Elder
Gary Paul Nabhan

WILDLANDS PROJECT



reconnect restore rewild

WE ARE AMBITIOUS. We live for the day when grizzlies in Chihuahua have an unbroken connection to grizzlies in Alaska; when wolf populations are restored from Mexico to the Yukon to Maine; when vast forests and flowing prairies again thrive and support their full range of native plants and animals; when humans dwell on the land with respect, humility, and affection.

Toward this end, the Wildlands Project is working to restore and protect the natural heritage of North America. Through advocacy, education, scientific consultation, and cooperation with many partners, we are designing and helping create systems of interconnected wilderness areas that can sustain the diversity of life.

Wild Earth—the quarterly publication of the Wildlands Project—inspires effective action for wild Nature by communicating the latest thinking in conservation science, philosophy, policy, and activism, and serves as a forum for diverse views within the conservation movement.

WILD EARTH

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Contents

2

Around the Campfire
with Dave Foreman
Don't Worry, Be Happy

5

Letters

6

A Wilderness View
Tom Butler
Fighting Evil

17, 35, 45

Poetry

70

Reviews

Review essay on cyborgs, etc.
by Bill McCormick

This Sovereign Land

Selling Social Change (Without Selling Out)

76

Artists This Issue

79

Announcements

80

Wildlands Project Perspective
Leanne Klyza Linck
Catching On Down Under

INSIDE BACK COVER

Species Spotlight
Onychomys torridus

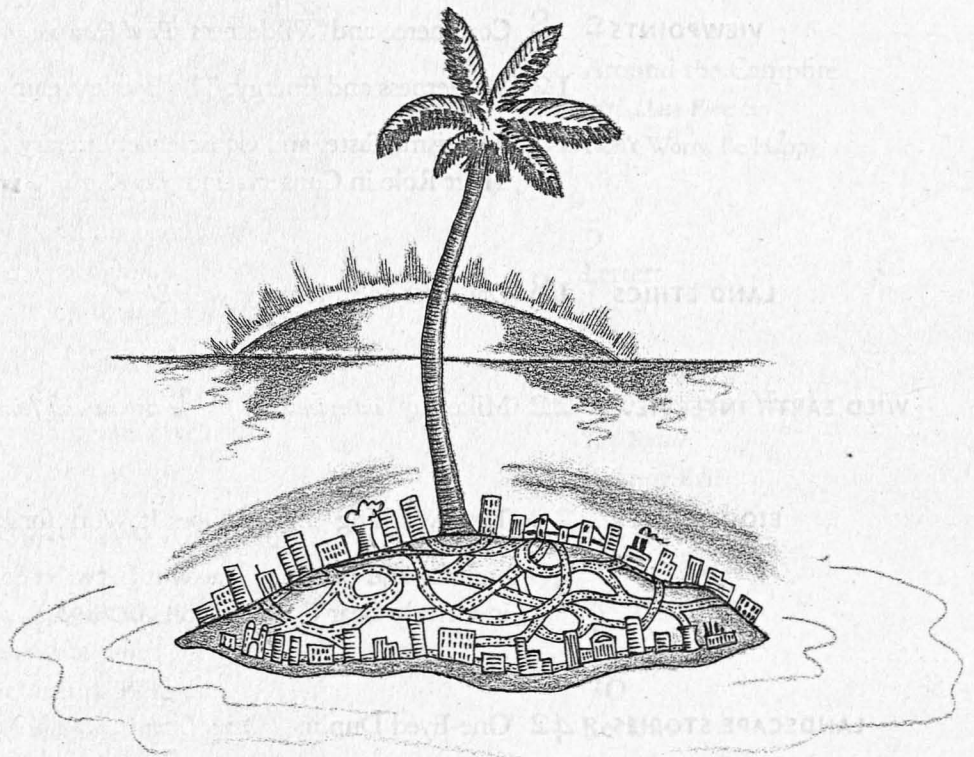


- VIEWPOINTS** 8 Commerce and Wilderness *Paul Hawken*
12 Wilderness and Energy: The Battle Against Domination *David Johns*
14 Activism, Taste, and Conscience: Literary Intellectuals and
Their Role in Conservation *Jay Kardan*
- LAND ETHICS** 18 Darkness and Memory *John Elder*
- WILD EARTH INTERVIEW** 22 Mike Fay *interviewed by Joshua Brown and Jennifer Esser*
- BIODIVERSITY** 29 The "Working" Forest: Does It Work for Biodiversity? *John Terborgh*
36 Smokey and Mirrors: The War Between Science and Pseudoscience
in Grizzly Bear Conservation *Stephen F. Stringham*
- LANDSCAPE STORIES** 42 One-Eyed Dunlin *Lyanda Lynn Haupt*
44 Beyond the Confidence Interval *Jeff Fair*
- CONSERVATION STRATEGY** 46 Conserving Wildlands in Mexico *Rurik List and Patricia Manzano-Fischer*
- CONSERVATION HISTORY** 56 First Steps Along the Appalachian Trail: Benton MacKaye's
Progressive Vision *Larry Anderson*
- POPULATION MATTERS** 62 Homeland Insecurity *Gary Paul Nabhan*
64 The Impossible Race: Population Growth and the Fallacies
of Agricultural Hope *Hugh Iltis*



ON THE COVER

"Oak, Cherry, Solidago" (detail), oil on gessoed paper by Heather Lenz, ©1998



Don't Worry, Be Happy

ONE OF THE MOST remote and supposedly pristine islands in the South Pacific is Henderson Island. Europeans first stumbled upon it in 1606. No people lived there. It was believed that no humans had ever lived there. Henderson's lack of human settlement was recently called into question when bird paleontologists Storrs Olson and David Steadman found the bones of three extinct species of pigeons and three extinct species of seabirds on it. Only after the extinct birds were uncovered were Polynesian archaeological sites found. Clearly people had lived on Henderson, destroyed their resource

base, and died out or left. Jared Diamond writes, "Given the widespread evidence for overexploitation of wild animals by early Polynesians, not only Henderson but the other mystery islands as well may represent the graveyards of human populations that ruined their own resource base."¹

The question we face today is whether we can avoid turning Earth into Henderson Island.

Remember Malthus's argument: "Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio."

William Catton, author of *Overshoot*, the wisest, most enlighten-

ing discussion of overpopulation I have read, explains:

Throughout the essay Malthus was referring to human population, and by subsistence he meant food...these conceptions were unduly narrow. But the really basic Malthusian principle is so important that it needs to be restated in the more accurate vocabulary of modern ecology. It states a relationship of inequality between two variables: *The cumulative biotic potential of the human species exceeds the carrying capacity of its habitat.*

This is an absolutely fundamental point for understanding the modern predicament. By *biotic potential*, Catton means how many children a couple

could theoretically produce, and *cumulative biotic potential* means "the total number of people that could result after a series of generations if every generation fully exercised its reproductive power." *Carrying capacity of its habitat* "is simply the maximum number of living individuals the available resources can indefinitely support." In other words, humans always have the potential to produce more humans than any area, including the entire world, can support.²

Simple. There are limits. We can overshoot them. This is a basic biological fact.

Opposed to this reality is the dominant faith of the world—*humanism*. In *The Arrogance of Humanism*, David Ehrenfeld warns that humanism is based on a group of assumptions, which "cut across political lines":

All problems are soluble by people.

Many problems are soluble by technology.

Those problems that are not soluble by technology, or by technology alone, have solutions in the social world (of politics, economics, etc.).

When the chips are down, we will apply ourselves and work together for a solution before it is too late.

Some resources are infinite; all finite or limited resources have substitutes.

Human civilization will survive.³

Catton warns that "believing crash can't happen to us is one reason it will. The principles of ecology apply to all living things.... Whatever the species, irruptions that overshoot carrying capacity lead inexorably to die-offs."⁴ When we overshoot the carrying capacity of our habitat, whether it is Henderson Island or the entire world, we damage the future

productivity of our habitat, causing its future carrying capacity to be less than it was originally.⁵

Ehrenfeld explains the danger along the path laid out by the Panglossian cornucopians: "The overwhelming trend of the humanist-dominated present is towards more ruined soils, more deserts, more children with anomie, more shattered, violent societies, more weapons whose horror surpasses imagination, more techniques of autocratic suppression, and more mechanisms for isolating human beings from one another."⁶

The cornucopians dismiss such views as a social pathology of pessimism. Ehrenfeld responds, "The motive for their constant insistence on being optimistic and 'positive' is simply the converse of this; optimism is necessary for those who are attempting the impossible; they could not continue to function without it."⁷ Veteran science journalist Eugene Linden warns, "Any vision of the future that either expects or demands a new human, a higher consciousness,

Humans always have the potential to produce more humans than any area, including the entire world, can support. Simple. There are limits. We can overshoot them.

or some other transformation of human nature should be automatically suspect."⁸ Linden also writes that "widespread optimism has always been a good indicator that disaster is around the corner."⁹ His recent book, *The Future in Plain Sight*, is a sober, credible look at possible tomorrows without assuming miracles.

Former Colorado governor Richard Lamm simply asks, "Given present realities, why do we want our children to face an America of 400 million people?"¹⁰

It is widely believed that "developed" nations are what "undeveloped" nations will soon become. Catton points out that just the opposite is more likely.¹¹ The writings of Robert D. Kaplan, who travels to the most dangerous and godforsaken places in the world, clearly show that many undeveloped countries are becoming even more undeveloped and poor, and suggest that developed countries, including the United States, may be degenerating as well.¹² Disturbing as that view may be, I think Kaplan has a far more accurate picture of the future than do the rosy-cheeked, bright-eyed economists worshipping at the tomb of Julian Simon.

At a recent conference, Kaplan said, "All the countries with violent upheavals in the 1980s and '90s were the ones that showed the highest growth rate in the '60s! Every country where bloody internecine civil

wars have occurred in recent years had a huge population preceding the conflict."¹³ Journalist Georgie Ann Geyer checked some figures to see if Kaplan was right. For the following countries, which are plagued by social and ecological problems, the first figure is 1950 population, the second is for 1998:

Rwanda: 2.1 million, 8 million
 Haiti: 3.3 million, 7.5 million
 Algeria: 8.8 million, 30.2 million
 Afghanistan: 9 million, 24.8 million
 Zaire (Congo): 12.2 million, 49 million
 El Salvador: 2 million, 5.8 million
 Ethiopia: 18.4 million, 58.4 million

For example, Rwandan women were on average each producing eight children before the horrible Hutu-Tutsi genocide. Geyer says she was "flabbergasted" after reviewing the numbers.¹⁴

After listing a few of the wars and internal conflicts plaguing the world at the close of the twentieth century, anthropologist Marvin Harris wrote, "As one of these conflicts ends, another begins: Nothing warrants the hope that the rate of carnage is about to slacken."¹⁵ According to Harris, "During the 1980s, some of the worst famines in history afflicted large parts of Africa and South Asia, under the very noses of the United Nations and other international agencies. In absolute numbers, more illiterate, impoverished, and chronically malnourished people live in the world at the end of the twentieth century than at the beginning."¹⁶

Stanford law professor John Donohue and University of Chicago economist Steven Levitt made another linkage between social anarchy and explosive birth rates when they inquired into the baffling drop in the crime rate in the United States. They believe that half of the crime rate drop is because of the legalization of abortion. Unwanted children brought up (or effectively abandoned) in a poor underclass where criminality, drug use, and joblessness are rife find it very easy to become criminals. As liberal columnist Ellen Goodman put it, "After *Roe*, to put it bluntly, some unwanted fetuses at risk of becoming potential criminals were aborted."¹⁷ This may be politically incorrect, but it makes perfect sense. Wanted children have a better shot for a good life than do unwanted children. Overpopulation in hopeless, degenerate communities leads to a further breakdown of civilized behavior.

Can we work it out rationally? Are we in charge? Marvin Harris warned in 1977 that "the major transformations of human social life have hitherto never corresponded to the consciously held objectives of the

historical participants."¹⁸ He later wrote that

the major processes of cultural evolution do not bear witness to our kind's ability to exert conscious, intelligent control over our species' destiny...all the major steps in cultural evolution took place in the absence of anyone's conscious understanding of what was happening...Each great transformation in human history and prehistory occurred as a consequence of conscious decisions, but the conscious decisions were not about great transformations.¹⁹

In other words, "nobody is at the wheel, because there isn't any wheel, nor can there be," as Ehrenfeld explains.²⁰

Those concerned about the future instead of immediate gratification should ponder David Ehrenfeld's warning:

In this Age of Ironies this must be the greatest irony of all: humanism, which proclaims and celebrates the critical intelligence of humanity, has in the last analysis failed to invoke it where it is needed most, to test humanism's own faith by appraising the success of our interactions with our environment.²¹

≈ **Dave Foreman**

Loco Mountains, Gila Wilderness Area

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THE SUMMER EDITION of *Wild Earth* featured an article ["Honoring a Wilderness Vision"] concerning additional wilderness designation on the Allegheny National Forest in Pennsylvania. While protecting additional wilderness areas is surely necessary, it is folly to believe that a few isolated islands of wild habitat will achieve long-term conservation goals in a land that has been exploited by the timber and oil and gas industries for a century and a half.

The Allegheny Defense Project has been at the forefront of the effort to restore the ecological integrity of the Allegheny National Forest. In preparation for the upcoming Forest Plan revision, we have initiated an Allegheny Wild! Campaign, which seeks to end commercial activities that degrade the forest, and replace them with management that emphasizes habitat restoration (including the obliteration of thousands of miles of roads that now fragment the beautiful Allegheny), watershed and wildlife protection, and low-impact recreation.

The Allegheny has much to offer. The Tionesta Scenic and Research Natural Areas and Heart's Content offer visitors the rare experience of the Allegheny Plateau's primeval forests. The North Country Trail passes through the Allegheny. Two Wild and Scenic Rivers—the Allegheny and Clarion—form the forest's western and southern boundaries, respectively.

Unfortunately, the Forest Service, U.S. Congressman John Peterson (R-5th District), and the extraction industries want to perpetuate the intense resource extraction that has been occurring on the forest. Between 1996 and 2000, oil and gas drilling spiked 500%! The Allegheny contains

an estimated 10,000 active oil and gas wells, over 100,000 inactive wells, and roughly 2,000 miles of access roads built for the oil and gas industry.

Wilderness is important and much needed for the Allegheny. However, in the absence of a more comprehensive plan to restore the ecological integrity of the Allegheny National Forest, wilderness area designation becomes a narrow, band-aid vision. What do we really achieve by saving 10% of the Allegheny National Forest, while sacrificing the other 90%?

This compromise is exactly what the Forest Service, Congressman Peterson, and the extraction industries are counting on. By supporting a small wilderness proposal, they can effectively mute those that have been working for years to establish real reform, while patting themselves on the back for appearing progressive.

Ryan Talbott

Clarion, Pennsylvania

Ryan Talbott works with the Allegheny Defense Project (www.alleghenydefense.org).

Appreciating Deep Time

VOLUME 12, NUMBER 2 [summer 2002] arrived today, and it's even more superb than *Wild Earth* usually is. I so appreciate the quarterly helping of eco-centric, evolutionary sustaining food for thought.

Stephanie Mills

Maple City, Michigan

Author and activist Stephanie Mills's new book is *Epicurean Simplicity*.

KUDOS ON YOUR Deep Time issue. I think it should be mandatory for environmentalists to study paleontology;

CONTINUES PAGE 75 ►



We can see the world as doomed and fatally flawed or we can see every trend and statistic as a possibility for transformation.

PAUL HAWKEN,
in "Commerce and Wilderness"

Any vision of the future that either expects or demands a new human, a higher consciousness, or some other transformation of human nature should be automatically suspect.

EUGENE LINDEN,
quoted in Dave Foreman's
Around the Campfire



Fighting Evil

CULTURAL TRANSFORMATION, loosely considered, has been the subtext of this journal's editorial mission since its inception. Underlying the practical strategic and scientific analyses we publish has been an ongoing conversation about humanity's most pressing need: how to live in a way that embraces the entire land community's right to flourish. That's an old conversation, of course, which far predates *Wild Earth*. Conservation literature, historic and modern, has long conveyed the urgency to protect living Nature in the language of moral imperative.

Such language is surely familiar to every American. From high school football to geopolitics, our social discourse has deeply entrenched battle lines between "us" and "them," "good" and "evil," "right" and "wrong," "freedom" and "tyranny," between American virtue and the folly of lesser peoples. Anyone within sight or sound of a

newspaper, radio, or TV in recent months has been deluged with this bifurcated rhetoric as the nation has been set on a course to fight evildoers—from the caves of Tora Bora, to the streets of Baghdad, to the executive suites on Wall St. (Just how vigorously prosecuted the war on corporate evildoers will be remains to be seen.) Now, I'm no moral relativist—although I suspect I'd like to be one if I were smart enough. It's considerably easier to believe in good and evil than forever be discerning shades of gray. For the record, I believe that protecting wilderness and wildlife is good. I believe that wanton destruction of life's diversity is evil. But I think I am just bright enough to be skeptical of moral absolutes and ethical certitude. That way lies the enticing waters of True Believerdom and siren call of *jihad*.

My dis-ease about absolutism and exhortations to moral conduct in the realm of land use deepened recently

while attending a public forum hosted by the U.S. Forest Service on the future role of timber management on the Green Mountain National Forest (GMNF). The format included an open comment period, during which audience members could express an opinion about what level of commercial logging, if any, is appropriate for Vermont's national forest. Four speakers (two timber industry reps, a Forest Service timber sale planner, and Jim Northup, a former Forest Service employee who now leads the effective regional advocacy group Forest Watch) were allotted time for brief presentations. One panelist, the executive director of the Vermont Forest Products Association, came out swinging—blaming Northup and other perceived "radical environmentalists" for the appeals and litigation that have effectively shut down GMNF logging for several years. He railed against additional wilderness:

"We don't support any more wilderness," he said. "Not one acre."

A second panelist took a more nuanced approach. A prominent forester who works for a large timberland management and land speculation company, he based his argument for increased public lands logging on ethical grounds. He said that it would be immoral to designate new wilderness areas here in the U.S.—"locking up [land] in a terrarium"—because the result will be massively increased cutting somewhere in the third world. He said that for every acre not logged here, 20 would be degraded somewhere else, probably in the tropics. That place almost certainly will be biologically richer and the logging there definitely won't be the exemplary forestry practiced by the Forest Service, subject to stringent environmental regulations that govern our federal public lands. (Anyone who has hiked through or flown over the clearcuts in the [name your favorite] National Forest may place somewhat less faith in the agency's silvicultural practices and the stringent laws that are supposed to protect public forests. Moreover, those regulations apparently are so onerous that the timber industry and its lackeys in Washington, D.C. are now working hard to circumvent or gut them.)

I found the industrial forester's remarks specious but fascinating, even beyond the odd assertion that there is a 20:1 ratio of destruction from off-shore to domestic public lands logging. (I'd love to see a source for such an analysis, which seems ludicrous, but what an argument against globalization if substantiated.) Explicit in the gentleman's remarks was that a growing human

population will have ever greater need for forest products in the future, and that managed timberlands—"working" forests in the current jargon—are the right solution because they can supply logs, wildlife habitat, and recreation opportunities (pretty much everything society could ask from any self-respecting, hard-working forest). Designating additional wilderness areas was somehow antisocial, ecologically destructive from a global standpoint, and selfish—perhaps even sinful. It was immorality in the form of land use foisted on rural communities by people from away, presumably urban, granola-crunching, Volvo-driving liberals. Although the panelist didn't make this point directly, some audience members did. (Alas, at this forum wilderness advocates far outnumbered logging proponents, and it seemed that no one from the anticonservation fringe felt emboldened to denounce the Wildlands Project's grand conspiracy with the United Nations, Boutrous Boutrous-Ghali, and, really low blow here—*Bill Clinton*—to strip patriotic Americans of their private property rights. Similar conspiracy-minded sentiments are regularly voiced at such meetings, however, and not only by members of the John Birch Society*; Alaska Congressman Don Young was quoted in the Anchorage newspaper after 9/11 speculating that the World Trade Center attacks were likely the work of eco-terrorists based in Seattle.) But I digress.

If North American wilderness advocates really were unconcerned about the plight of tropical forests and the people who live in and near them, if we were content to export our ecological footprint to the developing

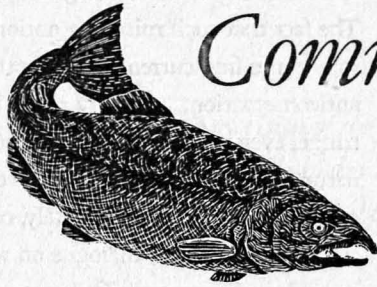
world, if we cared not about our own overpopulation and overconsumption habits in the United States and were not working alleviate them—then the charge of unethical behavior would be apt. But none of those things are true. The fact that such mistaken notions sometimes find currency outside the anticonservation, "property rights" fringe, even among conservationists' natural allies in social justice movements, is troubling. Fortunately, considerable thoughtful dialogue on ways to bridge unnecessary rifts between social and ecological activism is now occurring within the broader social change movement.

The notion that wilderness preservation is antisocial goes hand in hand with the old canard that wilderness advocates are misanthropes who care more about mussels and snakes than people. Perhaps there are a few malacologists and herpetologists who have greater affinity for the taxa they study than for humans, but I suspect they are rare. And thank goodness for the occasional literary misanthrope like Ed Abbey; railing against the foibles and follies of *Homo sapiens* has made for great art and biting social commentary. As a rule, though, such stereotyping is inaccurate. Every conservationist I know certainly has the capacity to care about Nature and people.

So if the substance of the forester's remarks were wrong, why was his argument compelling? *Language*. And empathy. He was talking about an ethical approach to land use, in essentially the same language that I would—but with diametrically

CONTINUES PAGE 75 ►

* While the logic is admittedly hard to follow, the Birchers appear to trace the roots of the Wildlands Project's international conspiracy to eighteenth century Bavarian illuminati. No kidding.



Commerce and Wilderness

by Paul Hawken

HAVING SPENT A MEASURE of my youth roaming the peaks of the Sierras, the dry eastern canyons that sprawl down to Mono Lake, and the White Mountain area above Owens Valley, I thought I knew wilderness. I was wrong. It wasn't until a journey to the Kitlope—North America's largest uncut temperate rainforest—that I realized what wilderness is.

Journeying through giant cedars and spruce, I felt that I had been thrust into a painting from the Hudson River School—a preternatural, romantic dreamscape trumped up for gullible nineteenth century urbanites. Yet here it was, before my eyes, a mythological setting beyond what most of us consider the normal bounds of experience. The five species of Pacific salmon—Chinook, chum, Coho, pink, and sockeye—swam underfoot in the shallows of the Lower Kitlope, fodder for the grizzlies and black bears. In the glacier-fed waters river otters peered curiously; wolf packs roamed the forest at night; and nesting eagles perched along every spawning tributary. Even fattened seals, a hundred miles from their normal maritime home, joined the salmon feast.

To visit the Kitlope is to witness a miracle we call life. This miracle is not describable in words. It cannot be fully experienced in a lifetime. In the Kitlope, the Serengeti, the Arctic National Wildlife Refuge, or in a thousand other wild places that civilization hasn't demeaned, what a traveler experiences is almost unbearable to the senses. As Emily Dickinson observed, "life is so startling, there is no time for anything else."

Our civilized world seems to have time and care for everything but this first miracle. It would be convenient to see the resulting loss of wilderness as purely an ecological issue, or even a consumption issue, and neglect its social component. We use too much, let's cut back and "save the environment," goes the conventional wisdom. It is critical to recognize that underlying the extermination of Nature is the marginalization of human beings. As C. S. Lewis said, "What we call Man's power over Nature turns out to be a power exercised by some men over other men with Nature as its instrument." Today this is the power of corporations over people and place. The world's top 200 companies have twice the assets of 80% of the world's people. This power was never granted.

Nevertheless, commerce must be part of a solution. Imagine a world in which cars and buses become whisper quiet, vehicles exhaust only water vapor, parks and greenways have replaced unneeded urban freeways, and the very "wastes" of our industrial society become the "foods" for other industrial processes, mimicking how Nature works. Landfills will close, worldwide forest cover will increase, dams will be dismantled, and the wild will be returned to our lives.

Fundamental to this revolution will be the recognition that capitalism doesn't conform to its own accounting principles. It liquidates its capital and calls it income. It neglects to assign any value to the largest stocks of capital it employs—the living systems as well as the cultural systems that are the basis of human capital. In short, industrial capitalism is a

massive transformation of natural capital into manufactured capital. Its advent in the eighteenth century simultaneously allowed human beings to produce and consume more. The more natural capital that technology sucked up, the more productive laborers became. The more work a person could do, the cheaper products became; the higher income climbed, the faster demand went up. This is why it was a revolution: it was self-actuating. It has not stopped since.

Though some pundits tell us that the old industrial patterns are no longer dominant, modern economic growth is just as driven by mechanization and technology today as it was during the early industrial revolution. Mobile phones, laptops, and other assorted “post-industrial” technologies are little different than spinning jennies and steam engines. They require large amounts of natural capital for production and use, and are designed to increase human output. Consider this one example: For every pound of electronics in your pocket or on your desk, approximately 8,000 pounds of waste was cre-

ated somewhere in the world. This is not the information age; it is the despoliation age.

As ever more people place greater strain on living systems, limits to prosperity are coming to be determined by scarcities of natural systems rather than industrial prowess. Today, economic progress is becoming restricted not by the number of fishing boats, but by the decreasing numbers of fish; not by the power of pumps, but by the depletion of aquifers. Unlike traditional economic factors of production, these biological limiting factors are not fungible.

To understand why the erosion of wilderness is ongoing, one need look at the industrial metabolism of the most consumptive country—America. Industrially speaking, what do we eat, where do we defecate? Just as with an organism, industrial metabolism has a beginning and end. In sum, all substances, both solid and gaseous, required to support one American for a year, including water used that is not available for reuse, total roughly 980,000 pounds. If we add outputs



generated overseas for products and services consumed here, that figure easily exceeds one million pounds. It is equivalent to 109 tractor trailer-sized truckloads for a family of four. Leaving out water still requires 16 full-size moving vans per family, or one billion truckloads a year.

In the U.S., for every 100 units of energy that we introduce into our economic system nearly 98 units are wasted. Essentially, we are 2% efficient. Think of that, when you hear the president of the United States say that drilling for oil in the Arctic National Wildlife Refuge is vital to our national security. Building a pipeline in the fragile arctic landscape to deliver oil that will not arrive for another ten years and that would supply, at best, 180 days of total U.S. consumption will do only one thing: satisfy the senators from Alaska and the CEOs of oil companies. It will do nothing for U.S. energy security; it does nothing to change the inherent nature of a wasteful industrial system.

If you are surprised at the 2% figure, consider your car. After a century of engineering, the modern car is still in the Iron Age. Of the energy consumed, about 80% is lost, mainly in heat and exhaust. Of the 20% that gets to the wheels, only 5% moves the driver. Five percent multiplied by 20% equals 1%, a level of inefficiency that means cars burn their weight every year in gasoline. If you are stuck in a traffic jam, or sit with your engine idling, automobile efficiency plunges to zero. The solution to such gross inefficiency is not more energy *production*—more oil wells, gas pipelines, strip-mines, and nukes. The solution is radically increasing energy *productivity*.

There are now a plethora of innovative techniques that can reduce energy consumption fifty-fold greater than the purported supply of oil in the Arctic National Wildlife Refuge on an annual basis, and they are cheaper, more effective, and create more jobs.

If the United States Geological Survey estimates are correct, the Arctic Refuge could provide about 292,000 barrels of oil or about 156,000 barrels of gasoline a day for thirty years starting in 2011. That would run about 2% of the cars in the U.S. for three decades. Improving fleet mileage just 0.4 miles per gallon in our light vehicles would accomplish the same objective with the important exception that it would cost consumers less.

These savings are just the tip of the iceberg. U.S. fleet mileage is currently 24 mpg, a 20-year low. Current hybrid-electric cars such as the Toyota Prius get 48 mpg city/highway combined. There are now over 350,000 on the road here and abroad. VW is already selling a car that gets 78 mpg and

is said to have a 200-mpg car available in 2003. The Big Three automakers are testing family sedans that will head for production in the next three years that exceed 70 mpg. Another way to think about this is that we can create the equivalent of about 30 Arctic Refuge oilfields in Detroit with good engineering. It takes bad politics to destroy the real one.

Before we could get a drop of oil from the Arctic Refuge (should drilling proponents eventually prevail), we will be driving electric cars powered by fuel cells. These cars, whose emissions are hot water vapor and oxygen, have an extraordinary secondary use: if the U.S. auto fleet were powered by fuel cells, it would equal mobile power plants with 5–10 times the total output of all our power plants. Parked cars can feed electricity into the grid, forever eliminating the need for coal-fired and nuclear power plants.

In buildings, the potential for similar savings abounds. With relatively low-tech methods including new glazing, proper siting, efficient lighting, and passive heating and ventilation, we can create state-of-the-shelf, quiet, thermally comfortable buildings that are a visual delight. These buildings save 30–50% of the energy cost over conventionally built structures. With the addition of photovoltaic cell arrays, most buildings can also feed the grid. Integrating green building technology with new urban planning can similarly reduce traffic, energy use, and waste.

In industry, large cost and energy savings can be attained as companies shift away from reactive chemistry that has produced a witch's brew of toxic compounds. New enzymatic and biological techniques not only promise safer compounds, but also low-temperature manufacturing that can reduce energy costs by 90%.

The good news is that these savings already exist in the form of tools, products, and services that are being deployed everywhere in the United States. More are coming.

Contrary to current industry propaganda, it is the *excessive and inefficient use* of resources to produce our goods and services that is inhibiting prosperity and poses the main threat to our well-being. The question is no longer how much timber, soil, minerals, or water is required to create one unit of well-being in society. The real question is: How much prosperity can we create with each board foot of timber, each liter of pure water, each square meter of topsoil, each pound of copper?

Nothing like this transformation can happen until America begins to see again. If you cannot read, books look like firewood. You may see a bird as gossamer and feathers, or you might see it as a creator of forests and meadows, fly-

ing with its small sac of undigested seeds. We can see the world as doomed and fatally flawed or we can see every trend and statistic as a possibility for transformation. If we are to save wilderness and wildlife, then we will have to turn to each other and take care of all the human beings here on Earth. It is not mere industry that must be reformed, it is our sense of each other. We have the responsibility to create a world of equals, not just a nation of equals. The first rule of ecology is everything is connected. The first rule of Earth-saving is we are all connected as a species. The economy that destroys the taiga is the same one that creates tens of millions of refugees, that causes families to sell their children. There is no boundary that will protect the natural world from a suffering humanity.

Commerce requires the governance of politics, art, culture, and Nature to slow it down, to make it heedful, to make it pay attention to people and places. Commerce has never done these things on its own. The destruction of languages, cultures, forests, and fisheries is occurring worldwide in the name of speeding up business. Yet even business is stressed by rapid change. The rate of change is unnerving to all, even to those who are benefiting. To those who are not benefiting, it is devastating. The current industrial growth economy will not continue indefinitely; physically it cannot on a finite planet, and too many people now recognize its fundamental weaknesses and are working to overturn it.

In the United States, more than 30,000 nongovernmental organizations, foundations, and citizens' groups are addressing the issue of social and ecological sustainability. Worldwide, this number may exceed 100,000. Together, the groups address a broad array of issues, including environmental justice, ecological literacy, public policy, biodiversity conservation, women's rights and health, population growth, renewable energy, corporate reform, labor rights, climate change, trade rules, wildlands protection, ecological tax reform, water conservation, and others. These groups tend to be local, marginal, poorly funded, and overworked. It is hard for most groups not to feel justified anxiety that they could perish in a twinkling. At the same time, a deeper pattern is emerging that is extraordinary.

Never before in history have so many organizations arisen in accord without a common ideological framework. There is a mass movement on Earth addressing sustainability in the largest sense of the word. Call it what you wish. The two most complex systems in the world are living and human systems. The study of how human commercial activity is linked to liv-

ing systems (resources) is consigned primarily to economics. It needs to be addressed by every discipline and every sector of society. The practice of sustainability, as nascent and wobbly as it may be, is essentially the study of this relationship from a new perspective.

Sustainability proponents do not agree on everything—nor should they—but remarkably, they share a basic set of understandings about the Earth, how it functions, and the necessity of fairness and equity for all people in partaking of and preserving Earth's life-giving systems. They believe that water and air belong to us all, not just to the rich. They believe that seeds and living organisms cannot be owned or patented by corporations. They believe that Nature is the basis of true prosperity and must be honored.

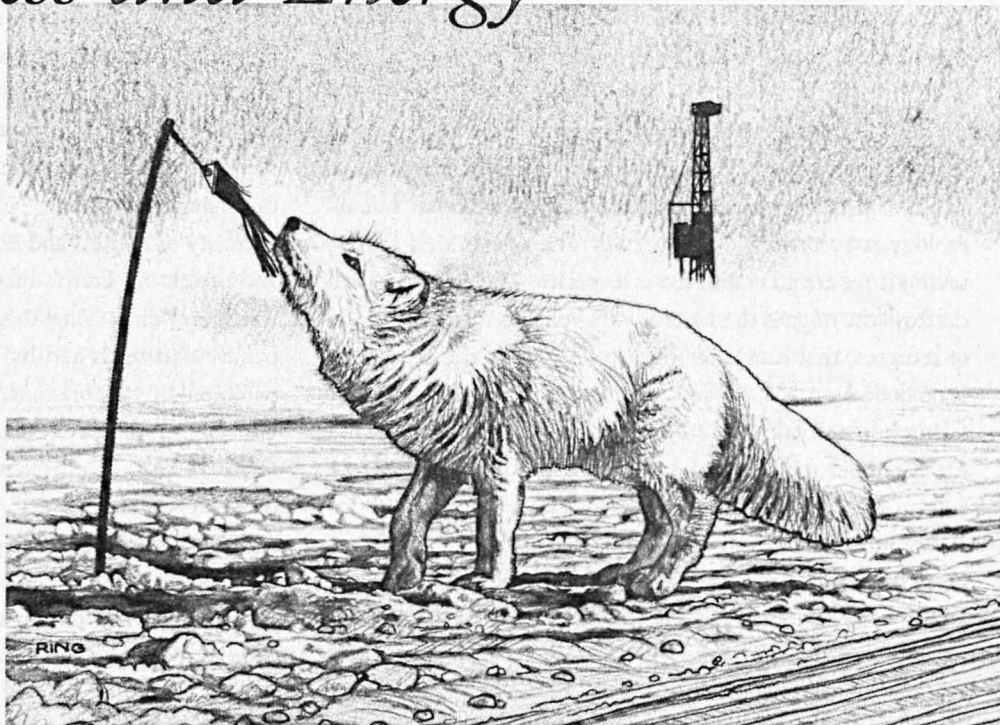
This shared understanding is arising spontaneously from different economic sectors, cultures, and regions, and is spreading worldwide. No one started this worldview, no one is in charge of it, and no orthodoxy is restraining it. It is the fastest and most powerful movement in the world today, unrecognizable to the American media because it is not centralized, based on power, or led by charismatic white, male vertebrates. As external conditions continue to worsen socially, ecologically, and politically, organizations working toward sustainability multiply and gain increasing numbers of supporters. As Václav Havel, writer, dissident, and first president of the Czech Republic has said, we are at the brink of a new world because the old world is no longer valid.

It is no longer valid for America, with less than 5% of the world's population, to consume 30% of the world's resources. Logging the remaining ancient forests, mining fossil water, destroying critical habitat, and despoiling the last sanctuaries where wild creatures can live and thrive is unacceptable. We must change. In this century we can commence the work of ecological and cultural restoration on a grand scale. We can begin to reduce carbon in the atmosphere; recharge aquifers; restore lands that have been taken by deserts; create habitat linkages for buffalo, panthers, and wolves; and begin to rebuild paper-thin topsoil. We can create a world where wilderness co-exists with civilization. We can and will do this because it is the only way we can be fully human, and the only way Earth's grace will sustain us. ☾

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Wilderness and Energy

The Battle Against Domination



by David Johns

THE DEFEAT OF THE MOST recent efforts to despoil the Arctic National Wildlife Refuge recalled to mind a striking map published a few years back by the Yellowstone to Yukon Conservation Initiative. Depicting “linear disturbances,” this map looked like the steel grid-work of some giant, misshapen cage. There were the roads and rail lines common to North America, but also seismic exploration lines, oil and gas pipelines, and access corridors cut through the wilderness throughout the region—far north of the railroads and regularly traveled highways. It’s not news that energy extraction is a threat to protecting the wild. But to see it only in those terms is to miss something much greater: it is *energy* that fuels, literally, the transformation and degradation of the Earth.

Half a globe away from the Yellowstone, in the mountains and deserts of southwest Asia, troops of a dozen countries fight a war whose roots lie in the quest for the control of oil. Human life and the natural world sustain enormous “collateral damage” as a direct result of this latest in a series of skirmishes, covert operations, terrorist incidents, and low-intensity wars (for the victims of course it’s *all* terrorism). One of the circum-

stances that makes this war popular, indeed possible for the United States and other western countries is that it can be fought with little loss of life for western combatants and civilians. Nixon’s Vietnamization of another war three decades ago made it clear that Americans would tolerate loss of life elsewhere as long as the body bags stopped coming home. With machines that run on oil, and with oil-fed factories that make the machines, the U.S. and similar societies can fight a capital-intensive war, insulating themselves from human casualties. Those without access to the machinery must fight with their bodies, or turn the machines against their owners.

These are not the only costs of some societies’ dependence on huge amounts of energy. Aberrant weather, a sea of SUVs choking the streets and polluting the air, civil liberties under assault by would-be leaders seeking to guarantee oil supplies, and conservationists’ great efforts to prevent drilling in many regions are also results.

In the face of these costs why is it so difficult to wean ourselves from this terrible addiction? Is it simply myopia? A love affair with motorized toys and air conditioning? Because

ruling elites have direct economic interests in the oil economy and the ability to limit serious consideration of other options? Do we unconsciously know that so much of the bread and circus that distracts us from our growing alienation and declining freedom and quality of life depends on energy? Or is it that John Peet was right when he wrote that underlying the human economy, measured by the abstraction of money, is Nature's economy measured in calories and calories are really what it's all about? It's calories we eat, calories that make and fuel our machines.

If these were the only obstacles to kicking the energy habit, they would be formidable enough. But they do not fully explain the depth of the problem. To protect the wild, to develop truly sustainable economic and political systems, conservationists need to understand how fundamentally the dependence on energy is woven into the fabric of civilization. It is true that the first significant energy subsidy that humans captured—fire—predated the emergence of human hierarchies. But with human efforts to systematically control Nature (including the capture of energy subsidies) something very important changed: we adopted forms of social organization and technology that at heart involve the control of some humans by others. Once this inequality and hierarchy exists, its maintenance and enhancement becomes a distinct social goal: it remains interwoven with the control of Nature but becomes a separate motive force. *Central to both* is the control of energy, of caloric subsidies.

The extraction of energy beyond that necessary for biological maintenance and reproduction of a reasonable human population* is itself an act of domination and control. It entails reshaping ecosystems and disrupting vital processes. The forms change over time: from exploiting the labor of domestic animals and the calories stored in plants, to slaves and waters wheels, tenant farmers and factory workers, to petroleum and nuclear-generated electricity. The energy extracted is the precondition for the domination and control of Nature in other realms (such as the conversion of whole ecosystems to pavement or factory farms) and the control of people by vast hierarchies, including their armed servants. Who can forget the image of police standing before the Nike store in Seattle during 1999's antiglobalization protests?

Those at the top of the human hierarchy know that hanging on to their position requires that they directly control the

institutions that "produce" and manage energy. They do not want to see the energy they control decreased, dispersed, and localized. It is not a coincidence that the words "energy" and "power" can be used almost interchangeably.

Those societies that have harnessed relatively greater energy subsidies have pushed aside, conquered, absorbed, or destroyed societies that have used less energy or used it less effectively. Hunting and gathering cultures—societies with the lowest subsidies and the most ecologically friendly form of human social organization—have disappeared except in "peripheral" areas of the globe. The first world dominates the third world in part because the former has harnessed energy in greater amounts, and has sustained that advantage over time. Like a cancer that has reached the stage where it tricks its host into providing it with a blood supply by disguising its nature as a tumor and parasite, energy subsidies give the power to dominate, as surely as getting the subsidies in the first place is an act of domination.

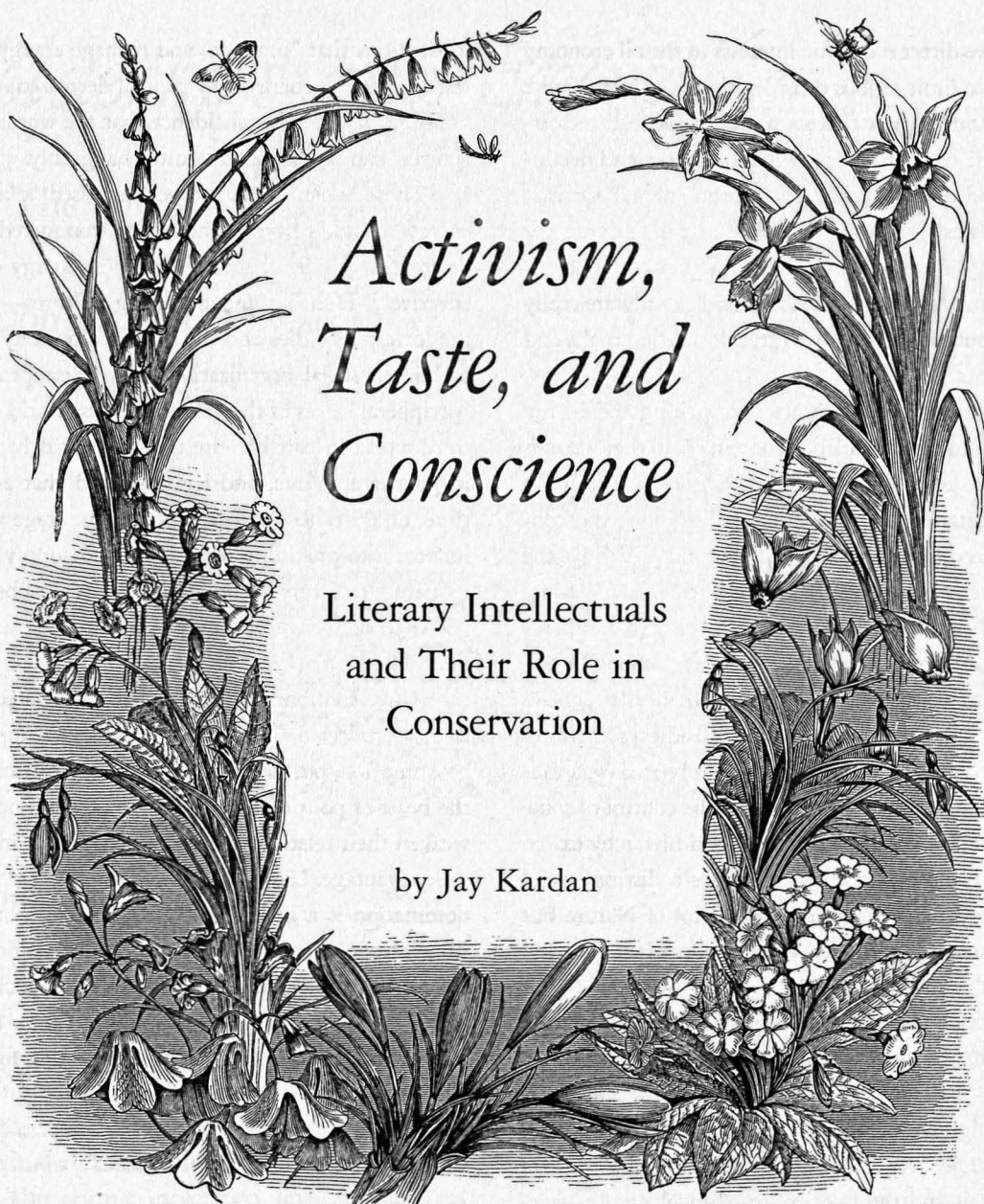
Thus, confronting the problems associated with human energy extraction and use is not just about unplugging from consumption, but unplugging from domination. Energy is at the heart of political and economic power—no one wants to weaken their relative position; indeed, every inclination is to seek advantage. Like disarmament, dismantling energy-based domination is a global problem. No one wants to go first. Elites have often compromised—to a point—with other groups in society and even elites in other societies, when it comes to dividing the pie. But they seldom agree to share power—that is, *decision-making*—without a fight. ☪

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* A reasonable human population is one that does not degrade the capacity of Earth's systems to sustain all species in natural patterns of abundance and distribution, and to maintain fully functional ecological and evolutionary processes.



Activism, Taste, and Conscience

Literary Intellectuals
and Their Role in
Conservation

by Jay Kardan

NOT LONG AGO, at a retreat-cum-planning-session for environmental leaders, I was one of an audience of over a hundred listening to a political communications consultant specially hired for the occasion. He had played a part in the election of several officials, including a United States senator, and was expected to administer tonic doses of “perspective” and “reality” from the world of practical politics. This he did, in no timid terms. While giving technical advice on crafting our message, he accused us of talking too much to one another, of overestimating the attention span (and, he hinted, the intelligence) of the public, of caring more for our own cleverness and virtue than for victory in our causes. “The purpose of public communication,” he reminded us, “is not to make the speaker look smart.” We should tailor our press releases and other pronouncements to the ears and minds of the overworked, undereducated, financially worried, soccer-team-ferrying unfortunates who make up our audience. Slogans, sound-bites, and arguments based on threats to

human health—especially the health of children—are effective. Complexity, ambiguity, elaboration, irony, polysyllabism, appeals to biological and wilderness values are not.

The advice is typical of that being given to activists across the country, and on hearing it I experienced a moral uneasiness I imagine must be common to many activists, and doubly acute in those with pretensions to literary culture. In the first place there is the discomfort felt by all honest, thoughtful people at the prospect of using persuasions they would not themselves find persuasive. Let us admit it: in arguing by the methods of political advertising, we are engaged not in public education, but in propaganda; and propaganda, as the historian Norman Davies has written, "is the antithesis of all honest education and information." Unhappy as its targets, we are ashamed to inflict it on others, even as we admit its effectiveness in certain situations. We might think, for instance, that if our object is only to persuade the public on a specific point—say, to elect a candidate, or to affect the progress of a piece of legislation—simplicity (not to say simplemindedness) must be our watchword. In such campaigns, time and other resources are always limited, and it could seem foolish to spend them on any but the most narrowly pertinent discourse. But the definition of pertinence grows more doubtful with the admission of larger and vaguer goals. What if these include deepening the public's appreciation of biodiversity, or raising the level of public discourse on our issues? In the heat of tactical activism, such ambitions are usually relegated to "another time and place"—a time and place which, all too often, are never found.

The way things are said is as important as the thought behind them; indeed, the literary faith is partly an affirmation that expression and content are indissoluble. Even within the realm of avowed propaganda, there is good propaganda and bad propaganda (good and bad, I mean, by the standards of literary taste), and the kind recommended by expert manipulators of opinion is often bad. Not only does it appeal to existing prejudice, like all propaganda; it does so in the language of the sitcom and television commercial. Not only does it fail to challenge the thinking of its target; it fails to challenge his conception of how that thinking might be expressed. "Sometimes I think you environmentalists would rather be right than win," the consultant at the retreat later complained to me privately, referring to moral self-righteousness. But among conservationists who are also literary intellectuals, the stricture often fits our sense of aesthetic and semantic rightness. We would rather be fully honest in our discourse, fully sensitive to the com-

plexity of its issues, fully and even artistically literate in our style, than win by methods that betray those values. Where then in the environmental movement do we belong?

It's a question that has puzzled me for some time in directing my own life, and is far from insignificant for the movement as a whole, whose present political fortunes cry out for the services of people skilled in the use of language. There is, of course, purely literary "nature writing." It has its place. But I came to the movement not simply to increase my literary activity, but for an active, exoteric, practically useful relief from what Henry James called "hammering out headachy fancies with a bent back at an inkstained table." It was with that aim that I spent the past eight years as a volunteer in the Sierra Club, at every level from my local group to the national Council of Club Leaders. I have edited newsletters, taken minutes as a secretary, coordinated strategy as a Conservation Chair, and, most recently, led the 14,000 club members in my state as Virginia Chapter Chair. In the course of the experiment I have made the usual volunteer's discoveries of hitherto-unsuspected capacities in myself. I know now that I can set up a successful press event, speak confidently at a public hearing, preside over a board meeting with some approximate respect for Robert's Rules. And, despite moments of doubt, I've confirmed my faith that organized activism can change laws, policies, and perceptions, even in politically backward Virginia.

There is excitement and satisfaction in all of this; but I have also learned that there are aspects of the whole enterprise I would prefer never to touch. If communicating effectively with the press or public means tailoring my discourse to some scientifically determined vulgar average of taste and understanding, if it means repressing the style, irony, or passion with which I'd normally treat a subject, I'd rather leave the task to others. I recognize the need for such methods (who am I to question the authority of polls and focus groups?), but I respectfully decline to be their instrument. I'm simply not happy talking about drinking water when I'm really concerned about the survival of freshwater mussels, or appealing to middle-class resentments by abusing government subsidies as "welfare." Nor am I willing to "talk down" to the public in the hope of being understood and liked. I've tried it, and it makes me feel cheap and dishonest. Activists with stronger stomachs for the work will do it better in any case.

Therefore I've decided to take a break of at least a year from activism. In that interval I hope to answer, provisionally and personally, some of the questions that have driven me into retirement. Is there a satisfying role for me in practical conservation

work? Is such work compatible with allegiance to literary values? Does the conservation community really need people like me, and, if it does, how can it best use them to mutual benefit?

A few tentative ideas—so tentative that I scruple to call them answers—already suggest themselves. Not everyone is suited to every sort of work, and raw ability to fulfill a function is not sufficient license for assuming it. This advice may seem banally self-evident, but anyone familiar with nonprofit organizations will know how often they ignore it. Their perpetual vacuum of help and talent is forever sucking volunteers into responsibilities for which they have small taste or aptitude. Only the individual volunteer himself can judge such matters, and he should do so ruthlessly (as I have not always done), for the sake of his equanimity and of his future in the movement. If he is someone for whom the use of language carries weighty ethical and aesthetic implications, he should refuse to compromise his standards in the service of the cause, despite all pleas that his talents are the very ones most needed. There is no surer road to activist “burnout” than mouthing propaganda in phrases false to one’s conscience.

In literary terms, this means never writing or speaking below one’s own standard of taste and culture. John Gardner, the novelist and teacher of writing, cut through the problem of imagining one’s audience by saying simply: “One writes for

Organizations, for their part, must do their best to accommodate such scruples, and to listen with a skeptical ear to the siren song of pollsters, “operatives,” and others promising infallible recipes for persuasion. After all, human history is filled with successful efforts that the experts were sure could not succeed. And the very meaning of success must be reexamined. Persuading the masses is important, but so is persuading the few who have enough leisure, intelligence, and education to appreciate subtler arguments. Effective leaders are likelier to come from the latter than the former, and conservation groups should recognize the need for communications, and communicators, adapted to their tastes. This is not preaching to the converted, or “talking to ourselves,” as my political friend put it. Think of it rather as talking to people who are ready join us, the incubation of conservationists *in ovo*.

Nor is talking to ourselves to be despised. Conversion to a cause, as to a religion, is not a simple, finite process, but needs continual reinforcement from contact with co-believers. “My conviction gains infinitely,” Carlyle liked to quote from Novalis, “the moment another soul will believe in it.” Every group of converts benefits from occasional preaching to reinvigorate its faith: preaching of a subtlety and sophistication proportionate to the congregation’s understanding of the creed, which is very different from the understanding of mere-



Elitism that worships birth or money is contemptible. But a recognition of moral and intellectual capacities, and a determination to employ them wisely in the work of saving the world, must be a part of any program seeking to advance that work.

people like oneself”—even if one doesn’t know any such people. Indeed, this is the only course that avoids the dishonesty of writing or talking “down” to others. Determining the real capacity of one’s readers or listeners is impossible, and beside the point in any case. To paraphrase Hamlet, we must use our audience not after their desert (imagined or calculated), but after our own honor and dignity. The literary faith I mentioned earlier includes an almost mystical belief in the power of well-crafted writing to communicate across differences of background, prejudice, and experience. Of course there are occasions that call for a humbler or a more elevated style—every good rhetorician is flexible in that way—but none that calls for phrases less well shaped, or arguments less sound, than those we would accept as worthy of ourselves.

ly potential allies. And both groups (if by potential allies we mean those truly likely to become activists) will respond to a higher level of discourse than will the general public. Conservation is one of the great moral causes of our time, and—as with other such causes—appeals most strongly to people of cultivated taste and conscience. Activist organizations must recognize that for many of them, taste is conscience: that is to say, their aesthetic and moral sensibilities are closely intertwined. Their ideals will never be limited to protecting wild Nature, but will extend to unshrinking recognition of complexities, to deep and developed thought, to honest and elegant use of language—the very opposites of the public-relations methods creeping into our movement. A part of our discourse, at least, should respect those humane values. If we gave

more weight to addressing the best members of our audience, as well as the mass of voters, there would be more room for such people in the crafting of environmental communication.

It might even be wise to consider literary conservationists a subdivision within the communications department, a special corps devoted to telling the whole truth about our ideals and purposes. Time and again I have heard front-line activists insist on the political necessity of tempering, editing, and otherwise concealing our real aims; but unless these are clearly articulated, how can they be agreed upon as collective goals? If we don't know where we want to go, we probably won't get there. Again, we should consider the possibility that in offering a diluted gospel for public consumption, we are failing to inspire those likeliest to be moved by a daring, comprehensive vision of reform. *Wild Earth* and the Wildlands Project have promulgated such a vision of the physical landscape, but there is room for parallel criticism of society. If we question our culture's ideal of unlimited (material) opportunity, if we envisage a society in which people live longer with their parents, marry later and have fewer children, own fewer possessions, inhabit smaller dwellings, and generally consume fewer resources, we should say so—not always and everywhere, but somewhere, so that such propositions are exposed to consideration and debate, lose the menace of novelty, and take their place in the range of available social goals. And we should say so through the tongues and pens of those best able to articulate them in convincing, humane, and elegant terms.

I'm aware that all of this may raise the ghost of "elitism" that has haunted conservation so long and tediously. Let me be clear. Elitism that worships birth or money is contemptible. But a recognition of moral and intellectual capacities, and a determination to employ them wisely in the work of saving the world, must be a part of any program seeking to advance that work. Somewhere between the disjointed platitudes of advertising and the inbred jargon of academia—between demagoguery and "talking to ourselves"—must lie a level of communication about the ecological crisis suited to what might fondly be called the "intelligent reader." I know how chimerical such a reader can seem in this age of barbaric busyness, when professional activity is too often considered the only preoccupation worthy of educated people. (Hence the importance to our movement of the class of the educated or "voluntary" poor—those who choose thoughtful leisure over lucrative work.) But it is part of the activist's task not only to recognize reality, but also to change it, and that includes changing how people talk, write, and read about conservation.

If we deplore the crudity with which environmental issues are treated in the press, we should redress the tendency by observing higher standards, not by responding in kind. Of course, as a movement, we can continue to influence elections and legislation, to pen snappy op-eds that strum the chords of popular prejudice, even (heaven help us) to be heard on radio call-in programs. But not all of us with a will for conservation work are fit for such things. Until it can find a mutually satisfying place for activists with what I would call a "literary conscience," our movement will be making inadequate use of those who could be some of its strongest advocates. ☾

Jay Kardan, of Palmyra, Virginia, has recently completed a two-year term as chair of the Virginia chapter of the Sierra Club, and is devoting his retirement from activism to writing. He receives job offers, manuscript solicitations, and contentious comments at jkardan@cstone.net.

[POETRY]

The Least of the Terns

small twirling diving things,
rejoicing perpetually without effort

can it be the wounds of their hearts
waterflung, upon daybreak open?
they sing, these the mouths of holy beings

endangered for decades,
shot and poisoned,
they build nests
in abandoned airfields, forgotten landfills, 'spoiled islands'

the tern, survivor's canary, does not know
that all our life hinges on her destiny
she brings us the white silk handkerchief of healing
from all we have tried to banish

~ McCabe Coolidge

I DON'T SLEEP AS WELL as I used to. When I first began to awaken in the night, I would often fret about unfinished tasks or brood over misunderstandings. But a feeling of contentment has gradually settled into these hours. I have come to relish the wakeful darkness. My nighttime reveries are sometimes still rattled by the traffic of anxiety, when every car on my street seems to need a new muffler. While the windows of susceptibility may slide open to such racket in the night, though, I find increasingly that the darkness also amplifies echoes of the love, health, work, community, and mystery giving life wholeness. Bodily quiescence opens the door to an inner ecology of excursion and return.

In commenting upon the fairy tales of the Brothers Grimm, Padraic Collum has suggested that the old stories attained their full richness only when darkness fell. "A rhythm that was compulsive, fitted to daily tasks, waned, and a rhythm that was acquiescent, fitted to wishes, took its place." But he also notes how, both in the Grimms' homeland and in his native Ireland, this shift in consciousness was eliminated by people's ability to live under artificial lights right up until the moment they went to bed. First kerosene lamps and then electricity meant that "in towns and in modern houses the change of rhythm that came with the passing of day into night ceased to be marked.... The prolongation of light meant the cessation of traditional stories in European cottages." Without the blurring and release that come to our minds in the dark, it is harder for us to be fully receptive to the magical transformations or talking animals that convey so much of humanity's accumulated wisdom. We're held in thrall to our own rationality and assertiveness, compulsively re-enacting our dailiness, no matter how unnourishing it may have become. Freud has written that "the neurotic repeats instead of remembering." His attention to dreams reflects an insight that such stories and images, coming toward us in the darkness, might mark a path back to the wholeness of our lives.

We seem to have forgotten, as a society, how to turn out the lights of our striving and acquisitiveness. Our projects keep the generators thrumming all night long and dry up the rivers. This is what it means to say that the ecological crisis is ultimately a crisis of culture. It's time to give ourselves again to the wisdom of old stories; to reawaken, in the retrospective dark, to the relationships that make our lives whole. Earlier stages of the conservation movement assumed that damage to the natural environment could be prevented or repaired by legislation. Advances of scientific knowledge would stimulate and reinforce our progressive policies. Such floodlit confidence

will not guide us to the roots of the problem, though. Thus, when bioregional educators speak of "the stories of home," we are referring to more than ecologically sophisticated narratives. We are also invoking an era before our glittering cities dimmed the night sky. Until we can find our way back to what Padraic Collum calls the "acquiescent" darkness, we will languish in a kind of collective Alzheimer's, unable to make out the constellations or remember the pattern that connects.

My sense of darkness as the vehicle for memory deepened last year when I had an opportunity to descend into the caverns of Pech-Merle. A narrow path led down into the earth and back into the past. France's Dordogne region holds a number of painted caves which, like those at Pech-Merle and Lascaux, seem to have been frequented by artists, questers, and priests between about 25,000 and 10,000 B.C. Scholars of

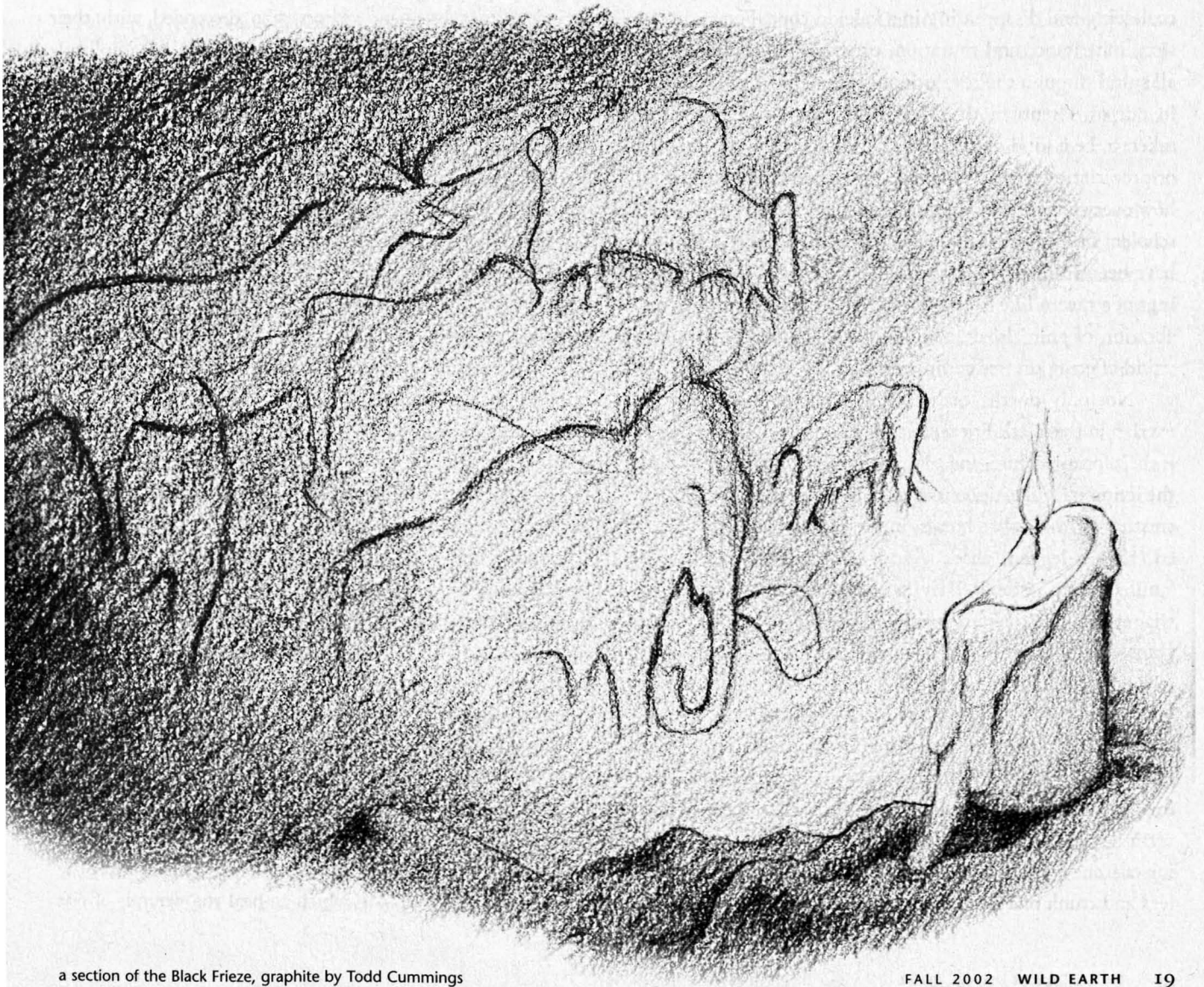
DARKNESS AND MEMORY

by John Elder

the Magdalenian era suggest that human beings would not have actually lived in these caves, because of their dampness. It seems much more likely that bands of hunter-gatherers would have sheltered on the surface under lean-tos or under the dramatic overhangs so prevalent in this region of limestone cliffs and outcrops. Most members of a given band may never have gone down into the depths of Pech-Merle, and the identity of those who did remains speculative. It is clear, though, that this set of caves was visited regularly as a pilgrimage site within an annual migratory circuit, along with the closely associated site of Conguac. As individuals cautiously made their way down into this darkened realm, they carried little stone dishes of fat, lit to give off a modest, flickering light. (A number of these artifacts have been discovered nearby.) Paintings created on the caves' irregular walls would

have swum up into sight only as the hand holding a lamp got close to a particular surface.

Even with the electric lights that were switched on as our small tour group arrived at each new chamber, the turning path and side-chambers made ours a shadowy procession. The initial caverns through which one passes at Pech-Merle are relatively close to the surface, and have several uncanny features. An ancient oak on the surface has somehow penetrated the roof of the first chamber with a fibrous, flexible root as big around as my arm. It hangs from the ceiling at the length of thirty feet or so, suggestive of a vein, a nerve, or an umbilical cord. It quivered in the wind of our group's passage. The impression of having entered a living body was reinforced by centuries of seepage down the limestone walls. The bubbling transparency of these ropy traces made them gleam as if wet. Sometimes



a section of the Black Frieze, graphite by Todd Cummings

pink fans of calcium hung on the walls like organs. The hunters of Pech-Merle, whose bands depended almost entirely on the herds of reindeer they followed, must have felt a connection here with the ritual skinning and dismemberment of their prey, and with the shining evisceration of those bodies so like their own. This was a sacramental journey within.

One of the most striking of the painted areas at Pech-Merle captures this effect of organic exfoliation and profusion. It is designated as the Black Frieze—a design almost twenty feet across depicting horses, bison, long-horned cattle, and mammoths. Often, the animals closest to the center are superimposed on one another, in a gesture that seems to express an ecology of the spirit. It offers a meditation on the flowering and flowing of distinct but overlapping forms within the mysterious house of life. I've never encountered a more eloquent exploration of what is, for me, the essence of evolution—the arising of bodies from bodies, like mandalas coalescing and disappearing in a kaleidoscope. Forest succession, inheritance and mutation, predator-prey adaptation—all spiral through the revolutions of the Great Dance. Earlier in our own century, the Magdalenian cave-paintings were taken to be a kind of ritualized hunters' magic, summoning or propitiating prey. But as evidence has accumulated about how overwhelmingly reindeer dominated these people's diet, scholars have posed the question why other species should have been so much more prominent than prey in the paintings of a cavern like Pech-Merle. Perhaps it was simply a celebration of animals' dramatic variety. There's comfort in a world offering diverse companionship.

Not only do the bodies of magnificent wild creatures overlap in the Black Frieze, but they also feel in some cases as if their form, posture, and placement were actually born from the living irregularities of the rock. Two of the most beautiful creatures within it are horses, in the big-bellied, small-headed, slender-legged, shaded, and speckled "Chinese" style familiar from Lascaux. They face away from each other but with their hindquarters partially overlapping. Our guide pointed out that the head of one of these horses is also perfectly outlined by a crooked fissure in the cave wall. It seems to be shoving out of the stone surface at that point.

A similar effect is found in the enormous figure of a mammoth, separated from the main group of animals. This image is painted on a section of the wall where there are five vertical folds, evenly spaced and with a slight outward rounding of stone beneath each two seams. Discerning the powerful legs and trunk of a mammoth in these forms, the artist drew

a curved line over the top, to evoke the massive animal's back, suggested a tusk sticking out beside the trunk, then brushed a group of vertical lines toward the beast's front to suggest its shaggy coat and beard.

The paleobotanist Steve Young has remarked upon the "antic" quality of evolution, all those elaborate, ever-changing costumes pouring out of the clown-car of Nature. I thought of this remark when our guide in Pech-Merle pointed out the faint red outline of a pike-like fish, riding along the neck and spine of the rock-faced horse on the right of the Black Frieze. It was yet another instance of antic profusion. But for me it also startlingly evoked the counter-motion of a mane—the brightness of a fish that swims and spangles behind the arched neck of a running horse. For these painters, the intricate juxtapositions of Nature accumulated into a larger harmony.

No one can say exactly how the caves at Pech-Merle were used, or precisely what the animals here meant, either to the artists or to subsequent visitors who descended with their smouldering grease lamps. But the carefulness and amplitude of these paintings feel like a prayer, their beauty like a celebration. Modern visitors have noticed how few human figures are in evidence, and how small and relatively crude such pictures are. The "buffalo woman," "wounded men," and "hunters in distress" that do occur feel scribbly—marginal, ambiguous, and fragile. In a way, though, such a lack of emphasis is consistent with these artists' loving, knowledgeable depiction of animals. They were looking outward, and inward, to a world that encompassed their little human lives and made them whole.

In the nearby Museum of Early Man at Les Eyzies are a number of stone knives and scrapers, each chipped on both sides into a keen, shallowly beveled blade referred to in the exhibition materials as a "biface." Such doubleness expresses the natural but profound ambivalence of the successful hunter. Gratitude that the people would now eat, but also a passionate sense of identification when skinning and dismemberment disclosed kindred flesh, glowing like a vision in the light of flames. Richard Nelson evokes a similar revelatory process in his essay "The Gifts," when he writes, "As my hands worked inside the deer, it is as if something has already begun to flow in me." I believe that the paintings at Pech-Merle were both the expression of such reverence and the images to which these human ancestors turned to recover and refine the language of their hearts.

Having experienced Pech-Merle, I think about our need for ceremonially designated spaces in which to encounter the wholeness of our lives—in which to heal the wounds of our

dividedness. The inattentive sprawl of our communities and the scattershot commercialism of our television reveal how urgently our whole society needs such healing. We need the circling mind of ceremony that will help us to recognize our kinship with each other and the world. We need to step out of the well-lit lab and face our grief.

Of all the images harbored deep below the pleasant French countryside in the caverns of Pech-Merle, one of the most moving came in a remote side-passage containing a dozen or more ancient footprints. Researchers identify them as having been made by a 12- or 13-year-old on some solitary trek away from the main, painted chambers. Who knows what vision, errand, or initiation was involved? One print, showing the individual impress of toes and heel, looked as if it could have been left yesterday by a barefoot teenager following a muddy path. No one can say exactly when these prints were made, except to specify that it would have been over 10,000 years ago, when a post-glacial slump of gravels and debris sealed off the cave and put an end to its use as a shrine by bands of hunter-gatherers.

IN ROBERT FROST'S POEM "The Tuft of Flowers," the speaker goes out to mow a field only to find a broken swath where a previous mower had scythed around and spared a spray of flowers growing tangled in the grass. This "message from the dawn," indirect as it was, spoke to the second mower's heart of a kindred sympathy with the earth. It helped him affirm the possibility of human community, "whether we work together or apart." I felt such a sense of connection with the teenager treading Pech-Merle's muddy path. Sympathy, community, even the integrity of our own lives are easier to believe in when we depart from the busy avenues of our days. When we encounter a mammoth stepping out of a cavern's wall. When we gaze down at a footprint in its prehistoric mud. Such visions are both corrective and affirmative. They remind us that we are not alone.

Humility before the larger earth community imbues our reading of human history, too, with a deep sense of sympathy. Such alertness to familial values recalls Padraic Collum's older values of acquiescence. Darkness invites us to turn away, in a restorative rhythm, from the dazzle and hum of our daily projects. It can offer a vehicle for insight and creativity as well as for memory. There is a lineage of environmental prophecy, running from George Perkins Marsh through Aldo Leopold and Rachel Carson to Bill McKibben in our own day, that begins with an awareness of biological cataclysm. Marsh calls attention to the devastating effects of deforestation upon climate, soils, and

water. Leopold looks at the destruction of habitat occurring when our hunters and "game managers" have not learned to "think like a mountain." Carson traces the toxic circulation of pesticides through the ecosystem of spring and into our own bodies. McKibben relates global climate-change to our ravenous appetite for fossil fuels. Such authors focus on disasters stemming from our society's heedless use of natural resources, and they insist that we regard such losses and violations with them. But they also invite us, through such insights, to turn back to a more mindful relationship with the Earth. The darkness of environmental crisis can be, in this regard, another path to memory and wholeness. It creates an opportunity to step outside the blazing circle of our projects—to look out and up.

In *Pan's Travail*, his book about ecological problems in the classical world, J. Donald Hughes relates a Greek myth to the drastic reduction of wildlife in the Aegean region: "The mighty hunter Orion offended Artemis, goddess of the wild, or as some versions have it, Gaia (Ge, Mother Earth) by boasting that he would kill every wild beast in the world. In retaliation, the goddess sent a giant scorpion to sting him. Before this could happen, Zeus set both the hunter and his arachnid enemy in the sky as constellations opposite each other." An implication of the myth may be that humanity shares with Orion the Hunter a rapacious appetite, one that can only be curbed by a threat of death. Such a crisis requires that a broader intelligence impose itself in order to prevent a disaster. The fact that this story has at least as much to do with human beings as with the gods is reflected in the facing positions of the two constellations. Together, they remind observers here below of the perpetual need for restraint.

We can still go out under the night sky and look from Orion to Scorpio. Seeing them, we may recall an old story whose pertinence is undiminished. Granted, these guiding stars will only be visible once we have made our way back into the darkness. This may mean moving well away from the illuminated house, or taking a long walk into the country. Even if neither of those choices is presently available to us, though, we still retain the power to read the myth, close our eyes, and give ourselves over to remembering the world. When day returns, we can decide upon our next steps. ☾

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A MERICAN CONSERVATIONIST J. MICHAEL FAY walked into the jungle on September 20, 1999 from Bomassa, in northeastern Congo. He stopped walking December 18, 2000 on the Atlantic coast of Gabon. His goal: an on-foot survey of the quickly dwindling forests of central Africa.

He called this long walk a “megatransect” to suggest not only the vastness of his 2,000-mile journey, but also the data-gathering intent behind this plunge into the heart of tropical Nature: he would fill dozens of notebooks and video tapes with records of ancient kapok trees, chimpanzees who had never seen people, aardvark burrows, ocean-surfing hippos, a chorus of birds, more than 20,000 piles of elephant dung, and nearly countless other smells, sights, and signs of what may be the most intact ecosystem on the planet.*

Fay is no conservation carpetbagger. Trained as a botanist, he has spent nearly 25 years in central Africa, completing his doctoral dissertation on western lowland gorillas and creating and managing wilderness parks—including ten years as the director of the Nouabalé-Ndoki National Park in the Republic of Congo. In this time, he developed a field style that might be fairly summed up as: find the most inaccessible forests and disappear into them for weeks with little more than a bag of food and a pair of river shorts.

On the megatransect, a joint expedition of the Wildlife Conservation Society and the National Geographic Society, Fay married this exploratory spirit with years of careful scientific planning. Using maps, overflights, and scouting forays, he noted villages, roads, rail lines, and logging operations. These points and lines of human settlement formed the boundaries of 13 abutting polygons of pristine forest. Fay’s course differed from standard straight-line survey techniques, snaking through the center of each wild forest, forming a huge backward S toward the sea. On the scale of daily itineraries, his party took “the path of least resistance” (a grand misnomer for 15 months of machete-hacking travel) around the widest rivers and deepest swamps. On the macro-scale, they always headed on a compass bearing toward the points with the least human presence.

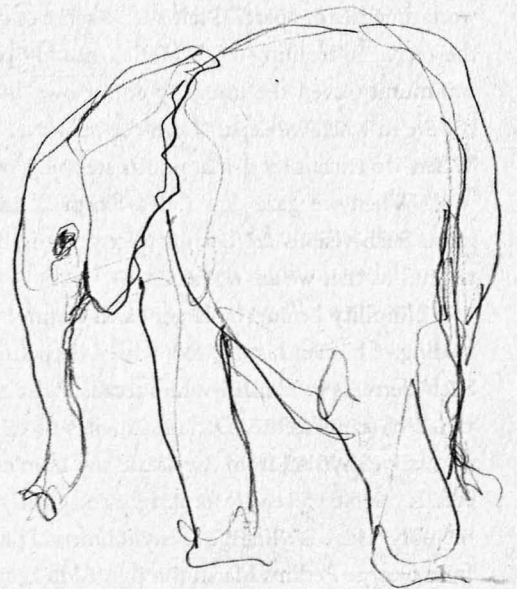
Though this was not his first visit to the jungle, it was the most ambitious, and the stakes were high. He and his crews of Pygmies survived neck-deep black-water swamps, hepatitis, arrest by local gendarmes, and charging elephants. But the greatest risk still lies ahead: will his headlong walk, his unorthodox methods, and his winding trail of data result in new protections for African forests?

Seeking a positive answer to this question, Fay returned to the United States this year to promote the cause of African forest conservation. *Wild Earth’s* assistant editor, **Joshua Brown**, and managing editor, **Jennifer Esser**, spoke with him on February 20, 2002.

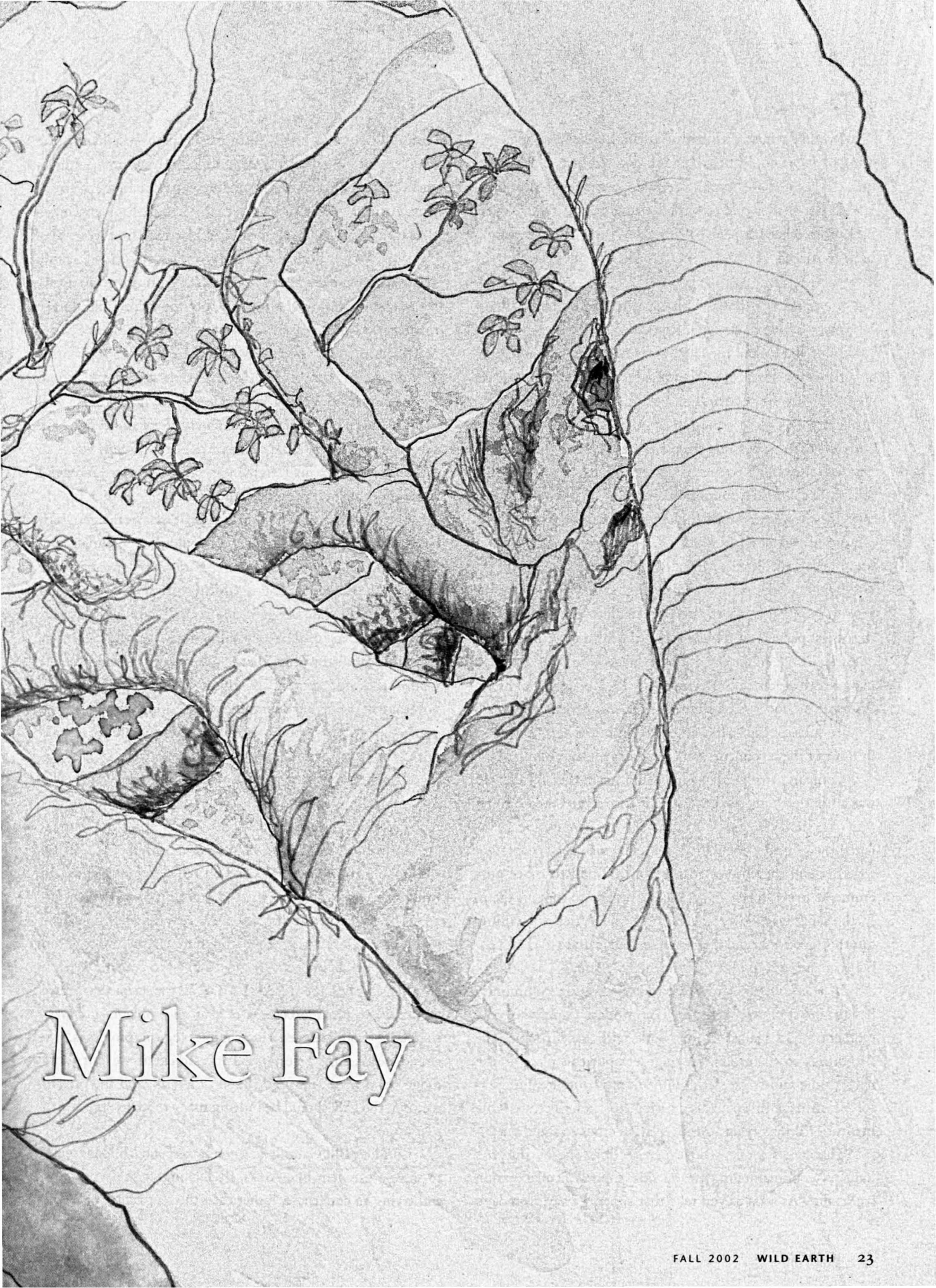
WILD EARTH: You have worked for many years to establish national parks in central Africa. Why there?

MIKE FAY: I have always been a conservationist as far back as I can remember and in college I fell in love with the big landscapes of Alaska. I thought I would end up there. But this all changed when I joined the Peace Corps in 1978 as a botanist and traveled to Africa.

There are wilderness areas in central Africa far larger in size than any place in North America, even in Alaska. Five kilometers in a forest is deep. I discovered roadless places in central Africa where you can go 70–80 kilometers deep and another 70–80 to the other side to get out. These are enormously rich and uninhabited tracts. I thought: there are no parks here; logging is going to destroy this place in 10–15 years; let’s get busy and create some parks.



* The grueling texture of Fay’s journey was captured in three *National Geographic* articles (October 2000, March 2001, and August 2001).



Mike Fay

I wasn't attracted to central Africa by the mission of creating parks. I simply arrived and discovered that we had to act quickly, because the logging companies are grabbing up the land as fast as they can. It was like being a century-and-a-half back from what happened in the Lower 48. I never made it back to Alaska.

Are the parks that have been established succeeding?

Yes, but we have to be careful about what we use to measure success. If you look at the U.S., the total revenue from national parks covers about 4% of the budget to run them, and yet there are about 300 million entrances annually into the national parks. Here we are in the U.S., a developed country with lots of resources, and the parks are subsidized. That doesn't mean they aren't popular or interesting to the people. They obviously are with 300 million entrances. But it takes subsidies; they don't run on their own. They are a collective interest, not private enterprises.

In the same way in Africa, the biggest problem is not the willingness of the people—from the lowliest Pygmy all the way up the president—to create and endorse the parks. That's the easiest part. The problem is that the infrastructure in most of Africa is not maintained, not managed, because of a high rate of corruption, and quickly growing human populations. Priorities are focused on immediate needs. African parks will require subsidies, just like in the U.S., but the governments in most of these countries won't or can't fill that role.

Compare Africa today with California in the 1850s. That was a frontier state, the government encouraged the exploitation of natural resources for money; it was a landscape dominated by a frontier mentality. Yet a few visionary people got together and they mustered the political will to move governments to act, to create national parks and to support them. In the same way, governments in central Africa are willing, but they need help and they need to demonstrate to their people that they are thinking about their welfare.

In this job, the international conservation community has an almost perfect niche; they can work with national governments, not against them, work with local people, the authorities on the ground, saying: let's put this place on the map; at the same time, let's build an infrastructure, hire personnel, manage this place as a national park; let's create some institutional history and a conservation ethos to stand on.

That takes money and expertise from the outside. As long as you maintain that outside support, collaboration works fine. As soon as you take that support away, in today's

Africa, almost universally, things fall apart. Just like in the U.S., if you pulled government support away from national parks they would collapse. One difference is that, for the most part, African governments can't afford to manage any infrastructure—roads, schools, hospitals, electrical supply, sewage.

So do American and European NGOs [non-governmental organizations] have the money and power to build and maintain a system of national parks in central Africa?

With the money we have, we do amazingly well—because African governments and African people are committed to having protected areas. They can see the writing on the wall and they recognize that protected areas are of value. We have several examples in Congo where the government starts to talk about degazetting [removing protection for] a reserve and invariably the local people say: no way!

But no, the money is not enough; it's far from enough. If we had 100 times more money we could do 100 times more conservation. What we are getting is tidbits. I met with the head of the National Cancer Institute in Washington and asked, "What's your budget?" He said, "5.2 billion this year and we hope to up it to 5.7 billion next year." This is the National Cancer Institute that is just one little branch of the National Institutes of Health. I think this is amazing. The U.S. government is putting \$5.7 billion into curing cancer—in one year!—but will only put \$2.4 million into conserving what is one of the two biggest blocks of tropical forest on the planet.

The forests of central Africa and Amazonia are globally extremely important—probably as important as cancer research—even from the perspective of protecting human health, irrespective of biodiversity conservation. Considering the amounts of money we spend on AIDS, on food relief, on military exercises here and there, \$2.4 million on African conservation is not enough. The U.S. government should be spending at least 10 times that amount. If they were, I am convinced we could be *saving* money in 5–10 years. If we look at water supplies, the spread of AIDS, all the social services we are forced to provide because of refugee problems and wars that arise from deforestation and ecological problems, we would be making a very good investment if we put more money into this. The World Bank, the UN, and the private sector in the U.S. should be putting many more resources into that area.

Consider Bill Gates. He is going to spend billions trying to solve a problem like AIDS, by looking at the symptoms and trying to cure those, rather than the root causes of AIDS

in Africa. If I could direct a paltry \$30 million of his granting budget a year, I could use his money far more effectively than the projects he is supporting in Africa right now. And for his cause, not necessarily for my cause.

I have heard you remark that—even if all the national park proposals that are on the table right now succeed—we are likely to see a loss of 90% of the forests of central Africa in the next few decades. Is that dismal projection within the context of existing funding streams to NGOs, or can we expect that loss even if western governments get more involved?

That projection is based on what resources we can count on now—with, say, 80% certainty. With more money we could protect upwards of 15–20% of the area now under threat. In that case, we are not always talking about national parks, but also about managed landscapes that take ecosystems and ecological function into account and do a really intelligent job of land-use management.

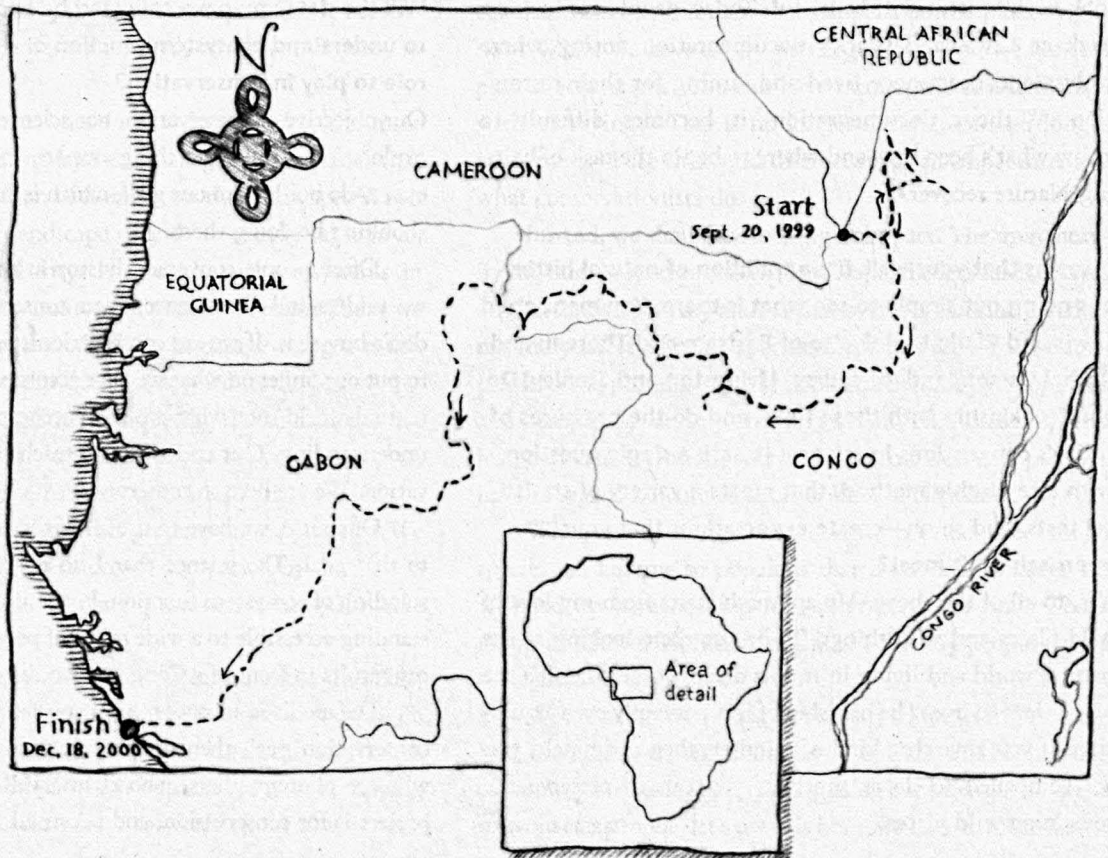
Other, better possibilities exist. For instance, global climate change could create conditions where carbon becomes worth, say, 17 dollars a ton on the world market. If you have

x number of hectares of forest, you have x number of tons of carbon. Forest owners could then negotiate with a power company to guarantee forest protection for the next 200 years, and in exchange get paid 17 dollars per ton. If that were to happen, overnight we could conserve 70% of the forest on the planet and begin wide-scale forest recovery.

Imagining the current trends in deforestation extending into the next 50 or 100 years, do you see your long walk, your documenting of the central African forests, as a kind of memorializing and mourning for what is passing?

Not necessarily. The optimistic view says we will parlay the megatranssect project into more protected areas and changed attitudes in all sectors of society including board rooms of major corporations, the U.S. government, the UN, African national governments, right down to local folks. Increased concern about conservation is one current trend that we can hope to support and strengthen. If we can change attitudes among 1% of the people, that translates into a lot of action on the ground eventually. But of course this kind of change becomes so diffuse it is difficult to document. In some ways, we won't be able to answer: what was the specific benefit of this walk?

Mike Fay's 2000-mile route through the forests of Central Africa—a "megatranssect."



The pessimistic view is that we will end up with 7–8% of these forests in reserves and that, yes, the walk becomes a document of what *was*. In either case, it is a task worth doing. Today, this landscape is so dramatically rich—the forest is vast, the trees are gigantic, the wildlife abundant, like we haven't seen on the North American continent for 12,000 years. We risk losing the African wildlife, just as we lost the megafauna on this continent at the end of the Pleistocene. Imagine if 12,000 years ago someone was walking around with a video camera and stills camera, collecting data on what was living here, recording the size of trees.

If we are conservationists, we have to be able to put our finger on what we have accomplished to protect the natural world, not what we have accomplished for scientific understanding.

Imagine if someone had walked across the United States in 1700 or 1600 doing what we did on our walk across Africa using the same tools we have today. We would say: "My god, this is amazing. The transect came through this town." In the same way, our walk document starts now and will exist forever. At whatever point people look back at it, it will be useful. Today, people are looking back at Lewis and Clark's documentation noting where wolves and bears once lived and aiming for their restoration. Without documentation, it becomes difficult to know what's been lost, and where to begin the task of helping Nature recover.

It seems that your walk fits a tradition of natural historians going out simply to see what is there. You mentioned Lewis and Clark; I think also of Bartram and Thoreau and Rachel Carson, and, of course, Livingston and Stanley. Do you feel kinship with those folks, and do the pressures of today's conventions in science—to ask a single question, with a replicable method, that meets a variety of statistical tests, and so on—create expectations that your approach can't meet?

Yes, to all of the above. My approach starts from my love of wild places and wild things. To be out there looking at the natural world and living in it, is a dream come true. It's the way I want to live. The hardship of it is not really even a question. If you have that kind of mindset, then ultimately, you are compelled to do as much as you can to preserve the remaining wild places.

Scientific data is very important in convincing people that what you are talking about is real. But the scientific bent I put into my work is not for a scientific reason. It's a validation. The system I have developed is a quantified natural history walk; it forces you to understand ecosystem function. Just wandering around the woods, you can piece things together. But if you quantify as you go and force yourself to intensively observe a wide number of variables simultaneously—which is very tiring, it's like being an air traffic controller—all of a sudden it starts to make sense. It is like mathematics. If you study math for a long time, all day every day, your level of understanding gets very complex, very deep. If one concentrates, the connections between widely separated things start to become apparent. Then if you take that data and display it graphically, you can show people the connections.

Because ecosystems are so complex we can't model them and then prove the model works. What we really have to do is go into the field, collect all these empirical data, and then demonstrate that we don't know *how* this works but these are the *relationships* that we see.

Will the data you have collected be best used to help us to understand ecosystem function or does it have a direct role to play in conservation?

Our objective is conservation, not science, not education, not exploration. If all these things we are doing—including science—do not lead to our goal, which is conservation, then we shouldn't be doing them.

Often people conveniently stop at the conclusion that if we understand the science, then conservation will occur. I don't buy that. If we are conservationists, we have to be able to put our finger on what we have accomplished to protect the natural world, not what we have accomplished for scientific understanding. Our end is not to teach people about conservation. We are here to conserve.

Of course, we have to use all of the tools available to get to that goal. The science that I do *is* leading to the understanding of ecosystem function, but it also makes that understanding accessible to a wide range of people. When I present my results in front of a Congressman, he understands.

The media is another tool. If you can use it to get to your conservation goal, then do it. But, once again, I see people who are photographers, who claim, well, this photographic project is for conservation, and because I have taken pictures

of that place it will translate into conservation. Well that might be true sometimes, it might be an honorable thing for a photographer to do, and it may be fun. But in a lot of cases, it is not effective for saving wilderness and wildlife.

Zoos are another example of this problem. Every zoo in the United States talks about how they are conservation organizations. That's how they bill themselves: we are conservationists. But if you look at what they are doing for conservation—other than a very diffuse kind of education—they are doing almost nothing. They could be doing a lot.

If zoos are for conservation, they should work harder to reach their conservation goals. Simply maintaining animal populations in cities around the U.S., bringing in money to maintain those animal populations, and saying you are educating people is not enough. Every zoo in the United States and around the world needs to be raising money for field conservation and they need to be making conservation happen on the ground. They are in a perfect position to do this because they are listened to at the local level. It is hard to believe, but the vast majority of American zoos have no field conservation programs.

What, then, is the most effective form of conservation? Is it purchasing land outright for national parks, is it establishing good management and, if so, what would that management be?

If you are on the front lines in any frontier area, the most important task is creating land-use management scenarios that organize the colonization of humans on the landscape. When humans colonize the landscape they don't usually do it in an organized fashion and they don't do it with ecosystems in mind. They do it with resource exploitation in mind. Today we are able to plan colonization of the landscape using a much more intelligent approach than was applied in the past.

Willy-nilly frontiersmen conquering the landscape is not endorsed by any country on Earth. If you are going to log on the frontier, even in the Amazon or central Africa, you need a permit. As conservationists, this presents an opportunity. We must focus on intelligent landscape occupation by the human species—which means creating protected areas. Our core work is protected areas.

Identify those areas that are most important or available. Try to go as far beyond or toward the frontier as you can go because there is an ecologically intact landscape at a much lower price. The speed at which humans are now occupying the land means you won't have to worry about a white ele-

phant out there as a national park. It will be surrounded quickly by human settlement anywhere on the planet except for Antarctica. In most cases, protected areas will be surrounded by people in the next 15–20 years.

Go out as deep as you can go into the frontier, work with whatever entity is responsible for the landscape, and make a case for how human occupation should occur: include strictly protected areas, and low-, medium-, and high-use zones—and linkages of natural habitat between the various zones.

The long and short of it is that large protected areas are the currency of conservation—but to secure these areas we do need to look all the way from the center of protected areas to the cities.

The place of people in Nature or outside of Nature is a source of endless debate among philosophers and conservationists alike. This debate takes on urgent practicality in how parks are managed. What do you see as the role of people in parks and protected areas?

I regard the human species as just one other species. It is obviously the dominant species on Earth other than, say, *E. coli*. We have the most impact. We are without a doubt a keystone species in the grandest sense of the term. We are the determinants of much that happens on the planet right now. While we have a very privileged position, we are still part of ecosystems. You can have human use of a landscape without saying, "This is no longer natural, this no longer wilderness." I see this rigid distinction as an impediment to what conservationists do.

Instead, we should be looking at impact. The more heavily the human species uses the landscape, the less that survives on that landscape. Any animal that overuses the land can dramatically affect all other species. Elephants are a good example. In some places in Africa, elephants become overpopulous and completely destroy the vegetation. This causes species loss, and causes erosion, and leads to ecological collapse. We have to regard humans as another kind of elephant.

What we need is management, because the human species has become so populous that if we don't manage we will end up with nothing in a short period of time. That's going to take an evolutionary shift in the way people regard their place on the planet.

We are so far from that evolutionary shift it is frightening. But, eventually, we will shift our ways. That will happen one of two ways: catastrophically or by using our brains. If we want to avoid catastrophe, let's use this brain we have to make shifts.

Do you think the megatranssect method is applicable to North America?

Absolutely. I have been wandering around Rock Creek Park in Washington, D.C. for the past eight months and have introduced the transect methodology to the park service there. The park is 1,800 acres, in the middle of a city, with hard boundaries; it experienced several events of ecological collapse in the past, followed by re-greening and reconnecting through wildlife corridors to Maryland and the Potomac Valley. Blocks of forest are 200 to 300 meters wide—not 150 kilometers wide, like in Africa. Yet when I look at the human trail system and infrastructure—and then map out polygons based on land use and vegetation, and traverse those polygons on a transect—the trends are obvious. Of course, they are not the same trends you would see in the forest of Africa, but in either case the megatranssect methodology is an effective way to collect background information.

For example, deer reappeared in the park in 1987 after being absent for at least 100 years. Suddenly they are back. What are the deer doing in Rock Creek Park? Where are they? Why are they there? You see, for instance, that they are much more abundant on a mosaic of golf course and forest-land, and they avoid roadways in the daytime; you see that they concentrate on oak mast fruiting in October. All this information can be gotten from the megatranssect methodology. There are many associations out there—and this is the heart of the method. It can be used anywhere: on a boat ride or a submarine path.

You have implied that good management in part means deciding where humans can occupy the landscape. You have also said that wilderness doesn't necessarily have to be a place where humans don't live. Do you see value in setting aside wilderness areas, such as we have in the United States, where "man is a visitor who does not remain"?

Wilderness is a nebulous concept. The human species has evolved over the millennia and over this span of time it has occupied the landscape to a greater or lesser degree and in various ways. Look at North America: the human species has only been here for 21,000 years. Maybe the landscape before that time was what we want to call wilderness. But, from a practical point of view, it is difficult to make management decisions based on a landscape that existed 21,000 years ago. I'm not saying that there shouldn't be places without humans, I'm saying that the concept of wilderness is nebulous.

What, then, is the value of wilderness?

People find spiritual meaning in wilderness. I do. But we also have to recognize the biological component in the way we see landscapes: human beings look at abundance in an ecosystem and are biologically programmed to see it as beneficial. We see lots of animals running around in a landscape and we think—good. Why do we think that? Because we eat them. Our biology, our evolution, says: lots of animals here, lots of trees—good. Open areas—good. Black soils—good.

I don't think of wilderness as just spiritual or a cultural construction. I believe that it is innate. That big fat guy from Chicago who comes to Africa in his safari suit, chasing after cheetahs and lions and looking at lion kills is thinking, "This is fabulous!" not necessarily because he is a conservationist but because people are genetically predisposed to love Nature. Abundance in Nature—good—that is all he has to know. Wilderness has everything to do with our biology. We have to consider the biological reasons for why people might think that wild places—and therefore protecting intact, wild ecosystems—are good.

We need to educate everyone on the planet that we still need Mother Nature to survive and that abundance is good. We are intelligent enough to figure out how we can save the majority of species on Earth; we can assure that water continues to flow and plants continue to grow and wildlife survives. It is an attainable goal and one that we need to accomplish as fast as we possibly can. ☺

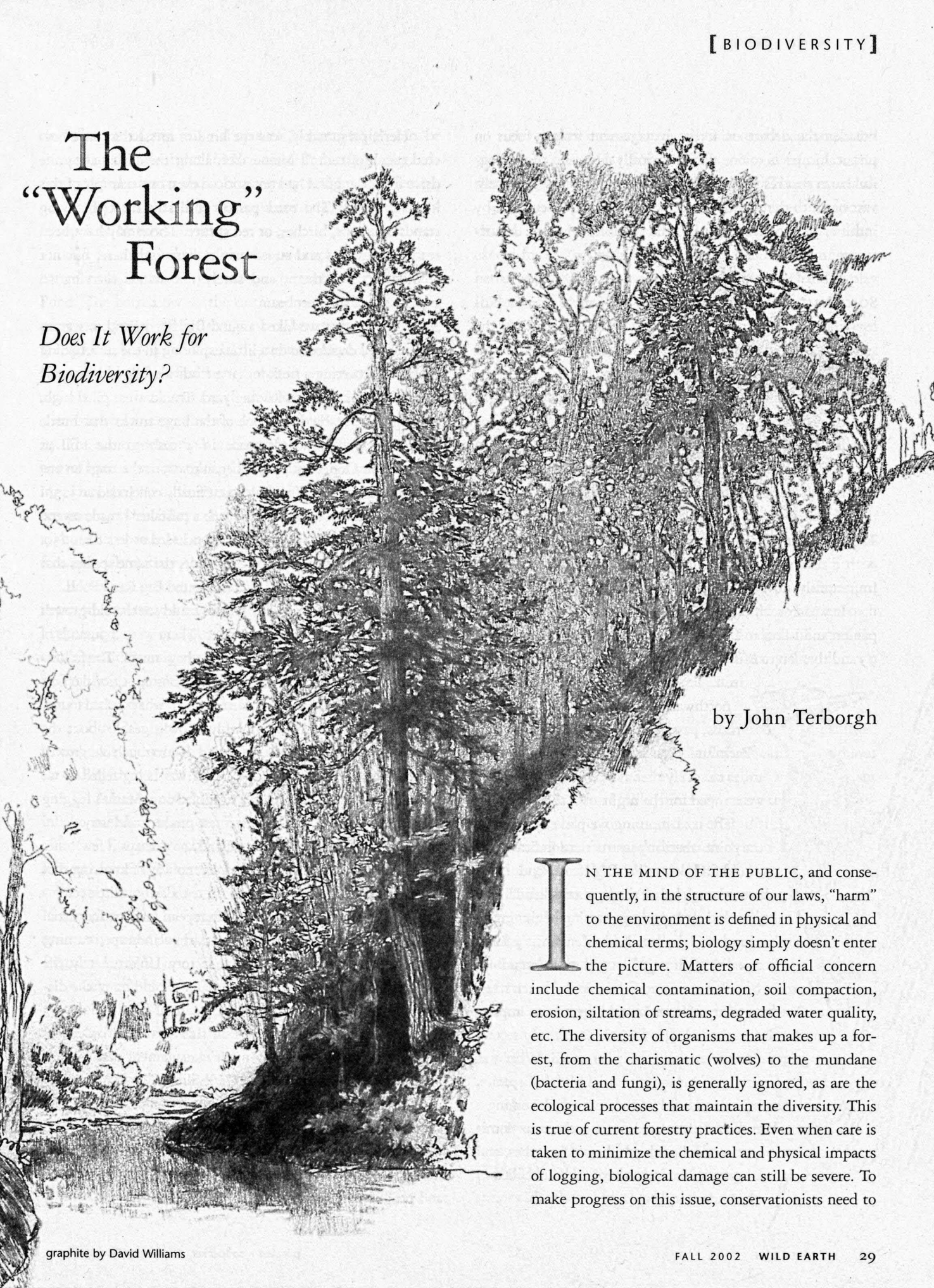
UPDATE Gabon Protects Rainforests

Mike Fay's efforts appear to be paying off. On September 4, 2002, the nation of Gabon announced that it will preserve 10% of its land in a system of national parks. A key motivation for Gabon's president El Hadj Omar Bongo: photographs of gorillas in the rain forest, taken on Fay's journey. U.S. Secretary of State Colin Powell traveled to Gabon to announce \$72 million of State Department and NGO support for the parks initiative and other conservation efforts in the Congo Basin. Fay led Powell on a walking tour, following elephant trails to the beach. With 13 new parks covering 10,000 square miles Gabon will move to the top of the list of nations—second only to Costa Rica—in terms of lands protected for biodiversity.

The “Working” Forest

*Does It Work for
Biodiversity?*

by John Terborgh



IN THE MIND OF THE PUBLIC, and consequently, in the structure of our laws, “harm” to the environment is defined in physical and chemical terms; biology simply doesn’t enter the picture. Matters of official concern include chemical contamination, soil compaction, erosion, siltation of streams, degraded water quality, etc. The diversity of organisms that makes up a forest, from the charismatic (wolves) to the mundane (bacteria and fungi), is generally ignored, as are the ecological processes that maintain the diversity. This is true of current forestry practices. Even when care is taken to minimize the chemical and physical impacts of logging, biological damage can still be severe. To make progress on this issue, conservationists need to

broaden the debate on forest management from a focus on physical impacts to one that specifically addresses the biological harm that results from logging operations. Unfortunately, vast harm to the forested landscape has already been done by industrial timberland owners whose public relations departments tout the benefits of the "working forest."

SOMETIME IN THE late 1980s, a notice appeared in a bulletin of The Nature Conservancy (TNC) announcing the acquisition of a 3,000-acre property surrounding Big Reed Pond in northern Maine. The tract was described as one of the last examples of old-growth forest remaining in the North Woods. The notice attracted my attention because I have a passion for inspecting remnant tracts of ancient forest in the East. I was living in New Jersey at the time. A trip to Maine had to wait until the following summer when I could escape my job for a few days. The woman who was then director of TNC's Maine Heritage Program very kindly provided me with directions on how to reach Big Reed Pond, and most importantly, how to locate the obscure trail that led into it.

It was Fourth of July weekend of 1990 when my companion and I flew to Bangor and rented a car. We drove up I-95 and then on to Millinocket, past the Great Northern paper mill. From Millinocket, we proceeded northward on gravel paper company roads, passing to the west of Baxter State Park and thence onward for another 75 miles or so. By then it was late afternoon, so we camped for the night near the road.

The next morning we parked the car at the point where my instructions indicated we would find the trail to Big Reed Pond. A little-used track led off through a thicket of berry bushes and slash, an unpromising beginning to the inspiring day we had been anticipating. After walking through logged-over terrain for most of an hour, we entered a stand of beech trees. The trees were not ones I would describe as impressive; they were no larger than those of many second growth forests one can see farther south. What was striking about this forest was its blend of species. Beech predominated, with sugar maple coming a close second. Scattered among the two dominants were yellow birch, hemlocks, ashes, and red spruce. Numerous hophornbeams filled in the understory.

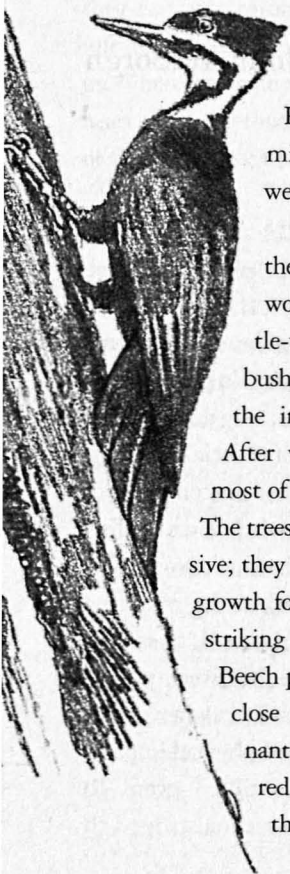
Here, presumably, was the kind of forest that once covered much of central Maine. Yet, along the entire 150-mile drive from Bangor, I had not noticed even one example of this kind of forest. The road passed endlessly through young stands of aspens, birches, or red spruce. There may have been scattered beeches and sugar maples here and there, but not whole stands of them, and surely not stands carrying an understory of hophornbeam.

The day after we hiked around Big Reed Pond, my companion and I decided to do a little exploring in the surrounding region. Discovering a fresh logging road, we followed it a mile or so until it ended in a loading yard. Trunks were piled high, waiting to be stacked onto one of the huge trucks that hurtle down Maine's backwoods roads in a rush to the mill at Millinocket. Out of curiosity, I began to count the rings on one of the larger trunks. When my count finally concluded at 325, I was flabbergasted. Could I have made a mistake? I made several more counts, and not one of them concluded at less than 250. The trunks were beech and sugar maple, the same species that had been so prominent in the forest around Big Reed Pond.

From the top of a nearby hill we could see the old-growth forest stretching off into the distance. There were thousands of acres of it, though I can't say precisely how much. The following week, I called both the Maine and the Boston regional offices of The Nature Conservancy to alert them to what we had found. The people I talked to were highly knowledgeable about the Northeast, but neither had any inkling that so much old growth remained in central Maine, nor that it was being felled as we spoke. My companion and I had stumbled onto Maine's logging frontier, a well-kept secret of the forest products industry.

Short of visiting Big Reed Pond, or perhaps a few other rare places like it, a Maine resident has no way of knowing that the forests which cover most of the state today bear little resemblance to those that met the first European settlers. Industrial forestry has completely transformed the landscape, turning much of the state into a huge tree factory. Unfortunately, the average citizen does not have a clear understanding of the distinctions between a tree factory and a natural forest.

Industry propaganda plays on this ignorance by claiming, not incorrectly, that its timber management practices are good for "wildlife." But what is "wildlife"? The industry definition is a narrow one based primarily on large mammals such as deer, moose, beaver, and bear, all of which abound in the timberlands of northern Maine. Large herbivorous mammals thrive on early regrowth, with its easily accessed foliage and profusion of berries. But large mammals make up only a



tiny fraction of the full richness of Nature, which can be encapsulated in the term "biodiversity." Industry propaganda does not make boasts about biodiversity, and for good reason, because industrial timber management is highly prejudicial to much of Nature's diversity.

We were reminded of this when we encountered a pair of barred owls in the old-growth beech woods near Big Reed Pond. The barred owl is the eastern counterpart of the now notorious spotted owl of the West. Like its western relative, the barred owl—a sizeable bird—nests in large tree cavities. You probably won't find barred owls in the young birch and aspen stands that cover much of Maine, for the trees aren't allowed to reach a size that would accommodate a nesting cavity. The same goes for pileated woodpeckers, frequent neighbors of barred owls that, like them, require large trees for nesting. Here are two birds that could be held up as indicators of ecosystem health. They contribute little to overall biodiversity, but their presence implies a lot about the maturity of the forests in which they occur.

Here we come to a major sticking point in the debate between industry and conservationists—the distinction between quantity and quality. Industry propaganda typically extols quantity; only a connoisseur demands quality. By sowing confusion on this subtle distinction, industry is able to score points in the popular media. To an industry representative, a bird is a bird, but to a connoisseur, some birds, like barred owls and pileated woodpeckers, possess higher intrinsic quality than others, such as starlings or house sparrows.

Birds have evolved to fill a great variety of niches. Some inhabit marshes, others prefer fields, still others are denizens of forests. Every stage of forest regeneration has its typical collection of species (Thompson et al. 1995). Although historical data are scant, it is almost certain that species able to breed in abandoned fields, recent clearcuts, and recovering stands are vastly more abundant now than they were when the Pilgrims landed.

One such bird is the chestnut-sided warbler, a species that John James Audubon saw only twice in his lifetime. Chestnut-sided warblers have profited greatly from the timber industry, for they now abound in recovering clearcuts. For nearly every bird species that has declined as a consequence of contemporary land management practices, another has benefited. It thus becomes a rather shaky proposition to claim that one set of birds—those that abounded in the aboriginal environment—is somehow preferable to another set that thrives in the human-dominated world.

The timber industry generally manages a landscape as a patchwork of stands of varying age, ranging from recent clearcuts to tracts that are ready for harvest (Thompson et al. 1995). Such a mosaic will often support more bird species than a virgin forest, which tends to be relatively uniform except for small gaps produced by fallen trees. The more-is-better argument thus gives the industry a strong hand to play in designing its public relations campaigns.

Although birds have been the subject of scores, perhaps hundreds, of studies on logging's effects on biodiversity, they are perhaps one of the least appropriate groups to use for the purpose. Birds of some sort utilize almost any habitat, even parking lots and ledges on city buildings, and they are instant colonizers of disturbed sites. Birds are so opportunistic that it is hard to find any habitat, however battered and degraded, that doesn't support at least a few. But in the larger world of Nature, such opportunism and colonizing ability are far more the exception than the rule. Most of the myriad plants and animals that make up "biodiversity" are small, inconspicuous things that are sensitive to disturbance and poor dispersers; many even lack the ability to cross commonplace barriers such as roads and agricultural fields. A fuller understanding of the impact of timber management on biodiversity should derive from studies of these sensitive organisms.

HERBACEOUS PLANTS are one such group of organisms. Contributing roughly 80% of the flora of eastern deciduous forests, herbaceous plants are far more representative of plant diversity than trees. Unlike birds and many trees, which disperse well and colonize quickly after disturbances, many herbaceous plants are weak dispersers that are slow to recolonize lost ground (McLachlan and Bazely 2001).

This lesson has been strongly impressed upon me in the nine years I have occupied a home at the edge of Duke Forest in Chapel Hill, North Carolina. Our house is perched atop a bluff overlooking a small river. Lying upslope is land that was farmed until the Great Depression of the 1930s and now supports a maturing pine forest. Downslope, the terrain is so steep and rocky that, so far as I can judge, it was never cleared or plowed. The spring wildflowers of this steep slope are an annual delight to my botanical proclivities. For more than a month each spring, the slope is alive with trout lilies, irises, pennyworts, hepaticas, anemones, trilliums, orchids, and many more. Altogether, some 978 species of plants have been recorded in Duke Forest, the vast majority of them herbaceous species like those just named.

A demarcation line between the recovering and undisturbed portions of the slope is inscribed in the herbaceous plants. The lush community of native wildflowers stops with the undisturbed soil almost as abruptly as if it had been held in place by an invisible hand. Upslope, in the pine stand, native herbs are few. Most of the scattered sprigs of green visible in the understory prove to be Japanese honeysuckle or other invasive alien weeds. An occasional trout lily, bellwort, wild ginger, or hepatica has jumped over the demarcation line, but this tentative reclaiming of the land has not advanced more than a few meters in 60-plus years. Never have I found an iris, showy orchis, anemone, or trillium above the line, an observation that explains why these plants are becoming rarer and rarer, even as forest cover has expanded throughout the East during the last century.

Herbaceous plants have my vote as the most sensitive and informative indicators of past disturbance in eastern forests. A landmark study conducted in the southern Appalachians by David Duffy and Albert Meier (1992) provides convincing evidence in support of this opinion. The survival of primary forests in such preserves as the Great Smoky Mountains National Park and Joyce Kilmer Memorial Forest provides undisturbed reference sites indispensable for judging human impacts on exploited forests in the region.

Using records maintained by the U.S. Forest Service, Duffy and Meier carefully selected a dozen matched pairs of sites in the southern Appalachians. One of each pair of sites was located in an undisturbed primary stand, whereas the other was a tract that had been logged just once, usually 90 to 100 years earlier. The pairs of sites were carefully matched for latitude, elevation, exposure (N, S, E, W), slope, soil, and underlying geology.

Duffy and Meier sampled the vernal herbaceous flora at each site using standard methodology. Their results were so startling that they provoked a furious reaction from the timber industry (Elliot and Loftis 1993, Steinbeck 1993). (Interested readers can refer to the cited articles and accompanying rebuttals, and form their own opinions.) The once-logged stands contained less than half the herbaceous diversity of the primary stands. The differences between the matched pairs of sites were so great that the ranges of values did not overlap. In other words, the differences Duffy and Meier documented were not merely statistically significant; they were dramatically distinct. Even a single episode of clearcut logging takes a toll of diversity that persists for at least a century.

Salamanders constitute another diverse group of slowly dispersing organisms useful as disturbance indicators (Welsh

and Droege 2001). The southern Appalachians, home to dozens of species, are a world capital of diversity for salamanders. Unlike birds, salamanders are quite strictly creatures of closed canopy forests, for they desiccate easily and thus require constantly moist conditions. Decaying logs of large diameter provide a favorite retreat for some species; others live in streams, springs, or seepage areas, and still others spend the days underground in chambers left by decomposed roots, emerging to forage at night. Clearcutting degrades salamander habitat in various ways: by increasing the temperature and lowering the humidity of the forest floor, by reducing the quantity of leaf litter, and by removing the large trees that would later fall and provide habitat in the form of rotting logs.

Studies conducted in the southern Appalachians consistently show reductions of 80% or more in the numbers of salamanders following clearcut logging (Ash 1988, Petranka et al. 1994). Subsequent recovery of salamander populations is slow—so slow that stands estimated to be 80–120 years old harbor substantially fewer species and individuals than still older stands (Petranka et al. 1994). Given that rotation times in Appalachian hardwood forests are around 80 years, it seems clear that salamander populations in a managed landscape will be permanently depressed. Meanwhile, the long-term effects of repeated logging on salamanders, herbaceous plants, or any other group of organisms remain unknown.

These studies and many others like them leave little doubt that industrial forestry drastically reduces or eliminates disturbance-sensitive and slowly dispersing species almost as surely as the annual plowing and disking of cropland. We should not be deceived by self-serving propaganda; industrial operations are engaged in the maximization of profit. Biodiversity is not a priority. Industrial timberlands may offer good habitat for deer and moose, but the presence of a few large mammals cannot compensate for the progressive loss of numerous other elements of our native flora and fauna.

We should dispel any notion that industrial forestry is bio-friendly. It should best be regarded as a form of agriculture. Logging massively alters the natural disturbance regime through which a forest regenerates itself, and profoundly perturbs the soil. Both of these physical intrusions open the way for the invasion of alien species. Even more fundamentally, tree farming replaces a native mixed forest with a monoculture of genetically uniform trees. Optimizing growth performance involves intensive interventions, such as wholesale mechanical harvest, site preparation, fertilization, and treatment with pesticides and herbicides. Any land that has been

through one or more cycles of this kind of treatment will bear little resemblance to its erstwhile natural state.

Can forests be managed for timber in a way that does not jeopardize biodiversity? The answer may be yes, in principle, but it is a highly qualified yes. Trees could be extracted one at a time from uneven-aged stands with minimal intrusion of heavy equipment and care taken to minimize collateral damage to surviving stems. Exercising restraint in harvest operations and deferring to the future in management decisions will inevitably add to the cost of the products harvested. Wood produced in such a fashion is unlikely to be competitive in the open market with wood produced by industrial methods.

Higher costs could potentially be recovered through premium prices for certified eco-friendly wood products. A sufficient premium for certified products could ensure profitability, but doubtfully *maximization* of profitability. Investments would have to be made for purposes other than, or in addition to, the profit motive, calling for a type of modified capitalism that is unfamiliar to much of the world business community. While advances in ecological forestry are welcome, the science needed to tell us whether single-tree harvest methods, if practiced for 100 or 200 years, would conserve biodiversity hasn't been done and won't be done in the foreseeable future.

LIKE IT OR NOT, in a globalized economy, industrial forestry is a fact of life which brings mixed blessings. More wood can be produced on fewer acres through industrial methods, but the benefits of efficiency become a curse when industrial forestry takes over the entire landscape. Efforts to rein in its practices through popularly mandated regulation face an uphill battle to achieve more than cosmetic improvements. Intensive forestry will likely occupy an important position in the future, just as will agriculture, which, lest we forget, is

even more destructive of biodiversity. But no one should be fooled by an eye-pleasing screen of trees into thinking that industrial forestry is somehow kind to Nature (Lansky 1992).

Rather than questioning whether industrial forestry has a right to exist, it is perhaps more constructive to ask how large a position the industry should occupy in the landscape. Right now it enjoys a dominant position in some portions of the country, northern Maine among them. People can be justified in concluding that the industry's footprint on the land is currently too large.

Nowhere is the footprint of the timber industry larger than in the Southeast, the most biologically diverse region of the East. Already tens of millions of acres of native southeastern forests have been replaced by biologically barren pine plantations in a process that is predicted to continue unchecked for decades (Wear and Greis 2001). A recent survey conducted by the U.S. Forest Service concluded that only 1% of the entire region from Virginia to Texas was legally protected from clearcutting (Rudis 1998). This 1% is primarily contained in national parks and designated wilderness areas in national forests. Does 1% represent a good balance between the interests of industry and the interests of Nature? The question is so preposterous that it can't be asked with a straight face.

Clearly the status quo is unsatisfactory, so what could be done to improve it? Regulation of the forest products industry is one option, but one that is unlikely to reduce biological impacts to a sufficient degree to halt further biodiversity loss. Moreover, the task of garnering the public support necessary to reform forestry practices in places like the Southeast and northern New England, where the industry is deeply entrenched and politically well connected, is a tall order. Yet it is just these portions of the country with large private land bases where something needs to be done soon.

Their results were so startling that they provoked a furious reaction from the timber industry. The once-logged stands contained less than half the herbaceous diversity of the primary stands.

Conserving biodiversity requires large tracts of land that are free from commercial exploitation and within which both predators and natural processes can run free. North American biodiversity took care of itself before Europeans brought technology and a market economy to the continent. We now face the daunting prospect of trying to recreate congenial conditions for biodiversity in a highly altered and fragmented landscape.

Clearly it is impractical to restore large, ecologically intact wildlands in a single step; development of regional networks of conservation lands will be incremental. The immediate imperative is to prevent further degradation of the best of what remains of partially altered and semi-wild lands (Gullison et al. 2001). We can't readily undo damage that has already been done, but we can work to prevent further damage and to give Nature time to heal. In the mid-term future, restoring landscape connectivity and rewilding are needed on a large scale with the ultimate goal being self-willed lands supporting native plant and animal communities free of alien species. It is a goal that none of us alive now will ever see, for the full recovery of native ecological communities on degraded land via the processes of dispersal, colonization and succession will take a very long time, if it can be accomplished at all.

At present, the land is too fragmented and too replete with alien species to assume that Nature will heal spontaneously if merely left alone. The restoration of predators and key natural processes are certain priorities, but whether additional measures should be adopted to accelerate rewilding is unclear, for the science of eliminating exotic species and restoring native communities is in its infancy. Until the science of rewilding attains maturity, the endangered species list will continue to grow, and intensive management will be required to avert further extinctions.

IN MY VIEW, the best option immediately available for rescuing Nature in North America is land acquisition through both public and private purchase. At least two pioneering public sector programs have achieved outstanding success. One is in Florida, where voters have been galvanized by seeing green space disappear before their eyes as 8,000 new residents move in each week. In 1990, and again in 2000, Floridians of both parties enthusiastically supported multi-billion-dollar bond issues to pay for the acquisition of conservation land. To date, nearly a million acres have been secured, with the prospect of similar gains over the coming decade (Florida Department of Environmental Protection website).

Ironically, the annual amount being spent on land acqui-

sition by the citizens of Florida exceeds recent appropriations by the federal government under the Land and Water Conservation Fund (Congressional Research Service 2001). The fact that the people of a single state are willing to outspend the federal government on conservation is a stunning affirmation that attitudes prevalent in the U.S. Congress are out of tune with those of the public at large.

A second example that could easily be emulated is the State of Maryland's "Program Open Space." Funded by a painless tenth of a point on every real estate transaction, the program has enabled Maryland's current Glendening administration to purchase more than 235,000 acres, representing a 40% increase in the total area protected statewide in just seven years (Program Open Space 101).

With a little imagination and some support from the public, the legislatures of other states might be persuaded to enact similarly creative measures for raising conservation dollars. At the same time, private land trusts at the local, state, and national levels have been growing rapidly. The conservation movement is acquiring more financial strength every year. Instead of fighting the timber industry, conservationists should be engaging it in the marketplace to acquire the best remaining tracts for conservation (Gullison et al. 2001).

The key place to lobby for reforms in land management practices is on public lands, both state and federal. Nearly 40% of American territory is held in the public sector, and were it not for this fact, U.S. biodiversity would be much more severely threatened than it currently is. Nevertheless, reforms are urgently needed to prevent the further gradual degradation of public lands managed under the rubric of "multiple use." The Clinton administration's proposals to protect roadless areas and remaining old growth represented encouraging steps in the right direction. (Unfortunately, even these relatively modest protections for public land have been undone by the Bush administration and Congress.) Additional steps would include grazing reform on public lands in the West, restoration of semi-natural fire regimes, recovery of riparian zones, predator restoration, and curtailment of federally sponsored predator control programs. These are all issues that can be engaged in the political arena by a well-informed and concerned public. Reform of management practices on public lands is much less threatening to industry than restrictions on the use of private land, and thus much more possible politically.

As for Maine and other sections of the country lacking much public land, the best that can be hoped for is that legislatures and philanthropists will step up and help land conser-

vancies acquire the most crucial tracts when they become available. Buying land is usually uncontroversial and runs with the grain of our market-driven society as a process for achieving conservation. Habitat connectivity and recovery of intact food webs—including large carnivores—remain distant goals for many parts of the Americas, but as progress is made toward consolidating larger and larger tracts of self-willed land, the time will come when wolves, wildflowers, and salamanders—when all members of the land community—will flourish. ☺

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Above Dissension

Above dissension
the wild geese
are changing position.
As the leaders tire
they drop back
and others
part the sky.
Their shouted directions
are clear
not muffled
by the wind
like ours.

~ Elizabeth Caffrey

Evensong

November, dusk.
Mist, like fine ash,
settles
over the pond.
The wild fields fill with warm fur
and warm breath
The gray woods
empty

~ Cheryl Hellner

threatened species is one that is likely to become endangered within the foreseeable future. Logically, therefore, a species has not recovered until it is no longer endangered or likely to become endangered within the foreseeable future.

The ESA also stipulates that decisions about whether a species warrants classification as endangered, threatened, or recovered must be based solely on the best available scientific information, not on political or socioeconomic considerations.

In its report "Science and the Endangered Species Act," the National Research Council noted that these decisions should be based on rigorous scientific assessment of impacts and of consequent *risks* of extinction and endangerment (inviability). Yet, to date, the USFWS has never committed to maintaining any ceilings on risk, much less to using risk level as a criterion of species status.

The ESA can reasonably be interpreted as mandating that once a species has been listed as threatened or endangered, continued protection should be automatic until there is compelling proof of recovery—until the listed population or metapopulation has achieved long-term viability.

Has this burden of proof been met for the grizzly? No. Viability appears to be declining; several of the most potent sources of risk to the grizzly are not waning, but intensifying. How then, can the Fish and Wildlife Service consider delisting this bear? Because meeting the agency's official Criteria of Recovery does not equal restoring permanent viability as implied by the ESA.

Ultimately, the fate of a population—whether it thrives or goes extinct—depends on whether enough individuals are born and survive to adulthood to offset those dying, much as a person's financial solvency depends on income offsetting expenses. Unless births equal or exceed deaths [income equals or exceeds debits], a population [bank balance] shrinks. If birth and survival rates are impaired too long, a population will decline towards extinction.

Assessing status of an interest-bearing checking account depends on knowing its rates of interest, deposits, and debits. So too, assessing status of a wildlife population depends on knowing its vital rates of growth, birth, and death. Current status is assessed from current rates; future status is predicted by estimating how each rate is likely to change over coming years, decades, and centuries. That, in turn, depends on future supplies of food, cover, security from threats, levels of human impact, and other factors.

Assessing vital rates, and analyzing the factors controlling them, is central to wildlife management and ecologi-

cal research worldwide. It should likewise be central to conserving grizzly bears and other high-risk species—with rigor enhanced in proportion to the increased risk and decreased tolerance for error. Is this what we actually find? Not for the grizzly bear. As we consider the official criteria by which recovery of the Yellowstone population is to be judged (according to the federal government's Grizzly Bear Recovery Plan), let's continue drawing parallels between the information needed for managing bear populations vs. personal finances.

- If your bank account received payments from numerous clients, would it make sense to keep track only of the *number* of payments received, but to ignore their amounts? Not if amounts vary substantially. Yet, in essence, this is what the government does with grizzlies. Instead of taking into account all offspring born each year, as population biologists normally do, the recovery criteria consider only the number of litters born, estimated from the number of sows seen with cubs. Litter size [payment amount] and total cub numbers [total deposits] are ignored—even though this information is already in hand.
- How long could you avoid overdrawing a checking account if you kept records only on what was spent on just one expense (recreation, for instance), without recording checks for rent, food, utilities, clothing, and other expenses? Dangerous? Certainly. Yet, this too is essentially the government approach. Instead of taking into account all mortality [debits], the recovery criteria consider only known human-caused mortality, as a percent of *estimated* population size. Even if most adolescents and adults do eventually die from direct human causes, the proportion of human-caused vs. natural deaths can vary widely over time. Furthermore, a high proportion of mortality among immature bears is due proximally to "natural causes." Yet, natural mortality rates are entirely ignored by the official recovery criteria.
- Back to your spending on recreation. Is it excessive? That depends on how much money is needed for other expenses, and on your total account balance. Yet, by analogy, the government not only ignores other expenses [causes of mortality], but it uses only the crudest estimate of account balance [total grizzly numbers]. How crude? Consider this analogy: Suppose that over a period of

years, say, 1975–1985, your mean checking account balance on July 4 (of each year) was \$1050, and that mean number of deposits was 100 (per year). The ratio of balance to deposits would be 10.5:1. Now, how safe would you be in assuming that your July 4 balance in 2001 was also 10.5 times the number of deposits made that year?

Am I kidding? Unfortunately not; essentially this is the agency's approach. During a several-year period more than a decade ago, the ratio of the estimated total population size to the the number of cub litters seen was about 10.5:1. So, despite the roughness of that ratio even for past years, the size of the Yellowstone grizzly population in each following year has been estimated by multiplying cub litter abundance by approximately 10.5. Moreover, although better methods for estimating population size are now being developed, the recovery criteria will apparently not be revised to utilize this new information.

➤ If you were interested in buying a small business, you would want to know how profitable it has been in the past, how solvent it is now, and how profitable it is likely to be in the future—that is, how much income is likely to exceed expenses. Similarly, a reasonable criterion of recovery would be whether grizzly births have been exceeding deaths for a substantial period, and whether they are likely to continue doing so in the future. But

this sort of bottom line accounting is ignored by government recovery criteria for grizzlies, which don't even address relationships between its singular component of income [the number of cub litters seen] and its singular component of debit [human-caused mortality].

➤ Having information on only a fraction of your sources of income and debits would be more than enough to handicap most businesses; errors in that information would only make matters worse. Grizzly management suffers from both limitations. The amount of population income and debit that agency biologists record each year depends on how much effort is put into gathering this information, and on how well the job is done. Funding is critical to both. Indices of population health could be improved simply by increasing money for counting litters and decreasing money for monitoring human-caused deaths. (President Bush's recent condemnation of corrupt business accounting at Enron and other devious corporations could just as appropriately be applied to the government's own accounting for grizzly populations.)

➤ Finally, instead of considering how a population is likely to be influenced by long-term trends in habitat size, quality, utilization, accessibility, carrying capacity, and impacts, official recovery criteria are based on much more simplistic indices—for instance, the number of "Bear

President Bush's recent condemnation of corrupt business accounting at Enron and other devious corporations could just as appropriately be applied to the government's own accounting for grizzly populations.



Management Units" within the designated recovery zone where mother-cub families have been seen.

Arguably, the government's official recovery criteria regarding grizzly bear demographics and (especially) habitat needs are arbitrary and capricious—determined not by the "best available science" but by the greatest bureaucratic convenience and ease of achieving politically correct results.

Assessing population status in terms of simplistic, easily monitored indices would suffice if there were compelling evidence that:

- these indices could be measured accurately and precisely;
- the indices were shown to be very highly correlated with the actual vital rates—for example, if an X% rise or fall in cub litter abundance were always accompanied by an $X \pm 5\%$ rise or fall in total cub abundance and in total population size;
- the indices would reveal with certainty (say, 99% probability) any population decline quickly enough for managers to reverse it before viability is lost.

But none of these burdens of proof has been met, and it is doubtful that they could be using the government's current approach.

VITAL RATES AND RISK—the probabilities that a population will become endangered or even go extinct—are governed by many factors. For bears, one of the most critical factors is the food supply. The higher the levels of soluble protein and of lipid (fat/oil) in the diet, the higher the rate of reproduction. Females on the richest diets tend to achieve the largest body size, to grow and mature most quickly to independence from the mother, and to produce their own cubs at the youngest age; they also tend to produce larger litters of larger cubs. Rich diets likewise tend to increase cub survivorship, so long as exploiting the rich food sources doesn't make cubs especially vulnerable to enemies or other hazards.

Within the Greater Yellowstone Ecosystem, the major sources of protein and lipid are bison carrion, spawning cutthroat trout that have left lakes and entered streams where they are accessible to bears, army cutworm moths, and nuts from whitebark pine trees. All four of these food sources are already declining or can be expected to decline in the near future. Bison are being killed to minimize the potential transfer of disease (brucellosis) from bison to cattle.

Cutthroat trout are being eaten by lake trout, a fish that bears cannot harvest. During part of their life cycle, moths are an agricultural pest that farmers attempt to eradicate. Both moth and pine nut abundance are vulnerable to global warming. Whitebark pine trees are also suffering from plagues of blister rust and bark beetles.

The last time the Yellowstone National Park grizzly population suffered loss of a major food source—when garbage dumps were closed beginning in 1968—many years were required for bears to fully adapt, and a high proportion of the grizzly population died before the shift was complete. Bison, trout, moths, and nuts cushioned the loss of garbage, but what will cushion their loss? Can grizzlies compensate for loss of bison carrion by eating more elk? And how is this affected by rising wolf numbers? Can bears make up for loss of moths by digging more earthworms or tearing apart more logs for ants? How long would the dietary shift take? How many Yellowstone grizzlies would die in the meantime? How much would risks of extinction and endangerment rise? For how long? Is there evidence that any grizzly population in North America can remain viable on such an impoverished diet? How many people would the desperate bears maul? Available information is too limited to yield definite answers, but the future looks grim.

As normal food supplies shrink, bears are put at greater risk as they seek alternative food sources such as livestock, beehives, camp coolers, and garbage. This brings them into more contact and conflict with people. Conflicts could also increase due to the exploding human population in grizzly habitat, site of some of the fastest-growing communities in America. Bears are killed because people believe that the animals are extremely dangerous, to protect property from damage by bears, or in the pursuit of sport or profit.

If trends in food scarcity and bear vulnerability to human persecution continue worsening, grizzly bear reproduction and survival rates will decline. The population faces a habitat bottleneck that may not support even the current number of bears. This would nullify any growth of the population over the past decade or two, and cause it to shrink again. Indeed, these populations may already be at higher risk than when they were listed as threatened.

Speculation that bears will find and learn to exploit alternative foods helps rationalize the claim by Recovery Coordinator Chris Servheen and biological modeler Mark Boyce (in the Final Environmental Impact Statement on reintroducing grizzly bears to the Selway-Bitterroot range) that the

risk of remaining populations all going extinct over the next century is down to less than one in a million, and probably far lower. But both notions are wrong, and two wrongs don't add up to one right. If Boyce's methods of calculating future risks for our few remnant populations were applied to the many grizzly populations that existed as late as 1850, they would predict that nearly all of those original populations would still be flourishing; in fact, nearly all have disappeared. An approach that cannot account for the rash of past extinctions certainly cannot be trusted to reliably assess risk of future extinction for the few grizzly populations that remain south of Canada.

Even if extinction risk were really as low as agency biologists assert, what would that tell us about endangerment risk, which is the actual measure of recovery specified in the ESA? Even if a population is viable now, how likely is viability to be lost over the foreseeable future? *This* is the key issue, yet the grizzly recovery team has never adequately addressed it.

It is only more smoke and mirrors to claim that long-term risks can be kept in check by implementing management techniques such as augmenting bear food supplies or reducing human disturbance. There is no proof that such techniques would suffice to prevent the grizzly from again becoming gravely imperiled, much less that managers will ever have the ability, funding, or political mandate to implement further restrictions on human impacts in bear country once the species is delisted. And there is little reason to believe that the recovery team will ever adequately address these and other deficiencies of the recovery criteria, or slow the rush towards premature delisting of the great bear. Indeed, preparations for official delisting are already well underway, and the planned grizzly reintroduction program for the Selway-Bitterroot Mountains was recently cancelled by Interior Secretary Gale Norton.

It would be highly irresponsible to remove the grizzly's Endangered Species Act protections without compelling evidence of true recovery, particularly when the weight of evidence suggests that long-term risks are increasing. But will this evidence ever receive due consideration? Not if government agencies and agency-controlled NGOs continue to control access to and dissemination of critical information.

Protecting science from politics

How the challenge of grizzly recovery is handled by wildlife scientists, managers, activists, politicians, judges, and other special interests is already setting precedents that will affect the fate of bears and many other imperiled species.

High-risk populations have little chance of long-term survival unless key government agencies and NGOs quit squashing dissent—and begin to support joint efforts to reliably assess:

- > current and future impacts, as well as consequent risks of extinction and endangerment;
- > the minimum protections needed to adequately limit these impacts and risks; and
- > how to achieve sufficient protection at minimal socioeconomic and financial cost. (At the 2001 conference of the International Association for Bear Research and Management, dissenting scientists were initially given permission to hold a workshop on this; permission was then withdrawn because of protests by government personnel; conference papers favoring delisting were given precedence over dissenting ones.)

Will such corruption ever be abolished? Will rigorous science ever play a decisive role in assessing impact and risk, and in decisions about when and if controversial species such as the grizzly have fully recovered? If not, what likelihood is there that ESA conservation programs for species of less interest to the general public will be anything but pseudoscientific exercises in political gamesmanship?

Ultimately, the war between science and pseudoscience in grizzly conservation is symptomatic of much larger issues. This war is not just about conserving bears or other wildlife and ecosystems. It is also about conserving democracy—about freedom of inquiry, information, and communication, about limitations on government's ability to coerce, and about an informed public's influence over politicians and corporations.

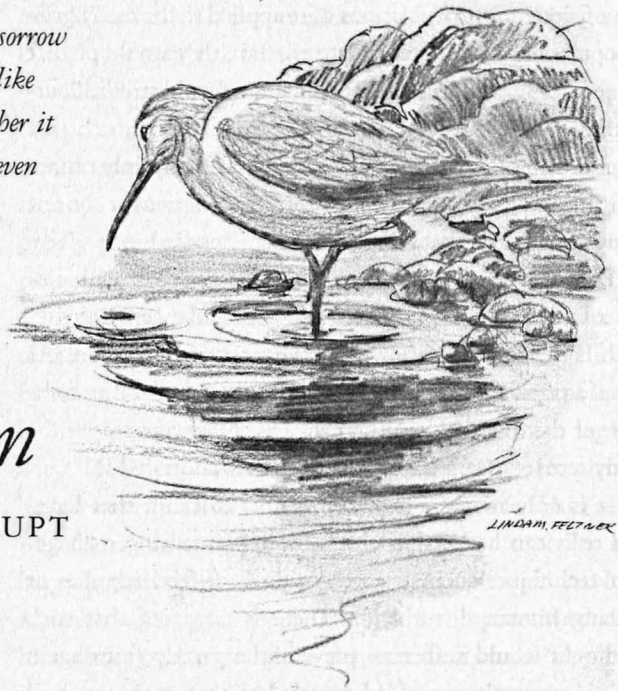
No battle was ever won by sitting on the sidelines. It is past time for major scientific organizations to identify examples of pseudoscience in implementing the Endangered Species Act and demand that government agencies better insulate their scientists from political pressures, be more thorough and timely in sharing information from government research with the scientific community at large, better foster peer critique of government research and management, and then use these critiques to upgrade government research and management of wildlife and ecosystems. Now is the time to act—to protect the bears and the scientists who study them. ☪

Steve Stringham, PhD, directs the *Bear Communication and Coexistence Research Program* (P.O. Box 941, Soldotna, AK 99669; stevestringham@hotmail.com; 907-260-9059).

There are birds here.

I hold in my heart an absolute sorrow for birds, a sorrow so deep that at the first light of day when I shiver like reeds clattering in a fall wind I do not know whether it is from the cold or from this sorrow, whether I am even capable of feeling such kindness. I believe yes, I am.

BARRY LOPEZ



One-Eyed Dunlin

by LYANDA LYNN HAUPT

I CAN SEE THE DUNLIN'S FEET—crossing slowly as it feeds. There are a hundred small brown shorebirds on the boat ramp, mostly dunlins, but this one draws my eye. The feet lag slightly, the steps are a fraction more tentative than the other birds. I am struck by the slow, crossing feet even before I notice that half the dunlin's face is missing. Balancing coffee and Pop-Tart on a nearby log, I focus the spotting scope on this improbable bird. First, I see, an eye is gone. But it is much worse than that—an eye, a cheek, part of the skull, all have been torn away. The dunlin continues to forage, touching its bill to the chipped cement of the boat ramp at low tide—touch, touch, touch.

Dunlins are squat little birds with longish, drooping bills. On Washington's Pacific coast, they gather in enormous flocks during migration, turning in waves above the water's surface. Feathered white bellies and brown backs turn and turn and turn with mesmerizing precision. The flocking behavior is, in part, a defense against aerial predators. Merlins and peregrine falcons are among the shorebirds' most pressing worries. Huge flocks are confusing to the falcons, making it difficult for them to focus on a single bird and take decisive action. A falcon's missed attempt is the likely cause of this bird's injury.

The one-eyed dunlin looks and behaves just like the other dunlins, except for the almost imperceptible slowness and, of course, the missing face. I wonder, is she aware of the injury, does she understand anything of her predicament's scope? A shorebird must be flawless—must join its flock with a perfection of speed and motion, must maintain a constant alertness, a readiness to leave earth for sky in less than a moment. Even in the best of shorebird circumstances, life is a wary, dangerous prospect.

I am momentarily pleased to see that the one-eyed dunlin's wound has healed—it is not bloody, not even scabby, but has resolved itself into some sort of hairy-looking, neutral skin. *She has lived long enough for this healing*, I find myself absurdly hoping, *perhaps this bird will continue life on the outskirts of her flock.*

Dunlins gather along this spit on the Olympic Peninsula each autumn—the last leg of a huge round-trip journey from Central America to their Arctic breeding grounds. The two-mile-long spit extends into the Strait of Juan de Fuca, shored up years ago by the Army Corps to prevent erosion. A road now extends the length of it, winding past the timber mill to a Coast Guard station and a small marina, where I park my travel trailer year-round. I escape Seattle to visit when I can.

The protected water on the east side of the spit is a haven for waterfowl, seabirds, and shorebirds.

An invisible dog barks from somewhere down the beach. The shorebirds lift, take a few wild zigzags in the air, briefly assess the situation. Safe. They alight back on the boat launch. The one-eyed dunlin does not lift, but keeps foraging—touch, touch, touch, beak to earth, picking unknown, unseen morsels, clacking bill quietly with small successes. Unable to fully join her flock, she is reduced to the basics, and ignores the rest out of simple necessity. She is round with a spare dignity, with animal grace.

My mind can't seem to help hatching a dozen cockamamie schemes to "save" the one-eyed shorebird. *I'll catch this dunlin up and take her home, where she will live comfortably in my bathroom, remodeled into a little dunlin refuge. Smooth stones strewn about and wetted regularly with salt water. Tasty invertebrates hidden so she can search them out, eat them up, stay busy. Maybe I will buy one of those compact discs that plays oceanic sounds. My cat will adjust. It won't be perfect, but at least she won't wander around slowly starving to death...*

These are unecological thoughts, and I immediately forgive myself for having them. I would never actually diminish a wild creature in this way. Still, it takes my widest possible vision to understand the presence of this bird as somehow perfect, accountable, necessary, ordinary, ordained by the breadth of wildness.

Where does such compassion come from, rising like rain—natural, unbidden, unlearned? Not from biology class, where I toiled with other young minds beneath a sign that read, "Thou shalt not anthropomorphize." The words were lettered in pseudo-ancient calligraphic script to give them the ring of biblical authority. Don't get sucked into the mire of animal consciousness lest it cloud your higher scientific intent! I waded through wildlife biology classes, where I learned to regard individual animals as data points, and measure them in terms of their statistical significance. In ecology and conservation biology, individuals are subsumed by species, with species-in-ecosystems becoming the appropriate dimension for research and conservation. It's not hip to worry over individual animals these days.

Yet it is on the level of individual being that we come into honest, direct contact with other creatures. As individual animals we all tend roughshod to the details of daily life—we find food, brush insects from our limbs, protect our young, avoid predators, stay reasonably clean, dip our lips to the water pool. We walk, and we look into each other's eyes.

Encountering other individual animals, it is appropriate to feel compassion for the harsh terms of our shared existence—to witness suffering, passing, and to claim loss in our hearts. We can realistically—even scientifically—apprehend the ecological whole where death and loss are not equated. We can feel compassion for individual creatures rising deeply within and beyond ourselves. *We can do both at the same time.* It is on this individual level that I wonder over the one-eyed dunlin. One animal to another.

I wonder—*Does she know? How much does she know? Did I imagine the quick flash in her eye—as the other shorebirds lifted, did she really steel herself against the intimation of what her fate will be? Did she, as it seemed to me, renew her effort to continue what she could? Foraging calmly, the tip of her beak stitching along the stones? Am I wrong to think her courageous? I swear I saw the flash. I don't know.*

That night my husband Tom and I take a walk down the spit, facing a wild sunset over the Strait of Juan de Fuca. We spot an immature peregrine falcon on the cellular phone tower, where they are known to roost. The young bird ruffles its scapulars, twists its head to regard the crows that are pelting it with their black bodies. It's a small falcon, probably a male. Confused face, quizzical eyes, worrying over the crows—this bird has not yet mastered the keen, distant gaze of the dark-eyed adult falcon. Through binoculars Tom observes the peregrine, the first he has ever seen. "Impressive," he acknowledges. But actually this bird is quite scruffy—the tips of its primary feathers are ragged, its plumage pale, faded.

In the morning boisterous crows alert me to the peregrine overhead, flying for open water, talons clenched around a smaller bird body. The dead bird's legs trail, as if boneless, into the wind. I lose the falcon and lower my binoculars. My thoughts border on a hope that the peregrine had swiftly culled the one-eyed dunlin, sparing her weeks of increasing starvation and confusion. But that night I see the bird on the side of the road, alone now, drinking from a mud puddle. Oil from the many parked cars has invaded the ground here, and rises in the puddle—rainbow colors around the dunlin's thin reflection. She peers into the water with one good eye. Holy, simple, shining bird. I speak to her out loud. *"I have seen you."* ☾

Seattle writer **Lyanda Lynn Haupt** has taught ornithology and birdwatching extensively in the Northwest. Her work last appeared in *Wild Earth* in summer 2001. This essay is excerpted from her book *Rare Encounters with Ordinary Birds* (©2001 by Lyanda Lynn Haupt) and is reprinted with permission of Sasquatch Books.

Beyond the Confidence Interval

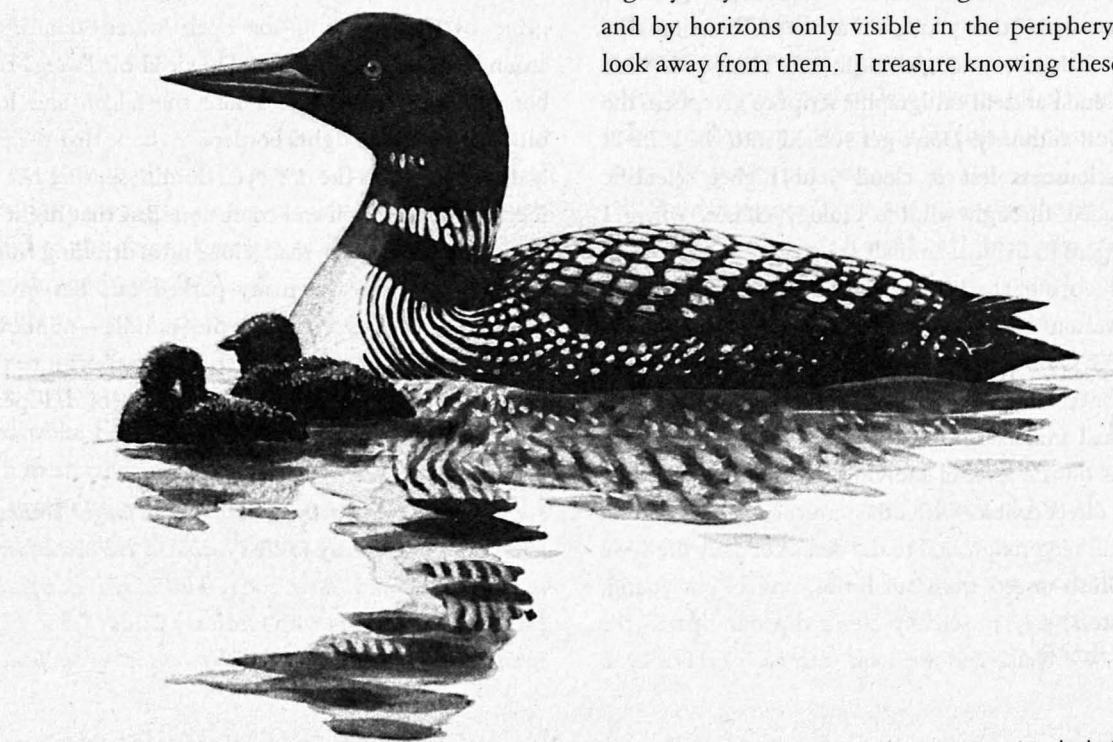
by JEFF FAIR

FIVE OF US WERE COURSING through the dark in an open skiff one moonless, late-summer night a few years ago. This was a large northern lake, the air was sodden and cool, and our velocity through the darkness enlivening. My companions had invited me along as guide. After 20 years of studying the common loons who live here, I had a good idea where they and the rocks might be hiding.

Our purpose was to capture loons and adorn them with bracelets—two colored bands on each foot in unique combinations—so that researchers could recognize individual birds and thereby learn something more of the culture and habits of these creatures. With the subjects in hand, we would also collect two secondary wing feathers and a tiny sample of blood for toxicological analyses. Flight feathers are manufactured in coastal winter retreats and carry poisons from the sea; blood samples show what toxins the birds are consuming there on the breeding grounds.

Leading our venture that night was David Evers, who had created the technique we would use to catch our quarry. The safe and practical capture of loons had been considered impossible for decades. Then along came Evers, the proverbial unenlightened grad student, ignorant of the impossibility. He pieced together two other techniques involving spot-lighting, recorded loon calls, and oversized landing nets, added a twist of his own, and to date has overseen the capture and release unharmed of more than 2,000 loons.

While I recognize the plight of loons—their ecological balance skewed by the heavy thumb of human industry, and the need for greater understanding—deceiving them with false cries and blinding lights seems somehow disrespectful. The idea of holding, in callused human hands, these wild spirits of the north woods vexes me, and one of the reasons I'd come along this night was to certify firsthand my companions' respectful handling of them. But I had other reasons. I find a deep satisfaction in knowing my way around a lake at night under starlight alone and by horizons only visible in the periphery, when you look away from them. I treasure knowing these birds well



enough to call on them in such an intimate fashion. It is this, and not science, that brings me joy.

After a quarter century of poking about the hinterlands as a wildlife biologist, I have come to recognize that science alone cannot come near to fully informing our understanding of the wondrous world. I depend on the scientific process, and believe in it—but only so far as it reaches. I know too that beyond the simple, certain beauty of objective observation and scientific technique lurks an intractable, immeasurable world of knowing—far outside the ken of statistical evaluation, yet real as the stars, a hunter's intuition, the curiosity of a child. I often wonder who among my fellow biologists allow themselves to embrace the magic, and I carry a certain distrust for those who ignore or deny it.

We had caught and banded four loons that night when things began to slow down. It was hours after midnight, the chill had penetrated us, and the ghosts had returned—those weird, cyclonic wraiths of steam arising from the warm lake surface, invisible under starlight but brilliant and opaque in the beam of million-candlepower technology. We were weary and worn-out, and had just been stood up by the Glassby Cove pair, who hovered 75 feet away, illuminated but untouchable. We shut off the spotlights to discuss strategy.

In the final dimness of the last fading beam, I saw one of the pair dive. At that very moment I experienced an odd and unexpected privity, a confidence that the diving bird was swimming toward us and would surface next to me. Under cover of darkness, while the others chatted, I poised my net near the water.

Seconds later the loon broke the surface beside me and, fully prepared, I slid the net under it. As I delivered that delicate spirit out of the night and over the gunnel, headlamps lit up, data sheets and wire rings of multicolored bands appeared, while whispered voices exclaimed in disbelief.

Myself, I felt exhilaration more than surprise. Exhilaration born of intimacy, however brief.

"I just knew it was going to be there..." I explained to Evers, the only silent member on board. Looking up for a moment from the sampling kit he was opening on his lap, he grinned serenely.

"I know," he said. ☺

*Author and field biologist Jeff Fair has traced and tracked the spirits of loons from Maine to Alaska for a quarter century. He is the author of *The Great American Bear* and a contributing editor to *Appalachia*.*

The Limits of Philosophy

If a tree falls in the woods,
And you are not there to hear it;

Or you are there, but fail to hear,
As though your ears were covered with bark;

Or you hear (yes, a big If),
In fact attend to the hearing with care—
The way trees listen to the wind with their whole bodies—
But no one is there to verify
The hearing, the hearer, the heard;

Or the act, the sense, the confirmation
All occur, but on the head of a toothpick
Or in the concavity of a dewdrop;

Or let us posit, for the sake of
Something greater than argument,
That we ourselves should fall—over or down;
In love; among thieves;
In a wet grove,
All a snarl of vines and limbs
Winding and unwinding
Like pulpy timepieces—
Will either one of us be
Finally philosopher, philosopher-king,
Asking what is real?

Or will we be listening
To the choir of leaves,
To their spirited songs,
And at last singing our own?

☺ **Pete Upham**

CONSERVING WILDLANDS IN MEXICO



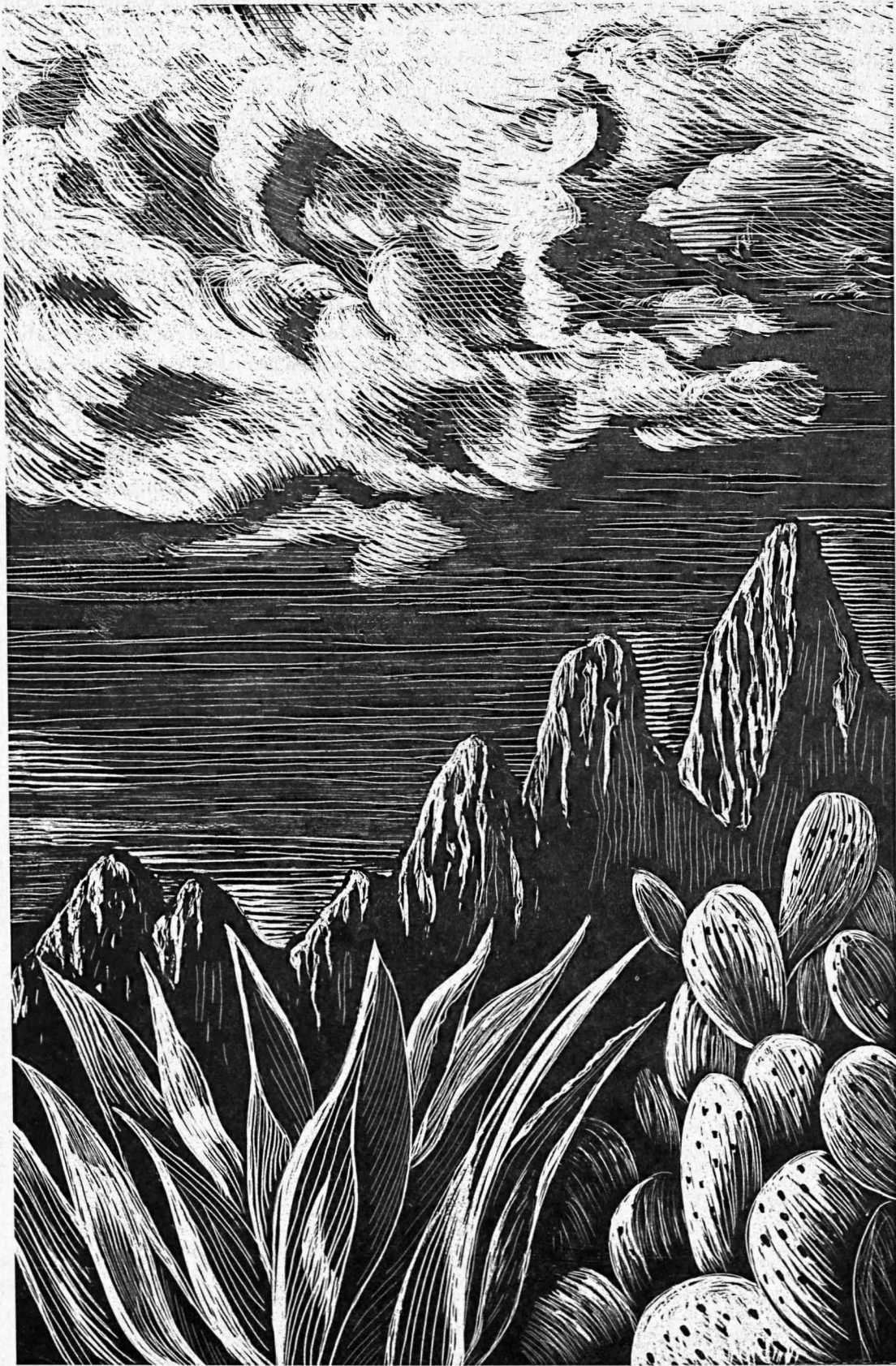
SERGIO NOLASCO

by Rurik List and
Patricia Manzano-Fischer

OVER THE PAST ELEVEN YEARS, our work in the Mexico–U.S. border region and with species of continental interest has taken us across northern Mexico and most of the western United States, allowing us to realize key differences in the approach to land conservation between the two countries. For instance, in Mexico, ecological integrity, large size, and the presence of unique biological phenomena are some of the criteria used to designate biosphere reserves; recreation and eco-tourism potential are among the considerations for designating national parks.¹ But the idea of solitude and absence of roads—both so important in designating wilderness areas in the United States—are not major considerations for creating protected areas south of the Rio Grande. In fact, in a decade of work in the wildlands of northwestern Mexico, we have never encountered a recreational hiker.

Nonetheless, 72% of the country still maintains native vegetation.² Fifty-four percent of this area is disturbed or fragmented,³ and the remaining 18% is what we consider wildlands—that is, tracts large enough to maintain fairly natural disturbance regimes, that maintain a mosaic of age classes and habitat types providing a wide variety of conditions for wildlife, and which also maintain large carnivores such as wolves, bears, and jaguars.

Although the largest roadless areas are in fact wildlands, only recently⁴ has some attention been given to the absence of roads when identifying priorities for conservation in Mexico—but there are no maps that portray roadless areas at a national level, nor initiatives to decommission abandoned logging roads or other types of unused tracks in the remote forests of the country. In the meantime, these abandoned roads give poachers and drug smugglers access to otherwise hard-to-reach areas. Similarly, there are no maps available that portray the wildlands of Mexico according to our definition, but most biosphere reserves and a few areas with different degrees of protection fit this concept. Many wildlands, however, are not legally protected, and most of them are found in the deserts and main mountain ranges of Mexico: the Sierra Madre Occidental and Sierra Madre Oriental in western and eastern Mexico respectively, and the Sierra Madre del Sur in the south of the country. Somewhat surprisingly, despite the high levels of industrial and agricultural development, immigration traffic, and illegal trade of all sorts, the Mexico–U.S. border region still maintains five important and well-preserved wildlands (see Table 1).



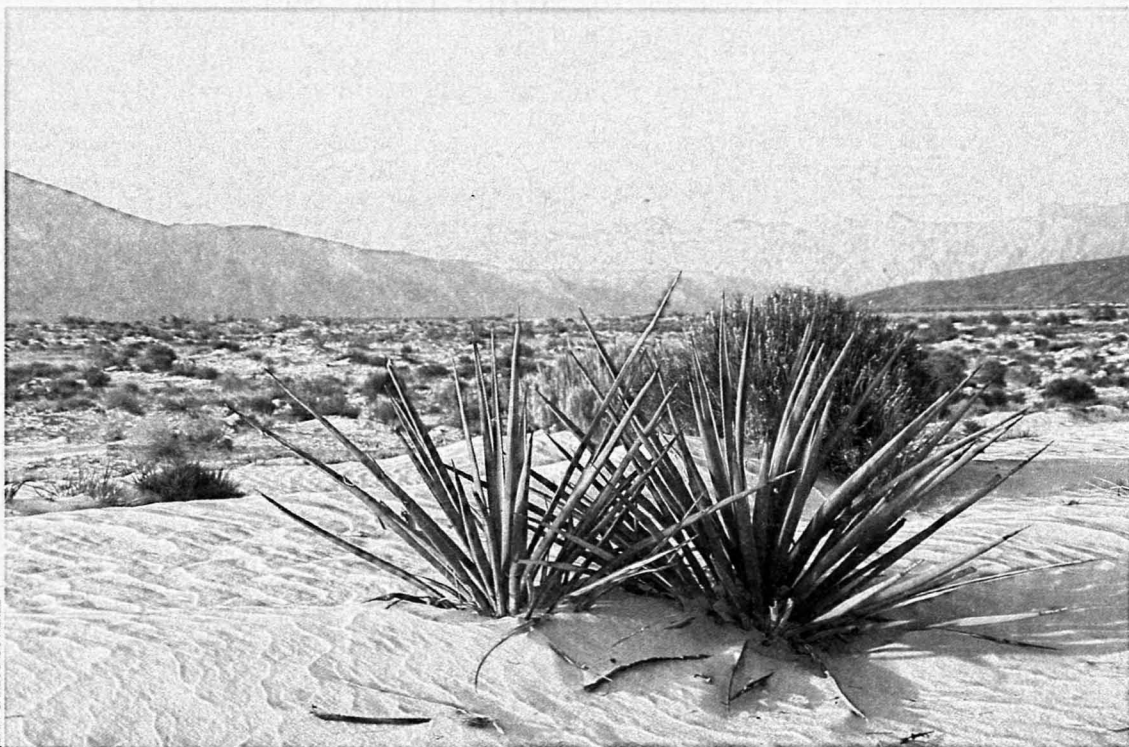
The loss of wildlands

A HISTORIC PERSPECTIVE. When our fathers were born in the 1930s, Mexico was largely wild. This was the Mexico that Aldo Leopold knew and wrote about, saying after a 1937 trip to Río Gavilán in northern Chihuahua: "Our own Southwest was pretty badly misused before the idea of conservation was born. As a result, our own conservation program for the region has been in a sense a post-mortem cure. There are, however, two magnificent semi-arid regions in which settlement came later than the conservation idea. One is South Africa and the other is the Mexican mountains."⁵ At that time Río Gavilán was part of a huge block of federal land that spanned western Chihuahua and eastern Sonora, where the now extinct imperial woodpecker and extirpated Mexican wolf still inhabited the thriving old-growth forests of the Sierra Madre Occidental.⁶ Across the border, the neighboring grasslands and forests of Arizona and New Mexico had been dramatically altered after a century of livestock grazing and logging. Wildlife was scarce, native grasslands were being invaded by dense mesquite scrub, and erosion was pervasive.⁷

Unfortunately, the Mexican wildlands Leopold knew began to vanish during the term of President Lázaro Cárdenas (1934–1940), an unraveling that must be seen in the context of the 1910 Mexican Revolution, which was based largely on

peasants' demand for land; the motto of the revolutionary hero Emiliano Zapata and his followers was "Land and Liberty." Consequently, once the revolution was over, agrarian reform began⁸—a process that provided land to *campesinos* to form *ejidos* (communal land holdings) by expropriating land from large private properties (*latifundios*). However, by the 1930s the demand for land surpassed its availability, and the Cárdenas government began allocating land to *ejidos* on remote federal lands, like the one visited by Leopold, leading to the settlement and exploitation of the Mexican frontier. Today, no federal land is large enough to figure in the conservation of Mexican wildlands.⁹ Indeed, the settlement of these areas has had far-reaching impacts on natural systems—further exacerbated by regulations that required the clearing of native vegetation and continuous exploitation of the cleared land.¹⁰

Then, during World War II, a forestry law was approved in Mexico that allowed timber companies to exploit vast areas, including those on indigenous people's and *ejido* land.¹¹ The logging of tropical forests was further aggravated in the 1970s when the National Cattle Ranching Plan encouraged converting tropical forests to cattle pastures.¹² In the temperate forests, the production of pulp for paper and cellulose has been the main culprit behind deforestation, resulting in a loss of more than 50% of the original temperate forest.¹³



JUAN CARLOS GUTIÉRREZ

These developments have transpired with little outcry from the general public, mainly because of lack of information and interest. By contrast, in the United States public opinion plays an important role in Nature conservation. Compare the membership of environmental organizations: Naturalia and PRONATURA, the main Mexican conservation NGOs working to protect wildlife and wild habitat have 150²⁴ and 245²⁵ members respectively, while the National Wildlife Federation in the United States has over four million members²⁶—an astonishing difference. And if we consider that there are many more environmental organizations in the United States, several with hundreds of thousands of members, we can see how little impact the general public has on Mexico's conservation issues, including wildlands conservation.

The disparity in the interest of the Mexican and American public towards Nature probably started to develop in the 1940s when the Mexican government started to push for an agricultural and industrial nation, which conflicted with the conservation agenda of previous administrations. Consequently, government support for conservation was dramatically reduced for at least four decades. At that time Mexico's population was mostly rural and illiteracy was greater than today, a combination that limited the exposure of the masses to conservation issues through printed media or books. Additionally, the income of most Mexicans was, and still is,

barely enough to survive, and in these circumstances people focus on immediate needs like their next meal, leaving little time or peace of mind to worry about environmental problems. Gradually, though, interest in Nature is growing and public pressure is beginning to affect political decisions, as exemplified by the cancellation in March 2000 of a large-scale salt plant in the San Ignacio Lagoon in the Sea of Cortez.²⁷

Natural protected areas

While the Cárdenas government had a negative impact on wild ecosystems by giving away large and well-preserved natural areas, it was also during his administration that more national parks were created than ever before or since.²⁸ During the first seven decades of the twentieth century, most land conservation efforts in Mexico were focused on protecting forests—particularly the temperate forests around the cities of Central Mexico, largely for their aesthetic value—through the designation of national parks.²⁹ Today, national parks account for 11.7% of the protected land in Mexico³⁰ (see Table 2); however, these were often established over *ejido*, private, and indigenous lands without compensating the original owners.³¹ These landowners retained title to their property but restrictions on use were imposed, resulting in less available area for people to make a living, and often leading to lingering resentment. This, combined with lack of surveillance and enforcement of park regulations

Table 2. Categories of natural protected areas in Mexico under federal administration.*

CATEGORY	CHARACTERISTIC	ACRES / % OF TOTAL PROTECTED SURFACE	NUMBER OF AREAS
Biosphere Reserve	Biogeographic areas important at a national level that include one or more well-preserved ecosystems; also inhabited by threatened or endemic species. (People and their activities are included.)	20,054,405 / 68.8	21
Area for Protection of Flora and Fauna	Areas that are clearly important for the long-term survival of species of flora and fauna.	4,103,189 / 14.1	9
National Park	Biogeographic representation of one or more ecosystems, of scenic, scientific, educational, recreational, or historical value.	3,423,234 / 11.7	63
Area for Protection of Natural Resources	Areas for preservation of soil, watersheds, and resources in forest land.	502,708 / 1.7	7
Natural Monument	Areas with extraordinary or unique elements that deserve absolute protection.	32,180 / 0.1	3
Pending re-categorization	Areas for which the original status no longer applies and is in process to be modified.	1,035,225 / 3.6	8

* Modified from Arturo Peña Jiménez, Leticia Durand Smith, and Carlos Álvarez Echegaray, 1998, Conservación, in *La Diversidad Biológica de México Estudio de País*, Comisión Nacional para el Conocimiento y uso de la Biodiversidad (México City: CONABIO), 188–189.

and the parks' generally small size, has led to illegal logging, hunting, and other abuses. The result is a loss of biodiversity to such an extent that sometimes national parks are more degraded than adjacent non-protected areas.³²

In the 1970s, wildlands protection was given a much-needed infusion of energy through the creation of the Man and Biosphere Program. Overseen by the United Nations Educational Scientific and Cultural Organization (UNESCO), the program stimulated the creation of biosphere reserves in Mexico and was championed by Gonzalo Halfter, the founder of the Instituto de Ecología, a leading ecological research institution in Mexico. In the biosphere reserves, aesthetic landscape considerations were exchanged for ecosystem representation, and strict protection was exchanged for sustainable development³³—the idea being that unless people are included in conservation efforts, protecting these areas for the long term is impossible.³⁴

Unlike national parks, the biosphere reserves were created in regions of great biological importance. Their total area greatly exceeds that of the national parks, making them more viable biologically. Biosphere reserves now account for 68.8% of the protected area in Mexico, including representative tracts of the major and best-preserved ecosystems in the country.³⁵ We consider biosphere reserves to be wildlands—they have core areas that are supposedly strictly protected, and buffer areas where compatible use is allowed. At the moment, biosphere reserves are the nation's predominant strategy for conserving intact landscapes.³⁶

Two other types of protected areas are important for Mexican wildlands conservation: areas for protection of flora and fauna, and areas for protection of natural resources (see

Black-Footed Ferrets Reintroduced to Northwestern Mexico

Between September and November of 2001, wildlife researcher and Wildlands Project board member Rurik List, along with colleagues from the National University of Mexico's Institute of Ecology and the U.S. Fish and Wildlife Service, reintroduced 94 black-footed ferrets into the prairie dog town of Janos–Nuevo Casas Grandes, in Chihuahua, Mexico. Monitoring to determine ferret survival and reproduction took place in September 2002, showing successful reproduction and survival—thus providing encouraging news for ferret recovery.

The black-footed ferret is the most endangered mammal in North America. Dependent on grassland prairies that are themselves highly endangered, these elegant carnivores were feared extinct by the mid-1970s—until a relict population was discovered near Meeteetse, Wyoming, in 1981. After most of the Meeteetse ferrets were lost to canine distemper and sylvatic plague, the 18 sole survivors were rounded up between 1985 and 1987 to launch a captive-breeding program. Roughly 300 ferrets are bred by the program annually, most of which are destined for reintroduction to wild habitat.

Considered keystone predators, black-footed ferrets are closely associated with the likewise imperiled black-tailed prairie dog—utilizing their burrows for shelter and travel and relying on them as a primary source of food. The reintroduction site at Janos–Nuevo Casas Grandes, located about 45 miles south of the New Mexico border, is home to the largest continuous prairie dog complex remaining on the continent. Indeed, Janos–Nuevo Casas Grandes has been deemed the only site in North America where a long-term population of ferrets could be re-

established. In the United States, seven sites have hosted reintroduction efforts—with the only true success occurring at Contana Basin in South Dakota. The remaining reintroduction sites feature very small prairie dog towns, which are often decimated by plague outbreaks.

Meanwhile, efforts are underway to give legal protection to the Janos–Nuevo Casas Grandes area to provide long-lasting protection for black-footed ferrets, black-tailed prairie dogs, and myriad other species inhabiting this extraordinary prairie ecosystem.

—Paula MacKay



Dave Foreman captured this image while helping to reintroduce black-footed ferrets to the Janos prairie.

Table 2). A few other designations have less relevance for wildlands conservation, though they can be important for biodiversity protection in smaller areas such as canyons that have high levels of endemic species, or critical wintering grounds for migratory birds.

The National Commission of Natural Protected Areas coordinates the 111 federally protected areas that comprise the National System of Protected Areas. The system covers 20 million acres, or 4.32% of the land area of the country,³⁷ which is less than half of the minimum 10% target advocated by some international conservation organizations (a figure that has been criticized as insufficient by conservation biologists Michael Soulé and M. A. Sanjayan).³⁸ Clearly, existing protected areas will not fully preserve Mexico's extraordinary biodiversity or assure the long-term health of wild ecosystems supporting all native species.

Current conservation priorities and strategies

Mexico is a mega-diverse country, holding almost 10% of the world's species; many of these are endemic species,³⁹ some with ranges of less than 2,500 acres.⁴⁰ Not surprisingly, most conservation efforts in Mexico have focused on saving this biodiversity. Toward this end, much recent effort has been directed at identifying and prioritizing biologically important areas. For example, Gerardo Ceballos, a conservation biologist

from the Instituto de Ecología of the National University of Mexico (UNAM) who believes that all mammal species should be represented within protected areas, is working to determine the most efficient combination of areas that will include all species. (Currently, 75% of Mexico's mammal species are found within protected areas.⁴¹) The area that harbors most species of mammals is the Montes Azules Biosphere Reserve in the rainforests that border Guatemala. Two protected areas on the Mexico-U.S. border also rank high in mammal diversity: the El Pinacate Biosphere Reserve in Sonora, adjacent to the Organ Pipe Cactus National Monument in southwest Arizona, and the Maderas del Carmen Area for Protection of Flora and Fauna in Coahuila, adjacent to Texas's Big Bend National Park. But in the currently unprotected Janos region, a landscape of grasslands and scrubs south of the Arizona-New Mexico border where we've worked since 1994, Ceballos found a rich diversity of mammals that is quite different from the diversity at Montes Azules.⁴² Janos should rank as high for priority conservation action as anywhere in North America.

The Mexican Commission on Biodiversity (CONABIO) has attempted a comprehensive approach to identify the areas in need of attention to protect biodiversity at a national level. Working with the leading experts in Mexican fauna and flora, CONABIO produced a map identifying areas of high priori-



OSCAR MOCTEZUMA

Wildlands Project in Mexico

Naturalia, a Mexican nonprofit organization working to protect Mexico's endangered species and ecosystems, is one of the Wildlands Project's key partners in transboundary conservation (visit www.naturalia.org.mx). In 1997, the Wildlands Project and Naturalia—directed by Wildlands Project board member Oscar Moctezuma—began to develop a bi-national strategy for maintaining the biological richness of the southwestern U.S. and northwestern Mexico. More specifically, this initiative sought to protect the ecosystems of northern Chihuahua and Sonora while restoring ecological connectivity between this region and the wildlands of the Southwest.

During the first phase of the project, 32 priority areas for conservation were identified in Mexico's Northern Sierra Madre Occidental. Collaboration between the Wildlands Project, Naturalia, and other Mexican partners has since led to a landmark conservation agreement to protect the endangered thick-billed parrot's primary breeding habitat in one of these areas—the old-growth forest of Cebadillas.

In an effort to further advance conservation in the identified priority areas, Naturalia has initiated the "Preserving Mexico Campaign." This campaign aims to immediately protect some of Mexico's most threatened species by preserving large areas of their habitat; funds raised by the project will be applied through a trust for land purchase. Five Mexican banks—the Bank of Mexico, BBVA-Bancomer, BITAL, BANREGIO, and the BANAMEX bank—are participating in the campaign by selling a special collection of silver coins. The "Endangered Animals of Mexico" collection represents 10 endangered species of the Mexican fauna: the black bear, jaguar, river otter, harpy eagle, river crocodile, manatee, golden eagle, pronghorn, volcano rabbit, and prairie dog.

The launching of the Endangered Animals of Mexico collection took place in June 2001 at the Bank of Mexico's headquarters, where Bank of Mexico's Governor, Dr. Guillermo Ortiz, officially announced this institution's commitment to protecting Mexico's endangered wildlife. The event was attended by many representatives from the Mexican conservation community, the private sector, the media, and the Mexican government—as well as by Leanne Klyza Linck, executive director of the Wildlands Project.

The Endangered Animals of Mexico coin collection is a limited edition that can be purchased only through the aforementioned Mexican banks. The cost of the entire collection and the coin album is U.S. \$250.00 plus shipping. To find out more about purchasing coins to benefit Mexico's endangered wildlife or to order a set, please contact Oscar Moctezuma at direccion@naturalia.org.mx. (Spanish speakers can learn more at www.monedasyespecies.com.) —**Paula MacKay**



ty for conservation⁴³ and a book with detailed descriptions and justification for the selection of those areas.⁴⁴ This work, generally accepted by Mexican conservationists, has been useful to determine where to put resources for conservation work, but given the little detail (scale 1:4,000,000) it has a large associated error, and it includes areas of lesser conservation value such as towns, cities, highways, dams, and agricultural land. The CONABIO strategy stimulated regional efforts to identify important conservation areas. The group PRONATURA Noreste together with the World Wildlife Fund identified conservation priorities in the Chihuahuan Desert ecoregion,⁴⁵ which led PRONATURA to create the first easement covering a large area of land that the organization purchased in Cuatro Ciénegas, State of Coahuila.⁴⁶

As a first step toward creating a wildlands conservation network in northwestern Chihuahua and northeastern Sonora,⁴⁷ the Wildlands Project and the Mexican organization *Naturalia A.C.* have identified priority areas for conservation that take into account factors that other initiatives have not addressed, such as absence of roads, low human population, presence of large carnivores, or remnants of old-growth forest. These efforts resulted in the conservation of the main breeding site for the thick-billed parrot, a species extirpated from the United States and for which the best hope of recovery depends on protecting the breeding grounds in Mexico.⁴⁸

The identification of biologically important sites is only the beginning and perhaps the easiest part of the work. The implementation of conservation actions or strategies is undoubtedly a more challenging task. In the United States, easements and legislative tools like the Wilderness Act and the Endangered Species Act have been available for decades to help secure both public and private wildlands. In Mexico, besides government-designated reserves, the legal options for long-term wildlands protection are very restricted. So far, easement experiences are few in Mexico. It is premature to say how useful easements will be for long-term protection of Mexican wildlands; for now, creation of reserves continues to be the main tool for conservation in Mexico, but other strategies are being tried.

One of these strategies that has ample support in Mexico is sustainable development, since it has been generally agreed upon that reserves fail in their goal to protect Nature when the needs of local people aren't taken into account. For instance, CONABIO is basing its large-scale conservation project, the Meso-American Corridor, on sustainable development and the participation of communities,⁴⁹ and the

Mexican Fund for the Conservation of Nature is increasing its funding of sustainable development projects.⁵⁰ The Ministry of the Environment has created a new system for wildlife conservation outside protected areas called Use and Management Units (*Unidades de Manejo y Aprovechamiento* or *UMAS*). Here, property owners are allowed to make sustainable use of wildlife that traditionally belonged to the Mexican Republic. These uses include hunting, capture of animals for the pet market, and plant collecting for ornamental or medicinal use.⁵¹ By 1999, 30 million acres of land were registered as *UMAS*,⁵² covering more area than the National System of Protected Areas. However, the effectiveness of the *UMAS* are still unclear—in some cases the goal of conserving wildlife and habitats is being fulfilled; in others *UMAS* have favored the legal overuse of resources.

Despite its broad acceptance, the merits of sustainable development are hotly debated. According to biologist Michael Soulé, only strict land protection (e.g., reserves or wilderness areas) effectively preserves wildlands including large carnivores.⁵³ The lack of examples of large predator conservation supported by local communities in Mexico appears to confirm the idea that strict protection is necessary. But strict protection has garnered little support from Mexican conservationists because it is viewed as antisocial, since in Mexico virtually all wildlands have an owner and therefore local people are affected when ecological protection is given to an area.

As we start the new century, we are faced with numerous challenges for wildlands conservation in Mexico, but perhaps the most urgent of all is to raise the awareness and sensibility of the citizens regarding conservation issues and Nature protection. In the past most land conservation achievements—such as designating national parks—were the result of government initiatives, but over the last three decades land conservation has been led by researchers working in biologically rich sites, many of which have become protected areas.⁵⁴ Examples of these are the creation of the Chamela-Cuixmala Biosphere Reserve and the protection of the main nesting sites for the maroon-fronted and thick-billed parrots. Only with widespread and enthusiastic support and active participation from the public in such conservation actions will we be able to protect our wildlands into the next century. ☪

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NOTES

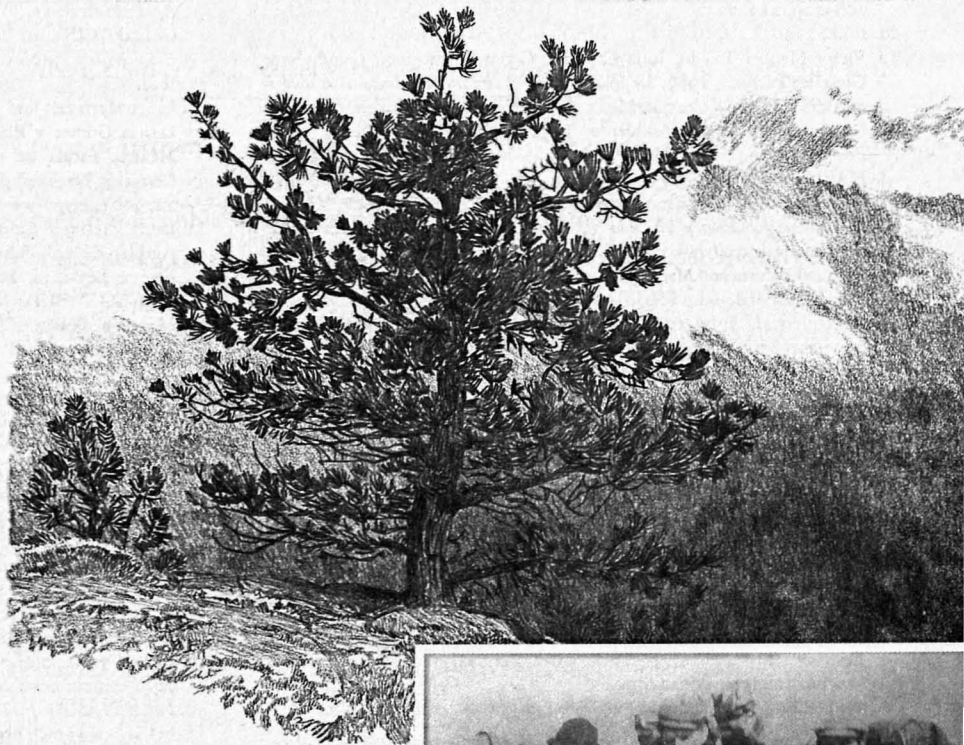
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First Steps Along the Appalachian Trail

*Benton MacKaye's
Progressive Vision*

by Larry Anderson

IN THE SPRING OF 1921, Benton MacKaye was 42 years old. The suicide that April of his wife, the suffragist and peace activist Jessie Hardy Stubbs MacKaye, was the grim climax of a tumultuous period in his personal and professional life. Trained as a forester, he had worked for the U.S. Forest Service until 1918, when he transferred to the Department of Labor. That agency in 1919 published his lengthy and provocative report on the colonization of public lands, *Employment and Natural Resources*. In a changing political climate, MacKaye left the federal government in 1920 to pursue a new career devoted to social change. Later that year, he worked as an editorial writer for a socialist newspaper, the *Milwaukee Leader*, but resigned in a dispute involving his wife's outspoken political activism. The couple returned to New York City, where MacKaye worked briefly with a short-lived organization of reform-minded engineers called the Technical Alliance. After his wife's death, his life took a fateful new turn, which opened an important chapter in the history of the American conservation movement.



Benton MacKaye and cohorts setting forth into New Hampshire's White Mountains in August 1897; on this trip MacKaye "first saw the true wilderness."

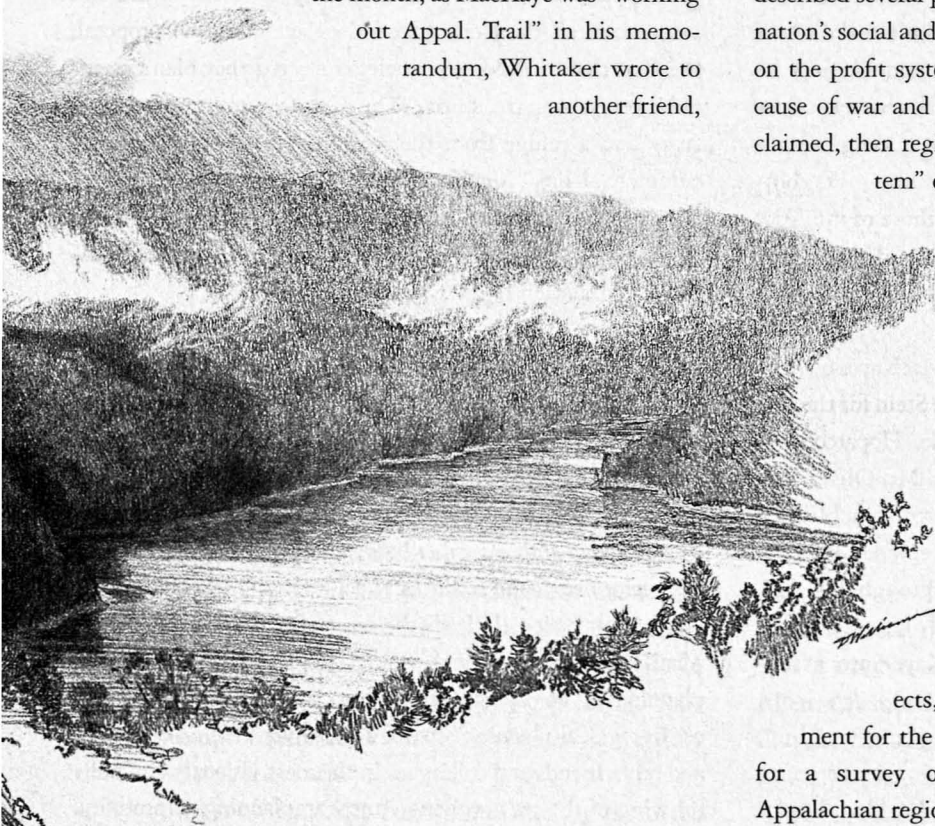
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THE DIRECTION OF MacKaye's life and career at this precarious moment was set by his generous and supportive friend Charles Harris Whitaker, editor of the *Journal of the American Institute of Architects*. MacKaye and Whitaker shared common ideological and political convictions, but they also had in common a New England upbringing, which instilled in both a yearning to recreate communities modeled partly after the region's rural villages. While MacKaye slowly regained his emotional and physical equilibrium at his brother Hal's home in Yonkers, Whitaker invited his distraught friend to spend some time at his modest farmstead in the northwestern New Jersey township of Mt. Olive. "Come on out and live there for a while and be my aide de camp," he wrote. "It is grand beyond words!"

By early June, Benton had settled in at Whitaker's rural retreat, where he returned to his writing. "Began work—doping out gen'l industrial plan," Benton noted in his diary, "blocking out recreation project." A few days later he began writing a "Memo. on Regional Planning." As Whitaker saw MacKaye's schemes taking shape on paper, he also had in mind a plan to broadcast those ideas to others. By the end of the month, as MacKaye was "working

out Appal. Trail" in his memorandum, Whitaker wrote to another friend,



This article is adapted from Larry Anderson's book, Benton MacKaye: Conservationist, Planner, and Creator of the Appalachian Trail, which will be published by the Johns Hopkins University Press in December 2002; it is used with permission of the publisher and author.

Clarence S. Stein, about MacKaye's work. Stein, an urbane, progressive New York City architect, headed the Committee on Community Planning of the American Institute of Architects. In the AIA's journal, Stein had been reporting for several years on the community planning movement. In Stein's eyes, community planning encompassed not only the development and rehabilitation of existing cities, but also the creation of entirely new towns and cities on previously undeveloped land. As Whitaker recognized, MacKaye's embryonic ideas suggested a novel type of community—entirely different from anything yet conceived by urban-oriented architectural thinkers like himself and Stein.

MacKaye was now free from political constraints and the muddled thinking that so often characterizes group efforts. So he outlined a far-reaching plan for the transformation of modern American industrial society that emphasized play as a first priority. His handwritten, 60-page memorandum was divided into two sections: "Regional Planning as a Reconstruction Policy," which outlined his personal philosophy of a new discipline; and "Projects in Regional Planning," in which he described several practical planning tasks. His diagnosis of the nation's social and economic ills constituted an unveiled attack on the profit system. If "surplus wealth" was the underlying cause of war and unemployment, as socialist orthodoxy proclaimed, then regional planning and a "unified industrial system"

organized on nonprofit, socialized principles provided the antidote. English-style "garden cities" and what he called a "recreation plant" were the two key components of his blueprint for the evolutionary takeover of the industrial system. Writing explicitly about regional planning for the first time, he asserted that the subject "to be of full use, must deal not alone with man's work but with man's life." "Given time," he optimistically wrote, "the cooperative principle will replace the competitive one."

MacKaye described three specific projects, "with a view to securing tangible employment for the regional planner." The first proposal called for a survey of industrial localities throughout the Appalachian region, but he concluded that the "time is probably not yet ripe for obtaining a client for such a project." The second was a detailed, six-point industrial survey of Vermont. He sketched out a vision of the state divided into self-con-

tained, "self-owning," "factory-ized" agricultural communities, organized according to watershed boundaries.

It was MacKaye's last proposed planning project, titled "Survey and Plan for an Outdoor Recreation System throughout the Appalachian Mountain Region," which piqued Whitaker's enthusiasm. "In view of...the fact that outdoor recreation makes instant appeal to all classes of humans," he wrote, "it is suggested that the most popular approach to a comprehension of regional planning might be made by presenting some big bold conception in public recreational life."

"Engineering projects which can be visualized geographically, and in their entirety, are well adapted to seize the popular imagination," he continued. "Witness the Panama Canal and the 'Cape to Cairo' railway." Citing parallels with Vermont's 210-mile Long Trail, which had been cleared and blazed beginning a decade earlier, but which would not be completed the full length of the state until 1930, he proposed "the building of a 'long trail' over the full length of the Appalachian skyline—from the highest peak in the north to the highest peak in the south—from Mt. Washington to Mt. Mitchell."

That was the backbone of his grand scheme. Then he elaborated on its rationale and purpose. "It would make a man sized project in regional planning and engineering, laying the foundation for a socialized outdoor life for the workers of the nation," MacKaye imagined. "Putting regional engineering on the map in this line—recreation—should lead to its comprehension and application in other lines—those of industry. It might well prove to be our route at least toward a socialized industrial life for the workers of the nation."

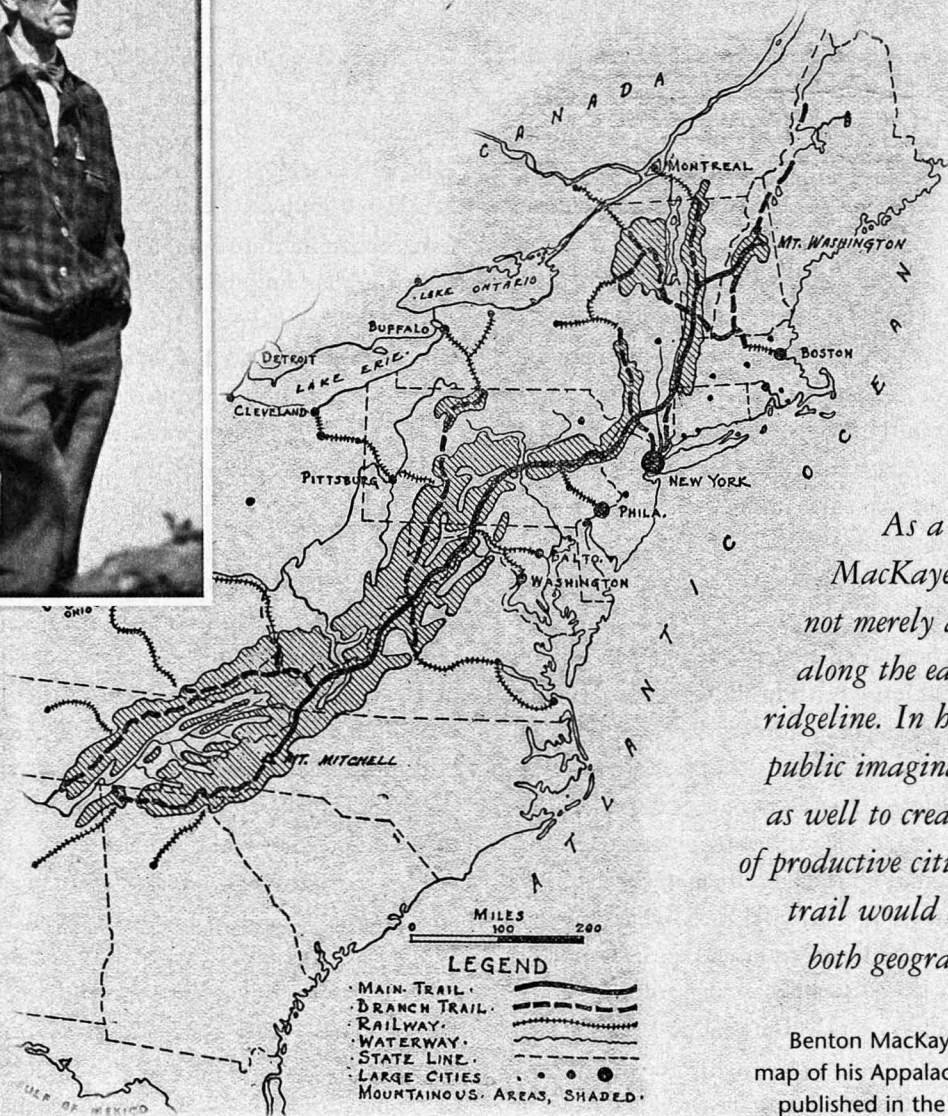
WITH SUCH DETAILED plans on paper, MacKaye, on July 10, accompanied Whitaker to meet Clarence Stein for the first time at the Hudson Guild Farm, near Lake Hopatcong at Netcong, New Jersey, only a few miles from Mt. Olive. This July 1921 meeting, at which Whitaker offered to publish an article concerning the Appalachian recreation plan in the AIA journal and Stein agreed to promote it through his AIA Committee on Community Planning, launched the Appalachian Trail; it also launched MacKaye into a self-designed profession as a regional planner.

In a new draft of his regional planning memorandum, Benton elaborated on the rationale for pursuing a recreational project as a more palatable first step in a broader plan for "social readjustment." Were they to mount a "frontal attack" on the industrial system, involving the construction of worker-owned industrial communities, it would meet stiff opposi-

tion from "ultra conservatives" and big business, he predicted. "If they did not call it 'visionary' they would say it was 'bolshhevistic' and 'dangerous.'" By contrast, a project combining a mountain trail and a series of recreational camps and communities "would make a flank attack on the problems of social readjustment. This fact if understood, would lose for the project the support of the ultra conservatives among the recreation group. But it would retain the support of the liberal minded and of the radicals therein. And these together would form a majority of the recreation group." The Appalachian project, in other words, would provide an indirect route to his conception of the ideal American society—"to live, work, and play on a non-profit basis."

From this memorandum, MacKaye distilled his article, "An Appalachian Trail: A Project in Regional Planning," which appeared in the *Journal of the American Institute of Architects* in October of 1921. He and Whitaker toned down the political thrust of the article by weeding out any direct references to its essentially socialist underpinnings, but the ideological implications of the proposal were still distinct. If the Appalachian Trail that eventually took shape did not incorporate all the elements of MacKaye's original proposal, the trail that evolved nevertheless reflected that plan's essential, even subversive, spirit. "The camp community is a sanctuary and a refuge from the scramble of every-day worldly commercial life," MacKaye wrote. "It is in essence a retreat from profit," an amateur, noncommercial, communal project in which "cooperation replaces antagonism, trust replaces suspicion, emulation replaces competition."

It was a measure of the intellectual distance MacKaye had traversed from his professional origins as a forester that his trail proposal did not appear in a journal of forestry, conservation, or recreation. Like the more reform-minded foresters and conservationists, many progressive architects and planners were ambivalent about the institutions and interests their professions served. In the *Journal of the American Institute of Architects* these architectural reformers found an outlet and a leading intellectual forum of their profession. Indeed, the issue of the journal in which MacKaye's article appeared was devoted mostly to community planning. As an explicit "retreat from profit," MacKaye's "project in regional planning" struck a chord with Stein, Whitaker, and other friends and colleagues in the most visionary and radical wing of the era's evolving American planning community. These were people interested not just in architecture, community-building, and other physical aspects of planning, but in overarching social and economic objectives as well.



As a social inventor, MacKaye hoped to build not merely a physical trail along the eastern mountain ridgeline. In his appeal to the public imagination, he aimed as well to create a community of productive citizens, whom the trail would link together in both geography and spirit.

Benton MacKaye ca. 1935 and the map of his Appalachian Trail vision, as published in the 1921 *Journal of the American Institute of Architects* article.

IN THE FALL OF 1921, Benton returned to the MacKaye family home in Shirley Center, Massachusetts, to work on two tasks that he saw as closely related: a campaign to promote the Appalachian Trail project, and the development and refinement of his general approach to regional planning. His arrival in Shirley coincided with the publication of his article in Whitaker's magazine. Clarence Stein arranged for his AIA Committee on Community Planning to sponsor the production and distribution of reprints of the article, to which he added his own introduction. Stein immediately grasped the scope and underlying purpose of his new acquaintance's vision. "He would as far as practicable conserve the whole stretch of the Appalachian Mountains for recreation," Stein wrote.

"Recreation in the biggest sense—the re-creation of the spirit that is being crushed by the machinery of the modern industrial city—the spirit of fellowship and cooperation....It is a plan for the conservation not of things—machines and land—but of men and their love of freedom and fellowship."

In late November, Benton met in Boston with his friend Allen Chamberlain, the conservationist and writer. On Chamberlain's urging, Benton in early December attended the two-day Boston meeting of the New England Trail Conference (NETC), where he was able to talk with the most influential figures in the regional trail community. His proposal struck a nerve with these outdoor activists. The Appalachian Trail would soon be transformed from pipe dream to literal pathway.

Many of the parties associated with the origins of the Appalachian Trail, in the NETC and otherwise, were not mere hobbyists, though. Chamberlain and Philip Ayres, who headed the Society for the Protection of New Hampshire Forests, were shrewd, experienced political activists, who had been instrumental in securing passage of the 1911 Weeks Act. Other NETC members, such as Sturgis Pray, Arthur Comey, Harlan P. Kelsey, and John Nolen Sr., were leaders in the fields of landscape architecture and city planning. And many other figures in the regional outdoor recreational movement were trained foresters, schooled in the Pinchot conservation doctrine of "the greatest good for the greatest number." These men (it would be a few years before many women assumed significant roles in the Appalachian Trail effort) shared a broad vision of the social utility of a protected and open public landscape. "It presents a planning project of real significance," Nolen wrote MacKaye after reading his Appalachian Trail article. "The interesting thing about your plan is that it is inherently likely to be carried out," predicted Ayres. "The trend of the times is likely to enforce it."

"Here is a project to be dramatised," MacKaye had concluded his 1921 article. As a social inventor, he hoped to build not merely a physical trail along the eastern mountain ridge-line. In his appeal to the public imagination, he aimed as well to create a community of productive citizens, whom the trail would link together in both geography and spirit.

THE APPEAL OF THE Appalachian Trail project paralleled developments in the coalescing American wilderness preservation movement. By the early 1920s, the fate and the uses of America's remaining undeveloped lands were subjects of intense debate among a small but expanding circle of foresters, conservationists, and land-use activists. A month after the publication of MacKaye's Appalachian Trail proposal, the *Journal of Forestry* carried an article titled "The Wilderness and Its Place in Forest Recreational Policy," written by the Forest Service's Aldo Leopold.

"By 'wilderness,'" Leopold wrote, "I mean a continuous stretch of country preserved in its natural state, open to lawful hunting and fishing, big enough to absorb a two weeks' pack trip, and kept devoid of roads, artificial trails, cottages, or other works of man." He challenged his fellow foresters to ask themselves "whether the principle of highest use does not itself demand that representative portions of some forests be preserved as wilderness."

Leopold's eloquent voice gradually redefined the terms in which the whole question of wilderness protection in the

United States was perceived and discussed. His early plea to forestry colleagues was a protest against the Forest Service's approach to recreation and wilderness preservation in the national forests. Historian Paul Sutter explains that what Leopold meant by wilderness was "preservation from certain forms of administrative and recreational development," especially road-building and the leasing of Forest Service lands for summer homes and other commercial uses. Leopold believed "that the Forest Service had, in many cases, been too generous to those seeking recreational access." And Leopold did begin to influence the agency's priorities. In 1924, at his prodding, the Forest Service would establish a 574,000-acre Gila Wilderness Area in New Mexico's Gila National Forest. The nation's first designated wilderness area (although not afforded complete legal protection until passage of the Wilderness Act 40 years later), the Gila Wilderness exemplified a principle Leopold articulated in his momentous article. "It will be much easier to keep wilderness areas than to create them," he wrote in his 1921 article. "In fact, the latter alternative may be dismissed as impossible."

Another Forest Service staff member directly attacked the threat posed by national forest roads. Arthur Carhart, the first landscape architect employed by the agency, in 1919 proposed that a tract surrounding Trapper's Lake in Colorado's White River National Forest be used for wilderness recreation rather than for vacation home sites; his proposal was adopted the next year. After conducting a recreational survey of Minnesota's Superior National Forest, Carhart also proposed that some national forest areas should be managed as wilderness. However, as historian David Backes has observed, Carhart's "idea of wilderness focused on scenery" and emphasized "making such areas available to the masses." Indeed, Carhart's plan for recreational uses in what would later become the Boundary Waters Canoe Area called for "motor-boat highways" and a string of eight rustic lakeside hotels.

MacKaye, the eastern counterpart and contemporary of Leopold and Carhart, also emphasized the recreational benefits of wilderness, but only as part of his larger social agenda. In fact, he identified a social dilemma exacerbated by the nation's geography and the distribution of its population. "Camping grounds, of course, require wild lands," he wrote in his article proposing the trail. Most of the nation's wild lands, however, were in the national parks and national forests of the West. These "playgrounds of the people," he continued, "are for the Western people—and for those in the East who can afford time and funds for an extended trip in a Pullman car. But camping

grounds to be of the most use to the people should be as near as possible to the center of population. And this is in the East."

MacKaye came to envision a reconstituted wilderness along the Appalachian Mountain range, where the original wilderness no longer existed—at least not on the scale or in the character that Leopold had experienced on federal lands in the Southwest. The Appalachian Trail would represent a conceptual wilderness, traversing numerous political jurisdictions, natural community types, and human cultures across thousands of mountainous miles. "The region spans the climates of New England and the cotton belt," MacKaye observed; "it contains the crops and the people of the North and of the South."

When Leopold, Carhart, and MacKaye used the term *wilderness* in the early 1920s, as scholars such as Backes and Sutter have carefully elucidated, these legendary figures of the wilderness movement did not necessarily mean the same thing. In practical terms on the American landscape, however, the two concepts introduced respectively by Leopold and MacKaye—the extensive wilderness *area* and the regional *linear* wilderness represented by the Appalachian Trail—would gradually, but never entirely, be connected.

AT THE END OF 1922, just over a year after MacKaye's Appalachian Trail project had first been publicly broached, the scheme had taken hold. Already, as he reported in that December's issue of *Appalachia*, individuals, outdoor clubs, and public officials were at work from the White Mountains of New Hampshire to the Great Smokies along the Tennessee–North Carolina border. A third of the 1,700-mile trail he originally proposed, according to his estimates, was already in existence, principally in such states as New Hampshire, Vermont, New York, and New Jersey, as well as in the national forests of the South. "In almost every locality along the Appalachian ranges a greater or less amount of trail-making is going on anyhow from year to year," he observed. "The bright idea, then, is to combine these local projects—to do one big job instead of forty small ones."

Benton could report on the progress of the "one big job" when the New England Trail Conference met in January, 1923. The meeting, as MacKaye put it, "was basic in clinching the start" made in the region. In his enthusiastically received address, MacKaye now promoted dimensions of the project he had downplayed in his original proposal. He envisioned the Appalachian Trail as the backbone of a publicly owned "super national forest" stretching from Maine to Georgia. The trail itself, MacKaye suggested, could be built by

local organizations in a series of links, "each link to be sufficient of itself and to serve for local use." He also floated his idea for a "central organization" to oversee the trail's creation and maintenance, taking up the tasks that Stein's AIA Community Planning Committee had been performing. But such an organization, MacKaye cautioned, "is something which should grow and ripen rather than be suddenly created."

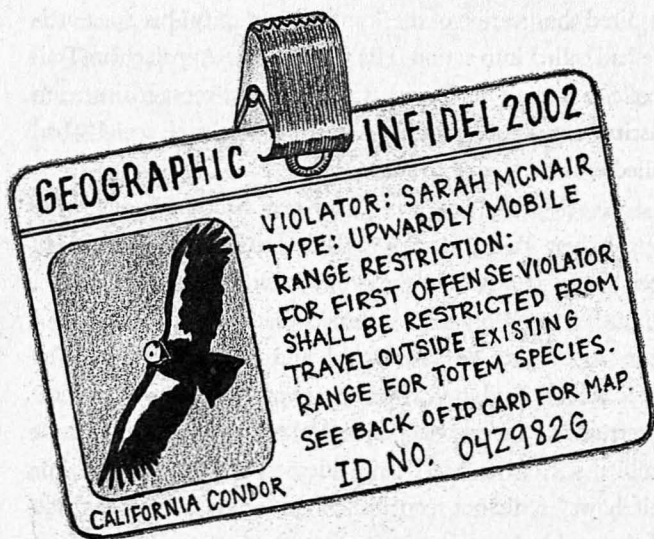
In later years, some leaders of the Appalachian Trail effort charged that MacKaye had not paid sufficient attention to the detailed, practical tasks of locating, building, and maintaining the physical trail. Such criticisms tended to arise from those who had not been involved in the trail project during its very earliest few years—the very years, in fact, when MacKaye made his greatest contributions to the small details as well as the overarching concept of the trail project, and at the greatest personal sacrifice. He succeeded in establishing the concept of the Appalachian Trail. As importantly, but harder to measure than the miles of trail blazed, he located and linked together other dedicated and influential trail enthusiasts throughout the region spanned by the project. Through his writings, correspondence, speeches, and travels, MacKaye inspired the creation of the "camp community" his 1921 article had called into action. His vision of the Appalachian Trail spoke to human needs and aspirations that most mainstream institutions—political, commercial, educational, social—had failed either to see or to address.

A self-styled radical, MacKaye had envisioned the Appalachian Trail project as "a flank attack on the problems of social readjustment." In the project's earliest years, most trail enthusiasts probably did not suspect that they were following a roundabout path towards social and political reform. The Appalachian Trail quickly won support across the political spectrum as a recreational project and would eventually become emblematic of the American wilderness ideal. MacKaye himself, however, did not soon abandon his original regional vision of the trail as "a project in housing and community architecture," encompassing many of the ideas for colonization and employment he had developed during the previous decade. ☪

Larry Anderson is a writer whose articles, essays, and reviews have appeared in such publications as *Sierra*, *Appalachian Trailway News*, *Harvard Magazine*, *Environmental History*, *Orion*, and *Wilderness*. He last wrote for *Wild Earth* in spring 1996. He serves on the New England Advisory Council of *The Trust for Public Land* and as a director of a land trust in Little Compton, Rhode Island, where he lives.

Homeland Insecurity

by Gary Paul Nabhan



I'D LIKE TO BREAK THE SILENCE which has fallen over America regarding the major cause of our social and ecological ills. No, it is not the floundering economy, unbridled consumerism, chronic overpopulation, or insidious threats from beyond our borders. Instead, it is something much closer to us that is threatening to rip apart the fabric of American families and ravage our home environments: infidelity. That's right: *infidelity to place.*

Let me explain to you how I discovered that such infidelity so gravely imperils our homes, our communities, and our landscapes. One day, I simply plotted on a map of America's counties the areas with the highest numbers of endangered plant and animal species. Then, I plotted in a different color on the same map the areas with highest human population turnover due to rampant in-migration as well as forced out-migration. Try this exercise yourself and you will see the near-perfect match: the loss of species and habitats is geographically correlated with rapid urbanization, migration, and, in general, demographic instability.

To put it another way, the richness and uniqueness of American life—floral, faunal, and multicultural—is at risk wherever the number of newcomers far exceeds the number of good ol' boys and gals: southern California, Nevada, Hawaii, Florida, and my home state of Arizona. These loose-living newcomers erect their swap-meets, park their doublewides, and drive their golf carts without much regard for what existed there before their arrival. They have no local knowledge of where the best fishing holes, cactus patches, deer blinds, and eagle roosts are situated near their newly planted turf. What's worse, these two-timing harlots abandoned their old haunts back where they came from, and have succumbed to a lifestyle that reeks with geographic lasciviousness.

I have written President Bush about this crisis that is undermining our society, urging him to entirely overhaul the mission of his Office of Homeland Security. No doubt Director Ridge and Attorney General Ashcroft are already busy identifying and rounding up the geographic infidels that are destabilizing our society. Every true American patriot can help win the War on Homeland Insecurity—by staying put, staying vigilant, and knowing the three character types of these enemies now moving freely within our borders:

> First, there are the *latitudinally mobile*: snowbirds who crave to build second homes in the Sunbelt rather than ice-fish all winter with Ollie and Swede Up North. Once divorced from their natal habitats, many of them lead lives of desperation as cactus-nappers and hoarders of Hawaiian shirts. After

filling our deserts up with Winnebagos and discarded cartons of instant casserole dishes, they often die prematurely, far from their loved ones back home. The highest rates of snowbird mortality occur near desert washes, where their attempts to ice-fish for sand-trout often lead to drowning in quicksand.

> Second, there are the *longitudinally mobile*: those who flit from coast to coast as if the only two centers of High Culture on the continent are located in Manhattan and Hollywood. As they sleazily slip from one coastal resort to the next, they demand more and more freshwater from the hinterlands to wash off their salt and sunscreen, creating massive coconut oil spills wherever they go. Let the truth be known about these rakish ramblers, the so-called beautiful people of the beach scene: many of them formerly lived happily landlocked in North Dakota and Idaho. Alas, they somehow went astray, leaving behind their wholesome rural accents, warts, varicose veins, double chins, and beer bellies to assume lives of the flawlessly sunny and unblemished. Because of all the unsavory skin and fat they had liposuctioned from their bodies before fleeing to Club Med, they are culpable for making the states of North Dakota and Idaho develop Superfund sites to deal with the massive piles of flesh they discarded. Sadly, Idaho and North Dakota continue to suffer the highest ratios of beer bellies to endangered species of any states in the union.

> Finally, there are the *upwardly mobile*: those who claim that they idle away their hours flying the friendly skies, when they are actually jet-setting along the axis of evil. These are exactly the people most likely to commit white-collar crimes while moving through the revolving door from business to government, and back again. More than any other group, we must keep these suspects out of our airports, even when they claim they have packed their own bags and have only accepted gifts from other CEOs.

I AM SURE that the President will agree with me that we must stop these bioregional infidels in their tracks. We must eliminate each and every government subsidy that encourages anyone to relocate away from the land that they know best. No more federal recruitment of Okie oil workers to build pipelines in Alaska, especially if they are to suck oil out of the Arctic National Wildlife Refuge to fuel more cross-country migrations. No more AARP discounts outside your county of origin. No more dual citizenship for Dick Cheney: it's either Texas or Wyoming, not both. And immediate cancellation of all flights from Kennebunkport, Maine to Mesquite, Texas and Washington, D.C.

As a positive incentive for staying put, the government could offer tax credits to homebodies, thus ensuring that the grass stays greener on their own side. Should such a promotion fail to reduce geographic promiscuity, our law enforcement agencies should mandate that first-time offenders carry a special ID card on them at all times. It will feature not the offender's photo, but his totem plant or animal—preferably a locally restricted species. On the flipside of the ID will be a map of that species' distribution range. Should the offender be caught traveling beyond his totem species' range, he will be sentenced to community service: restoring the portion of the species' habitat closest to the offender's residence. He must continue such work until the totem species recovers from its historic population declines, or until the offender dies, whichever comes first.

Although such a mandate may sound harsh at first, measures like this will encourage each citizen to become both a native and defender of his or her homeground, without having to divide any allegiances between two places. An allegiance to tutelary landmarks and charismatic species is not unlike the way in which certain Native American tribes adopted keystone species such as bison, salmon, or saguaro and fused these characters with their own cultural identities. As they slowly became the People of the Wapiti, Acorn, or Horny Toad, they could no longer imagine living beyond these species' reaches. Fortunately, this kind of fusion of human identity with a plant or animal totem is not peculiar to Native Americans. Many Anglo-, African-, and Hispanic-Americans have learned how to become couch potatoes for the Arizona Diamondbacks, the Baltimore Orioles, or the Santa Cruz Banana Slugs.

If America is to be strong and fully unified once more, we must focus on issues that bring together religious conservatives with the religiously conservationistic lunatic fringe. If we decide to once again unfurl our local colors, we will surely defeat all the provincially challenged, bioregionally fickle, and latent cosmopolitans that have tried to uproot the tree of life from our continent. Long live the hayseed! Death to the infidels of place! ☾

Gary Nabhan is the author of *Cultures of Habitat* (Counterpoint Press) and *Coming Home to Eat* (W.W. Norton). Although he concedes he was once a Midwesterner, he is now busy raising hell, Navajo-Churro sheep, and native crops on the same crappy Arizona soils that he has been coping with for thirty years. "It's hot here and on top of that, Arizonans incessantly eat chile peppers," he advises, "I wouldn't encourage other Midwesterners to try it."



The Impossible Race

Population Growth and the Fallacies of Agricultural Hope

by Hugh Iltis

IN THE WET TROPICS, particularly in the diverse but vulnerable rain forests and seasonally dry monsoon forests, a biological genocide is now in full swing. Of the estimated 30 million species of plants and animals on Earth, over half live in the tropics, on only 6% of the Earth's surface. Here, even on a highly localized scale, biodiversity can be overwhelming. Thus, fully 41,000 species of insects, mostly beetles, have been identified in one hectare (2.47 acres) of Panamanian tropical forest! The destruction of tropical habitats, therefore, will inevitably cause the extermination of millions of plant and animal species, for most of which we do not have a name or a description, a life history, or an estimate of their ecological or economic importance. As many as 20% of all species on Earth may become extinct within 20 years, at least one million species, but very likely many more. The utter devastation that human action wreaks in tropical ecosystems has to be seen to be believed.

In 1962 I stood on a primitive bridge suspended over a clear mountain stream and watched as troops of chattering spider monkeys, on branches a hundred feet off the ground, gracefully jumped from one tree to the next, eating the yellow-orange fruits from a gigantic plank-rooted fig tree. Here, near San Ramon in the eastern foothills of the Peruvian Andes, in a valley overwhelming in its greenness and serenity, giant, brilliantly blue *Morpho* butterflies sailed erratically through a sun-flecked clearing to disappear again into the rain forest canopy. Iridescent hummingbirds hovered over the yellow flower clusters of a trumpet vine liana, while a pair of banana-billed toucans sat motionless on a branch, silently watching. To our small group of biologists, this was a scene straight out of a tropical Eden.

Not one of these living glories has survived. That year, an intelligent but ecologically unaware young man from Lima bought the valley with a development grant provided by the U.S.-sponsored "Alianza para el Progreso" and, even on slopes exceeding 45 degrees, cut down the forest and planted coffee and bananas. Such forest conversion, common throughout the Andes, has resulted not only in the extirpation of species but

in massive soil erosion, siltation of rivers, and, locally, climatic change. Lately, the cultivation of coca has had the same effect. The unprecedented fluctuations in Amazonian water levels in recent decades are believed to be the unintended consequence of such land clearing, as is the siltation of the Panama Canal.

With such extensive forest destruction, countless species will disappear. For example, half of the world's primates—the lemurs, monkeys, and apes, our closest evolutionary relatives—are facing extinction. These are all highly endemic, often rare animals, each with its own geography and ecology, that conservation biologists are only now beginning to understand. What must be done to preserve them? The first step, of course, is to *preserve their forest habitat*. But even here, human need for protein—meat—has hunted out the larger mammals (including primates), birds, and reptiles from vast areas of Amazonia and Central Africa, so that many a forest, though superficially pristine, is in actuality an "empty forest."

The richly diverse forests themselves deserve protection. The lowland forests of the Pacific slope of Ecuador, for example, are the home of many unique plant species. Sharply separated for millions of years from their relatives in the Amazon basin by the snowy Andes, they evolved here in geographic isolation. Near Santo Domingo de los Colorados lies a small remnant of a moist tropical forest, intensively studied by Calloway Dodson and my former student, the late Alwyn Gentry. As described in their *Flora of the Rio Palenque*, this tract of only 167 hectares (420 acres) contains over 1,100 species of plants, almost half of which are trees, shrubs, or lianas. They found nearly 6% of the species to be new to science (including several of the giant canopy trees). Fully 4% were local endemics, that is, known only from here and nowhere else. The small "sierra" at Centinelas, only six kilometers away, had a strikingly different, but equally endemic, flora, with close to 100 species new to science discovered there. The Rio Palenque preserve is now the only surviving example of "moist tropical forest" in this region, a tiny island of extraordinary natural complexity surrounded by a vast ocean of sterile cultivated uniformity: thousands of square

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kilometers of pesticide-sprayed sugarcane, African oil palm, banana (mostly for export to the United States and Europe), and cattle pastures for the "hamburger society." Even though the Rio Palenque forest is protected, all of its larger forest animals, such as monkeys and tapirs, have long since become extinct, for it is much too small an area to sustain them.

Incredibly, Ecuador—a country no bigger than Minnesota—is estimated to have more than 19,000 different species of plants, over half of them endemic. Compare this to only 17,000 species in all of North America, and only 1,700 native species in all of Minnesota, which boasts only one endemic, a semisterile dog-tooth violet lily. In fact, some one-hectare plots of Peruvian rain forest sampled by Gentry contained 300 species of trees! To any temperate-zone botanist, such localized diversity is astounding. But all over the tropics local floras and faunas are saturated with unique taxa: local endemism is the rule, widespread species the exception.

Many tropical plants have turned out to be useful in industry, medicine, agriculture, or horticulture, furnishing drugs, waxes, oils, gums, spices, and fruits. Others, especially some gigantic fruit-producing trees, have been shown to be ecological "keystone species," indispensable to the survival of whole suites of animals, including parrots, Amazonian fish, and monkeys. For these reasons (among others) we need to legally protect extensive areas of tropical forest from agricul-

Preventing famine and disease are noble goals. Ending injustice and poverty are noble goals. But none of these will induce an elusive "demographic transition" to lowered birthrates in time to prevent widespread biological collapse, a collapse that would not only intensify human miseries but would further intensify the destruction of Nature.

ture, ranching, plantation forestry, and even from "rubber tapping"; even selective logging of key species will pull the rug out from under many organisms, tightly evolved and totally dependent on them as they are.

About half of the world's tropical forests have already been destroyed. The World Resources Institute estimates that an additional 7.3 million hectares (18 million acres) of closed moist forest are now being destroyed annually, and another 4.4 million hectares selectively logged. Even at these deliberately conservative estimates, most tropical forests may be destroyed within the next 20 years.

The urgency of restraining tropical deforestation is well illustrated in western Ecuador. Only 60 years ago, it was covered with the most inaccessible of tropical forests, uninterrupted for 100 kilometers from Quevedo to Esmeraldas, an area from where almost no biological specimens were then available for scientific study. But today, except for the Rio Palenque Science Center preserve, and an acre here and an arroyo there, this entire forest has been recklessly destroyed. Today, only an occasional plank-rooted forest giant, uncut because of its immense circumference, towers alone over a field of bananas, a silent witness to the tropical forest diversity that once was and a pathetic reminder that, from now on, no one in the world shall ever again study these ancient forests or document their botanical or zoological treasures. Extinction is indeed forever!

The Sierra de Manantlán: A Mexican biosphere reserve protected

More hopeful are the prospects for the cloud forests of the Sierra de Manantlán, a mountain range of Mexico's Sierra Madre del Sur southeast of Puerto Vallarta. Its preservation started in 1977 with the chance discovery by a young Mexican undergraduate student of a species of wild grass, later named *Zea diploperennis*, a perennial relative of teosinte, the ancestor of maize. This rare weed, which grows nowhere else in the world, may have enormous economic potential: it is immune to just about every known maize virus and readily hybridizes with maize, the world's second most important cereal crop, with a global harvest in 1999 of over 600 million metric tons from 139 million hectares cultivated, and worth around \$47 billion.

Logging formerly decimated the forests of this biological treasure-house. Trucks roared down the mountains every half-hour, hauling gigantic logs of oak, magnolia, and pine, to be made into lumber for building houses, into veneer for furniture, and into broomsticks for export to the United States to gain badly needed foreign exchange to pay off Mexico's staggering \$100-billion debt. But because of the discovery of this remarkable grass, and through the efforts of many Mexican educators, scientists, and government officials (and with international moral support), lumbering was stopped in 1984. A year later, 1,200 hectares of the cloud forest habitat of the diploperennial teosinte were bought by state funds for the Botany Institute of the Universidad de Guadalajara as a research station. Eventually,

with the help of Mexico's National Science Foundation (CONACYT), and under the United Nation's UNESCO Man in the Biosphere program, a 140,000-hectare (350,000-acre) Reserva Biosfera de la Sierra de Manantlán was dedicated in 1988 by Mexico's President Miguel de la Madrid. Administered by the Universidad de Guadalajara, the whole mountain chain with all its diverse ecosystems (home to rare mountain lions, ocelots, crested guans, hummingbirds, as well as to the teosinte and other endemic plants) has now been protected. Most significant has been the creation of the Instituto Manantlán de Ecología y Biodiversidad (IMECBIO) with a staff of 60, which, attached to the nearby Universidad de Guadalajara's Centro Universitario Costa Sur in Autlán, is devoted to the scientific study and management of its ecology and biota. It is sobering to contemplate what would have happened had agricultural development reached the habitats of *Zea diploperennis*: a few cows in a month's time could have obliterated this species and with it the possibility of mankind's ever utilizing its genetic potential.

The bioclimatic paradox

Almost without exception, economists, sociologists, scientific advisors, and humanitarians of the developed world have been misled by the overpowering luxuriance of tropical vegetation. How many times have these well-meaning "experts" announced that the problems of world hunger and excessive human population can be solved by increased agricultural production, especially in the tropics? But their deadly ignorance of ecology and geography, their unfailing optimism that the answer to the world's ills lies in growing more food and increased development—leading to a desperately hoped for but illusory "demographic transition"—have been fatal for human life and natural ecosystems, as recent famines in Africa and Asia, floods in Bangladesh, and the horrendous torching of Amazonia since 1988 have so clearly demonstrated.

Botanical reasons for tropical famines are not hard to find. As the geographer J. Chang of the University of Hawaii explained, slender, temperate annual grasses such as wheat, rye, barley, or rice have relatively low agricultural productivity in tropical latitudes compared with their high productivity in cooler temperate climates where they originally evolved. This lower productivity reflects a bioclimatic fact: during the long, warm tropical nights, respiration burns up most of the surplus carbohydrates produced by photosynthesis during the relatively short day. On the other hand, in my own state of Wisconsin (or in the wheat belts of Kansas or

Ukraine), the hot 16-hour summer days followed by cool 8-hour nights allow a much greater accumulation of storage photosynthate. Furthermore, in most parts of the lowland tropics, no matter how lush the vegetation, high rainfall interacting with high temperatures tends to leach the already nutrient-poor soils to sterile sands or stone pavements, often useless for agriculture after only three or four years of cultivation. Finally, in the tropics, there are no bitter cold winter temperatures to knock back insect pests.

Humanistic dreams of making breadbaskets out of tropical regions thus quickly evaporate into the fantasies they really are, notwithstanding optimistic editorials in prominent newspapers and lead articles by academic experts (often beholden to industrial financial support) in scientific journals. As the German playwright Bertolt Brecht wryly observed, "He who laughs has not yet heard the bad news." And Canada's Marshall McLuhan was not far behind when he quipped that "An expert is a man who doesn't make the slightest error on the road to the grand delusion"; a pernicious but grand delusion is the unlimited agricultural potential of the tropics.

Tropical forest ecosystems present a climatically determined paradox. Biologically they are super-diverse and valuable beyond belief, but agriculturally, they are usually quite poor. That the biologically depauperate states of Kansas, Iowa, or Manitoba can never become Mexicos, Panamas, or Amazonian Brazils in terms of biodiversity is obvious. At the same time, these tropical countries can never become like Kansas, Iowa, or Manitoba in agricultural productivity. But fallacies of hope die hard for nationalistic dreamers of economic glory, biotechnology investors greedy for profit, religious leaders stubbornly determined to ignore demographic realities, and humanitarian do-gooders hungry to rearrange the world. Nevertheless, we must accept these fundamental ecological realities, or the consequences, ecological and political, will be unpleasant indeed.

The problem of national parks and biosphere reserves

In the tropics, biopreservationists are thus faced with this low agricultural productivity versus high biodiversity paradox: the less-developed tropical countries blessed with Earth's richest biotas, hence with the often unwanted responsibility to maintain in national parks or biosphere reserves their great biological and ethnological wealth (not just for themselves, but for the whole world), are at the same time often much too poor to afford them. Statistics on park personnel show how

critical a problem this is. Compared to the tropical nations, the overdeveloped, industrialized countries spend ten times the money and support ten times the staff per unit area of park. And parks without biologists, armed guards, and legal protections do not long survive.

Thus, the very countries with the most biodiversity to preserve are able in their poverty to preserve very little and to scientifically study even less. It is a colossal problem in search of a solution. Yet some tropical countries have managed to make nature preservation an important part of their national economy. Tanzania's Serengeti Park, at least, is still well protected, or so we can only hope. Costa Rica and its former directors of national parks, Alvaro Ugalde and M. A. Boza, deserve special praise in this connection. Smaller than West Virginia, but with seven times the number of plant species (over 12,000!), Costa Rica has a national system of 35 well-administered parks, reserves, and *refugios* unrivaled by any other country in the Americas. Fully 13% of its total area is under national park protection, and its per capita financial commitment to parks is higher than that of the United States. In fact, including national forests, 20% of Costa Rica's lands are under some sort of conservation. Most promising are the efforts, inspired by American ecologist Daniel Janzen, to establish the Guanacaste Area de Conservación, which combines fragments of tropical rainforest and seasonally dry tropical forest with adjoining worn-out grazing lands to restore them all to their original forested state.

Other significant reserves have been established in Amazonian Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela. During the past few decades, over 12 million hectares of forest have been placed under protection, and, hopefully, many more will be protected soon by the recently conceived instrument of swapping international debt for protection of Nature. It is a grim reality, nevertheless, that many of these Amazonian preserves are nothing but "paper parks" now being invaded by squatters, lumbermen, and cattle ranchers.

By the dictates of our own biological evolution, it is our moral duty to be good ancestors to our descendants by protecting their future environment. We in the overdeveloped nations must learn, as an integral part of any "good neighbor" foreign policy, to approach the problem of tropical biotic extinctions seriously and responsibly. Ecologically enlightened U.S. foreign aid would give priority to the purchase of wild lands, and subsidize the staffing and upkeep of local nature preserves and the building of local museums of natural history throughout the tropics. Such aid would help train

local biological (not just agricultural) expertise by providing fellowships for their teachers of biology to our universities, or ours to theirs; by translating scientific monographs, it would make the world's biological literature available in the *local* language so that, finally, local scientists themselves could become experts—and defenders—of their own biota. This calls for major international cooperation, which among biologists is already well established, for the enormous complexity of tropical ecology and systematics cannot be mastered by the scientists of any one country alone. Only through the deep appreciation of their own biological patrimony can the less-developed nations protect their biota from opportunistic technocrats bent on development, be they American, European, or Asiatic—or their own.

The population bomb: Still ticking, only faster!

As of October 2000, the world population registered 6,100 million (6.1 billion) individuals of *Homo sapiens*, double what it was in 1962 when I watched *Morpho* butterflies in that Edenic Peruvian valley, more than triple that of 1925, the year that I was born. In just the last 12 years some 1,000 million people have been added to the Earth's population: 85 million extra to feed each year, 1 million every 100 hours, 250,000 every 24 hours, and 12,000 or so each and every 60 minutes. This cannot, must not, continue. The United States is not exempt from this population explosion. Since the coming of age of the modern environmental movement on Earth Day 1970, we have grown from 200 to 283 million Americans (illegal immigrants not included), a massive increase of 83 million that is doubly catastrophic for biodiversity if you consider our arrogant affluence, irresponsible resource use, and wanton waste, second to none in this all-too-finite Earth. And the predictions that the United States will reach 500 million by 2100 and 1,000 million shortly thereafter, achieving by then crowding and poverty levels of today's Bangladesh or China, is not something any sane person would wish for. The idea that by then the world population would begin to "level off" at 9, 10, or 11 billion human beings is by no means certain either. If we remember now that these many millions will still need land to grow food on, clean air and water, wood and fiber, housing and energy, the future of Nature is grim indeed.

Growth of any sort, demographic or economic, means more roads and dams, more cars and concrete, more corn and cows, more erosion and floods, more garbage pits and pollution, more acid rain and greenhouse effects, more dead elephants and dolphins, more hunger and starvation, more riots

and refugees, more poverty, prisons, and torture, more war, mayhem, and disaster—and *less and less wild Nature*. It need not be so! We need to stop and reverse human population growth now.

Admitting that the overdeveloped countries must adopt more reasonable expectations for their standard of living, that tropical exploitation by their multinational banks and corporations must stop, that their massive commercial development schemes promoted in the third world are among the primary causes of deforestation, and that freedom, justice, and equality are indispensable to a well-ordered world—let all of us (liberals, humanists, socialists, communists, or conservatives) never forget that poverty, lack of education, and above all *overpopulation* in and by itself are equally responsible for biological extinction: the chop-chop of a billion axes and machetes, the cravings of a billion hungry mouths all wanting to be fed. In fact, it is a poor excuse to blame the “population bomb” solely on capitalism or imperialism or to absolve population growth of its increasingly crucial role in the world’s ecological collapse. We must mention here the now increasingly deliberate (but rarely openly expressed) encouragement of large families by leaders of specific religious, ethnic, or racial groups to gain political advantage, to outbreed and so overwhelm their adversaries. In extreme cases this has led, literally, to “Geburten Kriege,” wars of birth, so dubbed by the Nazis, even now actively encouraged by one or both parties in Ireland, Israel-Palestine, Kosovo-Serbia, Central Africa, and even in the United States—a policy with terrifying implications for both people and the environment. There is no light at the end of that dark tunnel. As necessary as political struggles against the injustices of oppressive social and economic systems are, they must always go hand in hand with actions to correct the grave and ever-increasing imbalance between human populations and the natural world. Encouraging population growth, for whatever reason, is the worst way to go.

Thus, although the poverty-stricken people of the world must have food and firewood, they need birth control even more. By now, any knowledgeable observer of the global scene must come to the conclusion that, as the first Green Revolution so clearly yet dismally demonstrated, and the siren song of the new biotechnology and the second Green Revolution notwithstanding, *the food versus population race will never be won by growing more food*, but only by decreasing the world’s population, preferably through education and persuasion, especially of women, and always with the ready avail-

ability of every form of contraception. Let us be clear: to effectively facilitate a modification of our ancient, instinctive breeding behavior, to bring it into line with ecological realities, some forms of birth control must be made available to all men and women. And, here also, the rich developed nations, and modern science, have a vital responsibility. Lastly, let us no more than mention that most contentious issue, abortion, which would largely disappear if contraception were widely available. With its worldwide incidence of over 50 million per year, one can see that this question has enormous demographic implications.

Preventing famine and disease are noble goals. Ending injustice and poverty are noble goals. But none of these will induce an elusive “demographic transition” to lowered birthrates in time to prevent widespread biological collapse, a collapse that would not only intensify human miseries but would further intensify the destruction of Nature. We simply cannot allow the natural environment (which, after all, is the only environment humanity is adapted to) to deteriorate any further. In addition, none of these noble goals will be accomplished by furthering the immaculate misconception that raising more food by cutting down more tropical forests, draining more tropical wetlands, or breeding more bountiful crops will solve the demographic dilemma. We are running out of wild Nature, space, and water, as we are running out of nonrenewable resources. Meanwhile, the population bomb keeps on ticking, faster and faster. It needs to be defused, now.

The answer to the demographic dilemma is clear enough: we must abandon the fallacies of agricultural hope, for it is not a question of raising more food, but of raising fewer people. If population growth is not curtailed voluntarily, the dictatorial powers of the state (as by sheer necessity in China) or the brutal catastrophes of Nature (as in Africa’s Sahel and Sudan) will surely do it for us.

Only an ecologically responsible human society, living within limits and sternly self-restrained in both resource use and human reproduction, can give this spaceship world of ours any realistic hope of bequeathing to our children a beautiful, livable, and biologically diverse Earth. ☾

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An Ecology of Bad Ideas

Recommended reading on cyborgs, bionic kangaroos, and other scary possibilities

by Bill McCormick

JUST OUT OF CURIOSITY I checked the library the other day to see how many books I could find starting with some version of the word “transgressing.” I found 14. Next I found a dozen with the title *Crossing Boundaries*. Then, an astonishing 35 with the word “borderlands,” most of them published within the last 15 years.

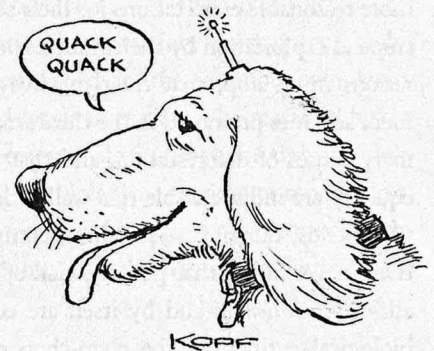
It is clear that this notion of “transgressing boundaries” has become *de rigueur* within postmodern academia. Trundling along beside it comes its ancillary theories—the much ballyhooed “reinvention of Nature,” and the notion that humans, animals, and natural systems ought to be grateful for the opportunity to merge with the machine and become “cyborgs.”¹

University of California–Santa Cruz professor Donna Haraway has been instrumental in spreading these ideas well beyond the cultural studies field, and has even been successful in getting environmental philosophers like William Cronon² and ecocriticism mavens like Harold Fromm to endorse this platform. In a 1998 *Hudson Review* article, Fromm imagines himself as a sort of anti–John Muir, bravely sallying forth in his auto, and having an “epiphany” where he realizes that “‘Nature,’ like everything else...is the technological production of our bodies and minds....” He becomes positively maudlin, breaking into tears, and “like Molly Bloom saying ‘Yes’ I experienced a powerful moment of assent to a newfound identity....I was indeed, after all...a cyborg!”³

Typically, this whole matter of crossing boundaries is approached in such a manner as to make it sound fun, cool, sexy, and a matter of expanding choice. Who could be against all that? Only a few puritanical aardvarks, surely. The very notion that boundaries, limitation, or restraint serve any useful purpose in Nature or culture is quickly hooted off the stage. In fact, we’ve grown increasingly accustomed to conferences on technology being dominated by the sort of person who broke out cheering when IBM’s Deep Blue supercomputer beat world chess champion Gary Kasparov, or thought HAL was the good guy in the book and movie 2001. I recall one cybergrandee who could barely contain his glee when he dramatically announced that “the most sexy woman on TV now is a Borg!”⁴

Grant nature a restraining order

Jhan Hochman, author of *Green Cultural Studies*, is one writer in the field who is not afraid to take on postmodern “heavy hitters” like Jacques Derrida and Haraway and show just how little substance there is to their theories. After analyzing Haraway’s celebration of the “joyful breach in the boundary” between Nature and the machine, Hochman wonders, “since animals have for so long been at the receiving end of contraptions and machines,” why “*would* an animal want anything to do with machinery?”⁵



He suggests that a “restraining order” for Nature from technology’s constant battering is really what’s needed, and concludes that

Green cultural studies and human culture would do well to ensure that plants and animals are granted separateness, independence, and liberation...before mucking about too much with forced fusions and coalescences. Otherwise, it is nature who/that will suffer most by this shotgun marriage with culture(s) made monstrous by thousands of years of naturalized atrocities against plants, animals, and elements.⁶

Bio-machines

One of the most notable arenas in which such forced fusions are taking place is that of biotechnology. Helena Norberg-Hodge notes, correctly I think, that “at most universities, whether in Stockholm or Berkeley, biologists are increasingly being turned into biotechnologists.”⁷

The rush to reengineer life is so frenzied that even some technologists are worried. Sun Microsystems co-founder and chief scientist Bill Joy caused quite a stir with his

Oppenheimeresque warning in *Wired* magazine that breakaway sciences like biotechnology, nanotechnology, and robotics pose a grave threat to life on the planet.⁸ In a 2000 article, Rocky Mountain Institute's Amory Lovins seconds these concerns, and writes specifically of biotechnology:

It speeds up evolution by roughly a billionfold, from a measured pace in which innovations are rigorously pretested over eons...to the frenetic pace of next quarter's earnings report....Then, since the products have a life of their own and are deliberately broadcast through the environment, mistakes can quickly escape and multiply.

He continues that "it was not from ignorance or superstition but out of deep biological wisdom...that the Creator failed to put fish genes into strawberries. Biodiversity is already perfectly adequate without our needing to create novel lifeforms." And concludes that "it will be a pleasant surprise if no designer epidemics are unleashed on the world, accidentally or deliberately."⁹

The wisdom of repugnance

The eco-philosopher Mary Midgley has written an astute essay entitled "Biotechnology and Monstrosity: Why We Should Pay Attention to the Yuk Factor." In it she addresses the growing postmodern preconception that the future belongs—in Haraway's words—to "promising monsters, vampires, surrogates, living tools and aliens."¹⁰

Midgley notes the arguments against "the wisdom of repugnance," and counters that "the sense of disgust and outrage" over fish genes in strawberries is "by no mean a sign of

irrationality. Feeling is an essential part of our moral life....Heart and minds are not enemies or alternate tools. They are complementary aspects of a single process." She expresses dismay with the notion that organisms are "cogs and sprockets" that can "be moved from one machine to another," and the penchant of bio-engineers to "look for biochemical solutions to complex problems" that are not reducible to mechanical solutions.¹¹

A carnival of choices?

One of the most common arguments deployed by acolytes of recreating Nature is that subverting the boundaries between humans, machines, and animals will dramatically increase the range of "choice" for all concerned. Want to become a genetically enhanced warrior woman, or a bionic kangaroo? No problem. And who, left, right, or center, would be against increased freedom of choice?

On closer scrutiny, however, this argument has all the trappings of what Kierkegaard called "the perilous delights of swimming in shallow waters." What sort of "choice" is it if we effectively have *no choice* but to be dragged into this bedazzling future, like it or not? And what of what Gary Snyder calls "the most ruthlessly exploited classes: animals, trees, water, air, grasses"¹² At this question, the machine pitchmen often drop their normally festive tone, and get downright nasty.

In *The Cyborg Citizen*, Chris Hables Gray takes pains to tell us that "we cannot stop the cyborg carnival." And consider this elegant summation. The proliferation of "posthuman possibilities is our only

choice besides a turn to the past that, since it would be in the context of postmodern technoscience, would make the Holocaust and the Gulag look like rehearsals."¹³ So it all comes down to that old chestnut again: If you don't agree with us, you're probably as bad as the National Socialists and the Stalinists combined. I personally like Ezra Mishan's riposte on this issue: "As the carpet of 'increasing choice' is being unrolled before us by the foot, it is simultaneously being rolled up behind us by the yard."¹⁴

Recommendations

What sort of positive recommendations can one make in the face of this explosion of contrived rebelliousness, semantic deadfall, and pernicious nonsense (other than to throw one's hands up, and say with Tennessee Williams, "File this crap under crap")?

On the literary front, I'd first recommend a reading of Wendell Berry's *Life Is a Miracle*. As he puts it, "we should banish from our speech and writing any use of the word 'machine' as an explanation or definition of anything that is not a machine." He reminds us that life is a mystery. "We live in a world famous for its ability both to surprise and to deceive us. We are prone to err, ignorantly or foolishly, or intentionally or maliciously."¹⁵

Secondly, we should pay attention to ecologist Michael Soule's warning that "a level playing field is one thing; but a playing field without rules and referees is a free-for-all where bullies win."¹⁶ This is not all just somebody's clever joke, a prank, or a "carnival," it is a serious matter with serious consequences for creatures human and wild.

Many people have seen the

1980s movie *Blade Runner*, but hardly anyone, it seems, has read the far superior 1968 book it was based on, Philip Dick's *Do Androids Dream of Electric Sheep?*¹⁷ In it people live in a post-apocalyptic future where Nature has virtually ceased to exist, and clever imitations of animals supplant the real thing. People become obsessed with the thought of having a real animal, and will pay almost any price for one. At one point a character becomes ecstatic when he thinks he's found an extinct toad in the desert, but is eventually crushed when he finds out that it also is a replicant. The assumption underlying the entire book is that *everyone* knows on a common-sense level that "reinvented Nature" is a sorry and blight-

ed substitute for the real thing.

In concluding these sketchy thoughts on some sketchy ideas, I should note that my title is taken from Gregory Bateson, who suggests that there is "an ecology of bad ideas" that "branches out like a rooted parasite through the tissue of life, and everything gets into a rather peculiar mess."¹⁸ His book, *Steps to an Ecology of Mind*, would be good for the post-humanist, ex-environmentalist, pro-mechanist to read with care. ☾

Over the years, we've had news of the peripatetic Bill McCormick in Virginia and Salt Lake City, riding his bike in Area 51, and, most recently, volunteering as a scullery maid at Iona Abbey off the west coast of Scotland, from whence his family hails.

NOTES

1. For a critique of this trend see George Sessions, 1996, *Reinventing Nature? The End of Wilderness?* *Wild Earth* 6(4): 51.
2. William Cronon, ed., 1995, *Uncommon Ground: Toward Reinventing Nature* (New York: W.W. Norton & Co.). Cronon's introduction to this appalling book is a case study in how *not* to engage in critical thinking.
3. Harold Fromm, 1998, *Ecology and Ecstasy on Interstate 80*, *Hudson Review* (spring): 75, 77. An expert on cult conversion could find much of interest in this article.
4. Actress Jeri Ryan now plays a schoolteacher on *Boston Public*, and the final episode of *Star Trek Voyager*, which features a face-off between Captain Janeway and the "Borg Queen," makes it crystal clear who the good guys are.
5. Jhan Hochman, 1998, *Green Cultural Studies* (Moscow: University of Idaho), 174.
6. Jhan Hochman, 2000, *Green Cultural Studies*, in Laurence Coupe, ed. *Green Studies Reader* (London: Routledge), 192.
7. Helena Norberg-Hodge, 1997, in Stephanie Mills, *Turning Away From Technology* (San Francisco: Sierra Club), 4.
8. Bill Joy, 2000, *Why the Future Doesn't Need Us*, *Wired* (April). For an excellent discussion of these issues, see Zac Goldsmith, 2000, *Discomfort and Joy*, *The Ecologist* (October).
9. Amory Lovins, 2000, *When Descartes Meets Darwin*, *New Perspectives Quarterly* (summer): 10-12.
10. Donna Haraway, 1997, *Modest Witness@Second Millennium* (New York: Routledge), 52. The fact that such ill-considered categories are thrown around so artlessly by the cyborgians seems further evidence of their ability to throw dust in their own eyes. Would any one of them actually want to become a "living tool"? And what of the socio-political ramifications of a creature that sucks the blood of its fellows, pray tell?
11. Mary Midgley, 2000, *Biotechnology and Monstrosity: Why We Should Pay Attention to the Yuk Factor*, *Hastings Center Report* (September/October): 9, 12. Leon Kass, 1998, *The Wisdom of Repugnance*, in Leon Kass and James Q. Wilson, *The Ethics of Human Cloning* (Washington, D.C.: AEI Press).
12. Gary Snyder, 1999, *The Gary Snyder Reader* (Washington, D.C.: Counterpoint), 457.
13. Chris Hables Gray, 2001, *The Cyborg Citizen: Politics of the Post-Human Age* (New York: Routledge), 196, 201.
14. Ezra Mishan, 1978, *Let the Men and Women of Wisdom Speak*, *Mother Earth News* (May/June): 6.
15. Wendell Berry, 2000, *Life Is a Miracle* (Washington, D.C.: Counterpoint), 135.
16. Michael Soulé, 1995, *The Social Siege of Nature*, in *Reinventing Nature? Responses to Postmodern Deconstruction* (Washington, D.C.: Island Press), 150. After a brief and disastrous stint as a substitute teacher, I can testify to the veracity of this argument.
17. Philip K. Dick, 1990, *Do Androids Dream of Electric Sheep?* (New York: Ballantine).
18. Gregory Bateson, 1980, *Steps to an Ecology of Mind* (New York: Ballantine), 484.

This Sovereign Land

A New Vision for Governing the West

by Daniel Kemmis

Island Press, 2001

285 pages, \$22.95

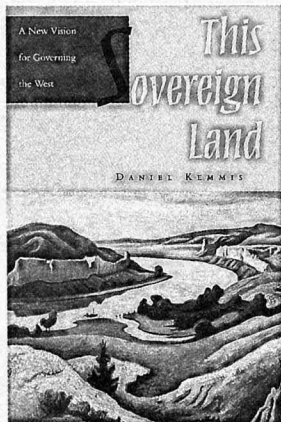
FEDERAL PUBLIC LANDS should be transferred to the control of the western states, Daniel Kemmis argues in *This Sovereign Land: A New Vision for Governing the West*. Sounds familiar, right? But Kemmis is no free marketeer, sagebrush rebel, or wise-use lackey—he's a well-respected western Democrat, the former mayor of Missoula, and past speaker of the Montana House of Representatives. Kemmis believes that the West has matured politically and that the success of collaborative and consensus processes throughout the region points the way to a new regime of public lands management, one in which the people of the West have sovereignty over their own lands. Such a new approach, he suggests, is the only way to achieve ecologically sustainable management over the long haul on these lands. Although certain parts of his thesis are attractive, on the whole the book is entirely unconvincing.

There are three major problems with *This Sovereign Land*: Kemmis's treatment of western history, his discussion of collaborative processes, and the haziness of his outline for how such a transfer of sovereignty would work. Kemmis writes of the imperial empire in the West, an empire in which the western landscape is under the control of the federal government in far-away Washington. This was and is hardly the case. In empires, the ruling subjects have little or no say over how they are

treated. Empire ends with statehood—since western states were created, the West has had political representation and power through Congress; indeed it has disproportionate power in the Senate. Furthermore, through much of the twentieth century it was the West that was in charge of this empire.

BLM lands were dominated by grazing permittee “advisory boards”; wilderness designations in a state (with the exception of Alaska) were made only with the support of the state’s congressional delegation; all secretaries of the interior since 1975 came from the West; and as late as 1958 every member of the Senate Interior Committee came from west of the Rockies. What has changed since the 1960s is that the nation at large has taken a greater interest in how these federal public lands are managed, and this has led to controversy as the West has lost control over *its* empire.

Kemmis’s discussion of collaborative processes is also problematic. He repeatedly states that such processes are fundamentally democratic. It is unclear to me how these efforts are democratic when the representatives of many stakeholder groups are not elected, nor selected by lot, nor determined in any democratic way. In some settings, groups that have what are considered “extreme” views are excluded from the process. For instance, what role do organizations like the Alliance for the Wild Rockies or the Center for Biological Diversity—aggressive conservation advocates based in the West—play in this process? If they are excluded from the outset, how is that



democratic? Kemmis properly criticizes the Forest Service and other public lands agencies for their increasing discussion of “publics” rather than the public. Yet in what way is the collaborative “stakeholder” approach much

different? Finally, it strikes me as obvious that collaborative approaches cannot solve all—or perhaps even most—land-use problems. Where should the messy politics take place? Who will have final authority?

Finally, Kemmis devotes far too little attention to the difficult problems in his sketch of what western sovereignty would look like. Would the West pick up all funding related to public lands—fighting fires, cleaning up mines, and providing subsidies for logging, mining, grazing, and water developments? I hope he isn’t advocating more “Get out and give us more money,” another version of taxation without representation. What would land management look like in the most urbanized part of the country? Would urban westerners be involved in making decisions? Kemmis talks of bioregions and watershed councils as key institutions. Does this mean those living outside a given watershed will not have a significant voice deciding its future? For instance, Denver would have no say on water management on the West Slope?

There are, I think, many reasons for the problems in public lands management today. At the top of my list is the failure of the resource management professions and agencies to keep up with the changing desires of the

American people as well as the inherent problems of shifting paradigms—from resource extraction to conservation. In the end, I am sympathetic to both bioregionalism and increasing local sovereignty. But if this is to happen, I want it to happen across the board, not just for the West and not just for public lands. The federal public lands are one of the greatest achievements of our nation. As a citizen, having the ability to debate and influence their management is one of the last things I would be willing to surrender. ☾

Reviewed by **Chris McGroary Klyza**, professor of political science and environmental studies at Middlebury College and author of *Who Controls Public Lands?*

Selling Social Change (Without Selling Out)

Earned Income Strategies for Nonprofits

by *Andy Robinson*
Jossey-Bass, 2002
 229 pages, \$25.95

ANDY ROBINSON is a heretic, some would argue. In *Selling Social Change (Without Selling Out)* Robinson claims that enterprising nonprofits can and should use business ventures to generate revenues to support their mission-based activities. Rather than a compromise and a capitulation to the forces of capitalism, profitable business activity is, he suggests, a tool for creating stronger and more effective mission-based nonprofits—even organizations that are actively anti-capitalist. And he’s right.

“Commerce, not capitalism” is

Robinson's way of differentiating constructive social enterprise from the rapacious, resource-intensive despoiling of human and natural communities that passes for modern industrial capitalism in many parts of the world. Commercial activity can be a highly successful approach for some organiza-

tions to develop new resources to serve their constituencies and meet their goals. As the preface notes, "this book is really about power." *Selling Social Change* provides the interested organization with a logical introduction to the process and the

issues to consider when exploring the use of business to gain the economic power needed to meet their mission objectives. Robinson takes care to describe his heritage as a fundraiser for conservation and other socially progressive organizations as the motivation for this kind of inquiry. Funding for many grassroots organizations is limited at best, and in many cases shrinking—necessity, he argues, breeds invention. He draws on the work of other widely respected thinkers in the social enterprise community to show that this idea is not exclusively his, or for that matter, all that new. More importantly, he presents the actual experiences of nonprofit organizations to show that lucrative enterprise is possible and that it can be done without losing sight of a group's underlying goals.

The farm started by the Food Bank of Western Massachusetts is an excellent example. Initially conceived as a way to provide desperately needed fresh produce to food banks across the

state, the Food Bank Farm is now a thriving Community Supported Agriculture project that produces 300,000 pounds of high quality vegetables per year. Half the harvest helps feed needy neighbors, and half is split between the 525 shareholders. Annual shareholder fees total \$220,000 and

cover the costs of operating the farm. As Executive Director David Sharken notes, "our profit is our vegetables." Incidental sales of eggs, maple syrup, and other local products add to the financial return.

Robinson has made wise choices in putting

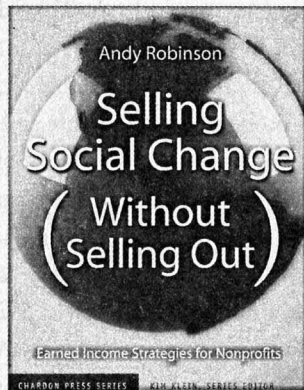
together this work. Each chapter addresses a step in the process of evaluating the appropriateness of social enterprise. Early in the book, he focuses on the "why," taking pains to explain each concept and articulate its advantages and disadvantages. Later chapters flow from the process of imagining opportunities, to developing a business plan, to finding start-up capital for the venture. Only at the end does he consider topics such as potential tax implications for nonprofits and managing growth. Throughout, the carefully chosen case studies and examples of successful ventures illustrate his message, offer credibility, and vary the tone of what is designed to be a practical, hands-on workbook. Each such case study ends with a series of take-away lessons to highlight questions and recommendations that are relevant to the issues discussed in each chapter.

A word of caution: this is an eminently readable guide for an exceedingly difficult task. The compelling stories

of others who have succeeded may mask a reality behind the easy worksheets—*profitable social enterprise is hard to do*. It requires a change of mindset, from a program-oriented perspective to one that focuses on the reality of cash flows, market desires, and value. Robinson walks a fine line between promoting the potential of social enterprise and acknowledging the many challenges of the marketplace. The biggest weakness of his approach is that in order to be accessible and interesting for all, Robinson addresses more of the principle and less of the detail. For those who actually decide to go for it, the book may not offer enough specific guidance. *Selling Social Change* feels a little like a National Park Service map—it's good enough to give you a sense for where the trail goes and get you excited to climb the mountain, but not quite specific enough to help you if you get lost.

Overall, Robinson succeeds. The greatest strength of this handy workbook is that it can help most nonprofit organizations make informed decisions about whether launching a business venture will be a wise choice. For many nonprofits it won't be; but for some nonprofits, social enterprise is, as one of Robinson's case studies notes, "our answer to the question, 'How do you level the playing field in a capitalist society?'" *Selling Social Change* will help these organizations get started in the right direction. ☺

Reviewed by Ed Barker (ebarker@communitywealth.com), a senior consultant for Community Wealth Ventures, a social enterprise consulting firm in Washington, D.C., and a board member of the Maine Lakes Conservancy Institute.



► A WILDERNESS VIEW, FROM PAGE 7

opposite conclusions. He was speaking, correctly I think, of the need for affluent North Americans to recognize their impacts on global ecosystems, and recognize the plight of people around the world who live in crushing poverty. He was appealing to the best instincts in human nature—that we should care about each other. And his sphere of ethical concern, at least rhetorically, even extended to the tropical natural communities that he alleged would be abused if we don't log public lands at home.

How can we walk the same path for so long to end up gazing upon such different terrain? Perhaps because when the path in the wood diverges, the forester, like most people, views the trees ahead primarily through the lens of human desire for comfort and profit. If the needs of humanity and Nature are seen as fundamentally competitive, or if we believe the natural world is simply a grand supermarket of resources and not a community to which we belong, then any self-willed land is an affront: "Not one acre." To be sure, in the frontier areas of the globe that Mike Fay describes in this issue the subsistence needs of impoverished people do directly compete with biodiversity protection. But in the long term, achieving cultural and ecological sustainability depends on seeing the vital needs of human beings as inseparable from the needs of the land.

If the ecological crisis is at root a crisis of culture, and if there is, as Paul Hawken says, "no boundary that can save Nature from a suffering humanity," then shouldn't wilderness activists put aside their current campaigns to focus on social justice and cultural

reform? No, they should not. First of all, eschewing tenacious defense of wilderness and wildlife to focus on cultural transformation would be strategically unwise, akin to basing one's household spending decisions on the belief that one will win next week's lottery. It may happen, but don't bank on it. Second, people are predisposed to care about other people; the vast majority of charitable giving and volunteerism is directed toward social causes, with a relatively few activists working on behalf of bears and beetles. Third, without wilderness, the nation's

► LETTERS, FROM PAGE 5

it's too easy to take current ecological conditions (or conditions on October 9, 1492, for that matter) as something more than a way station on a long, long journey. If more people realized there were giant freshwater lakes in the Mojave Desert 10,000 years ago, how much harder would it be for Bush to push a nuclear waste dump 300 feet above a current aquifer?

Yours for the restoration of Nothrotherium to the San Gabriel Mountains,

Chris Clarke

San Francisco, California

Chris Clarke edits *Earth Island Journal* and *Faultline*, an online environmental magazine (www.faultline.org).

DUE TO A DEMANDING writing project (and kids!), I haven't had much time for pleasure reading, but I did

natural heritage will continue to suffer losses, leaving a future America bereft of wild possibility. Finally, without natural habitats for people to enjoy, without wild places everywhere accessible for children to explore, we become ever more removed from the living context that made us human. In a fully domesticated, digitized world, the kind of societal transformation conservationists seek—to build a culture that honors and is infused by wild Nature—will be impossible. It will not even be thought of—and that, I daresay, would be evil.

~ Tom Butler

just dig into the summer issue of *Wild Earth*, and I'm compelled to write to congratulate. *Quite fine!* Maybe it appeals because it resonates with many of my cherished ideas, which I have not articulated; I didn't even know they had been by others.

Bernd Heinrich

Burlington, Vermont

Biologist Bernd Heinrich's recent books include *Why We Run* and *Mind of the Raven*.

WILD EARTH IS ALWAYS enlightening but this issue blew me away. Thank you. You brought together so many things I have been wrestling with myself.

Leslie Sauer

Sergeantsville, New Jersey

Landscape architect Leslie Sauer is the author of *The Once and Future Forest*.

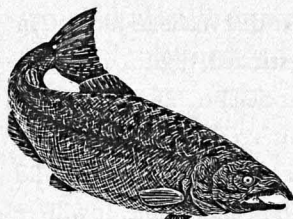


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[ARTISTS THIS ISSUE]

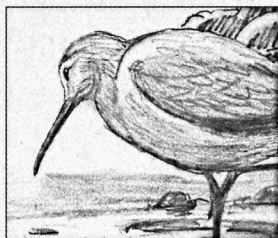
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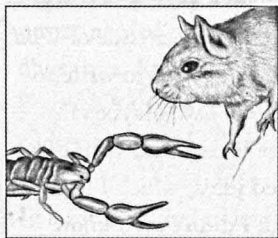
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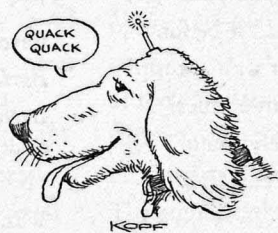


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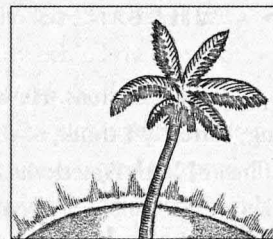
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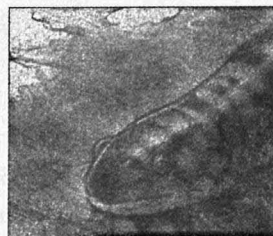


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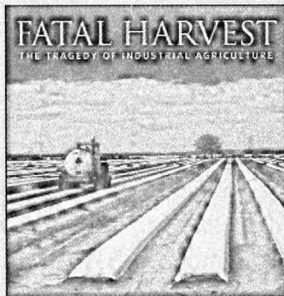
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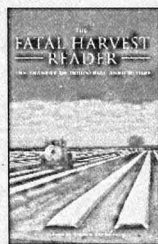
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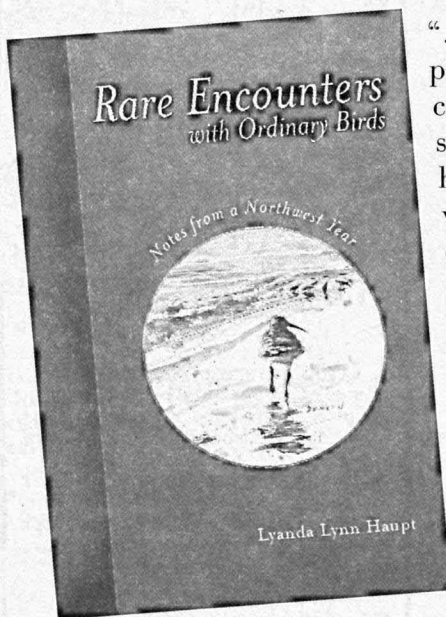
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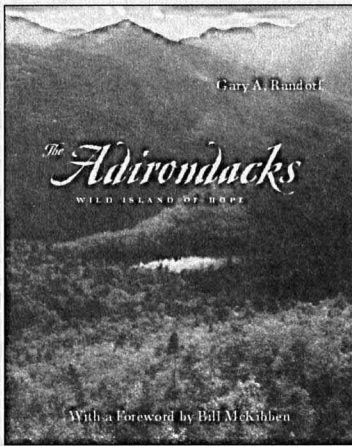
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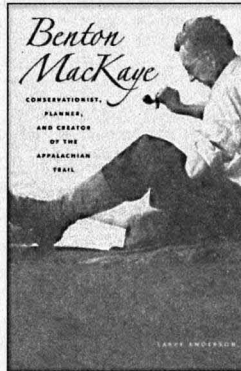
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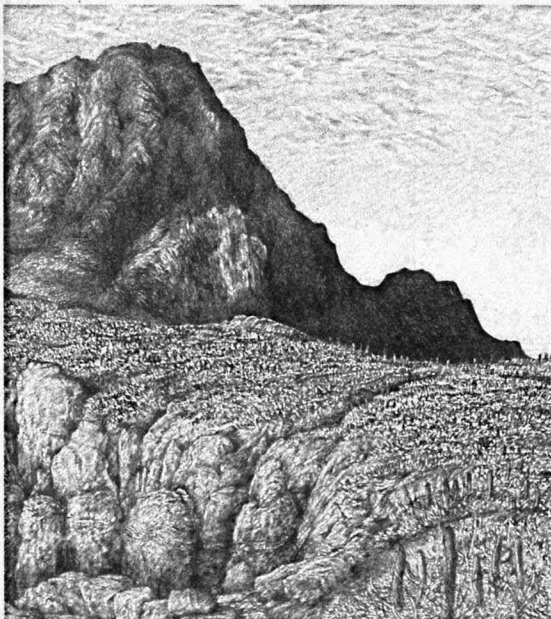


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Twenty-nine back issues are available, beginning with our spring 1991 edition. For a more complete listing, visit www.wildlandsproject.org. Order online or use the reply form insert in this issue. See form for additional publications.

Spring 2001 • Wild, Wild East Dave Foreman on Pristine Myths, An Eastern Turn for Wilderness, Eastern Wilderness Areas Act legislative history, Doug Scott reviews Congress's criteria for wilderness, David Foster interview, biotic homogenization in the Northwoods, eastern cougar recovery, David Carroll on turtles and trout, Tom Wessels on beaver recovery, lichens and ancient forests, biodiversity on the Appalachian Trail, wildlands philanthropy in Maine

Summer 2001 • Dave Foreman on cornucopianism, Tom Butler on Smart Growth and Sapsuckers, David Olson calls for conservationists to speak with one voice, Long-Nosed Bats and White-Winged Doves, saving the sagebrush sea, Lyanda Haupt delights in the Winter Wren, Cascades Conservation Partnership, battling invasive fungi and insects, genetically engineered trees, Farming with the Wild, Eco-Labeling, wilderness restoration forum, U.S. population stabilization

Fall/Winter 2001-2002 (combined issue) • **Citizen Science** Thomas Fleischner on natural history, Reed Noss considers whether citizen scientists are amateur naturalists, Rick Bonney suggests citizens collecting data help science, profiles of projects that monitor birds, mammals, fish, butterflies and more; Foreman on Early Awareness of Extinction, Biological Crusts, Sonoran Jaguars, Restoring Scotland's Caledonian Forest, Doug Scott examines words of the Wilderness Act, a lament for Florida, Pedaling Conservation Biology Across America, Saving School Trust Lands

Spring 2002 • Extinction or Recovery? Causes and Processes of Extinction by Dave Foreman, A Fleet of Arks by Scott Russell Sanders, Quantifying the Biodiversity Crisis, Learning from the Rocky Mountain Locust, Passenger Pigeon Lice Rediscovered, Wolves & the Ecological Recovery of Yellowstone, Canebrakes, Threats to the Black-Tailed Prairie Dog and A Plan for Conservation, California Condors in Arizona, Moral Meaning of & Today's Fight for the Endangered Species Act, Wildlife Amendment Protects Private Lands

Summer 2002 • Deep Time Dave Foreman on Paul Shepard, John McPhee helps us find our bearings, Evolution's Second Chance by David Burney et al., Connie Barlow says goodbye to the eternal frontier, Reuniting Pangaea by Yvonne Baskin, Jeff Bickart on Reclamation, Paul Shepard essay; Theodore Roszak on ecopsychology, Terrence Frest on native snails, Kathleen Dean Moore essay, Dean Bennett tells the story of Maine's Allagash Wilderness Waterway, a proposal for Pennsylvania's Allegheny National Forest, forum on federal recreation fees

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[ANNOUNCEMENTS]

PUBLICATIONS

Carnivore Conservation Document The Predator Conservation Alliance has released "Keeping the Wild in the West: A Multi-Species Carnivore Conservation Initiative for the American West." This 28-page report describes the ecology, current and historical habitat, threats, and best management practices for five imperiled forest carnivores: grizzly bears, wolverine, fisher, lynx, and wolf. Download the report at www.predatorconservation.org or call 406-587-3389 to request a copy.

Bird Count "American Birds," a new publication of the National Audubon Society, summarizes the data from the 102nd annual Christmas Bird Count. Several essays analyze population and distribution trends; regional summaries of species observations are also presented. All the CBC data are available at www.audubon.org/bird/cbc.

Colorado Plateau Assessment "Safeguarding the Uniqueness of the Colorado Plateau: An Ecoregional Assessment of Biocultural Diversity" synthesizes a wide range of data on the natural and cultural makeup of the plateau's half-million square kilometers and analyzes the area's hydrological, biological, and ethnolinguistic attributes. For a copy of the report, contact Naima Taylor at 928-523-0664.

Trout Report and Poster A report released by the Western Native Trout Campaign documents the highly imperiled status of western trout and the importance of roadless areas to their survival. Download at www.westerntrout.org. Also available is "Native Trout of the West: Protecting a Unique Natural Legacy," a 23" x 36" full-color poster. Joseph Tomelleri's illustrations highlight the distribution of western native trout species, threats to their survival, and maps of historical distributions. Available for cost of shipping at www.endangeredearth.org/store/index.htm.

Timber Theft Guide *Field Guide to Timber Theft: Understanding Timber Sales, the Contract & the Law* was developed specifically for forest activists by several former members of the Forest Service's Timber Theft Investigative Branch. The guide is useful in understanding timber sales on public and private lands and includes tips for using confidential information received by whistleblowers or informants. Download the 32-page report as an Adobe Acrobat file at www.whistleblower.org.

GATHERINGS

Carnivores 2002 Defenders of Wildlife presents "From the Mountains to the Sea: A Conference on Carnivore Biology and Conservation," November 17-20, DoubleTree Hotel, Monterey, California. Workshops and presentations address both marine and terrestrial carnivores. For more information, visit www.defenders.org/carnivores2002 or call 202-682-9400 x315.

Environment Conference The 9th Annual Public Interest Environmental Conference, "Florida's Final Frontiers: Saving What's Left," will be held February 27-March 1, 2003, at the University of Florida in Gainesville. This student-run conference brings together panels addressing a range of environmental issues. Among the panelists will be some of Florida's top environmental lawyers and scholars. Visit <http://grove.ufl.edu/~els> or call 352-392-2237 for more information.

Fish and Wildlife Conference The 59th Annual Northeast Fish and Wildlife Conference will be held April 13-16, 2003, Newport Marriott Hotel, Newport, Rhode Island. A call for presentations is open until November 29. Visit <http://northeastconference.fws.gov> for more information.



Catching On Down Under

IMAGINE 53,000 square miles of eucalyptus woodlands, rainforest, scrubland, grasslands, coastal and freshwater wetlands, and several vital marine ecosystems.

Now imagine a landmark agreement to protect this treasured landscape signed by indigenous groups, conservationists, state and local governments, and the cattle industry. The agreement creates a framework for the successful resolution of indigenous land claims, supports a region-wide World Heritage assessment, facilitates the purchase of cattle ranches of outstanding biological and cultural significance, and protects vast areas of wilderness, which will become the building blocks of a wildlands network for the region.

You can stop imagining, because such an agreement has already been signed in Australia, thanks in large measure to the efforts of the Wilderness Society (Australia), the Australian Conservation Foundation, and the Cairns & Far North Environment Centre. For the past decade, the Wilderness Society has been working in the Cape York Peninsula of northeastern Australia to ensure that this special place is protected. Already conservationists have secured permanent protection for over 1.2 million acres in the Cape (3.5% of the 53,000 square miles), and are working closely with aboriginal groups, private landowners,

and government agencies to protect additional lands. In the years ahead, the Australian Wilderness Society plans to build upon its success in Cape York to develop a continental network of core wilderness areas connected by wildlife linkages, and surrounded by regions of compatible human use.

Sound familiar? It should, because the Aussies are using the Wildlands Project's model to develop a system of interconnected wildlands for the entire Australian continent. Over the next several years, the Society's WildCountry program plans to develop a science-based blueprint for a continent-wide system of protected areas, protect an additional 3.6 million acres of land in Cape York, and develop wildlands network designs for at least three additional ecoregions of Australia.

To help move this agenda forward, the Wildlands Project signed a formal agreement with the Wilderness Society (Australia) this spring to assist them with their scientific methodology, campaign strategy, and fundraising programs. Wildlands Project board member Michael Soulé will co-chair the WildCountry program's Scientific Council. And this winter, we will be meeting with Australian Wilderness Society leaders here in the United States to further review their science programs and help them with U.S.-based fundraising efforts.

In many respects, Australia is an ideal candidate for large-scale wildlands conservation. The country is affluent and its people are conservation-minded. It possesses more endemic species than any other country on the planet. It has almost two million fewer human inhabitants than the state of Texas, yet its total land mass is nine-tenths the size of the continental United States.

Nevertheless, native biodiversity there faces serious threats. According to the International Union for the Conservation of Nature, Australia ranks fifth in the world in total number of threatened species. Since the arrival of British settlers in the eighteenth century, more than 150 species are known to have become extinct. And, unlike Australian icons such as the koala and kangaroo, most of Australia's endangered species are ants, reptiles, lichens, and fungi, hardly the kind of cuddly creatures capable of generating significant public sympathy.

Thus we face obstacles and opportunity, and we are very optimistic about our partnership with the Wilderness Society and the potential for wildlands conservation in Australia. Given the many historical and cultural similarities between the two continents, we are certain that our partnership will be a tremendous learning experience for both organizations.

~ Leanne Klyza Linck

To learn more about the Wilderness Society (Australia), visit www.wilderness.org.au.

Species Spotlight

Southern Grasshopper Mouse

KINGDOM Animalia
PHYLUM Chordata
CLASS Mammalia
ORDER Rodentia
FAMILY Muridae
GENUS Onychomys
SPECIES torridus

A Wolf in Mouse Clothing?

illustration by Rachel Ivanyi

A WOLF, SHRUNKEN TO Lilliputian proportions, might find itself at home in the company of southern grasshopper mice.

These predatory rodents form family packs, maintaining territorial scent posts as they search for prey.

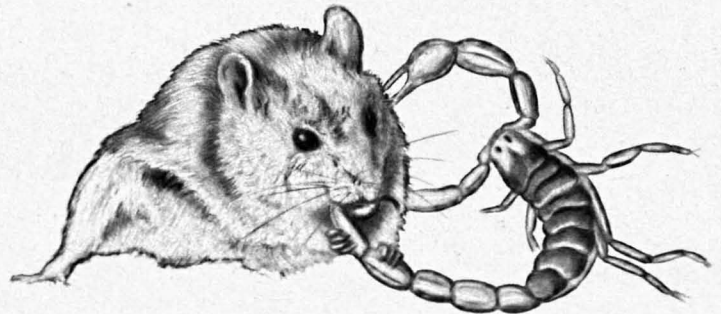
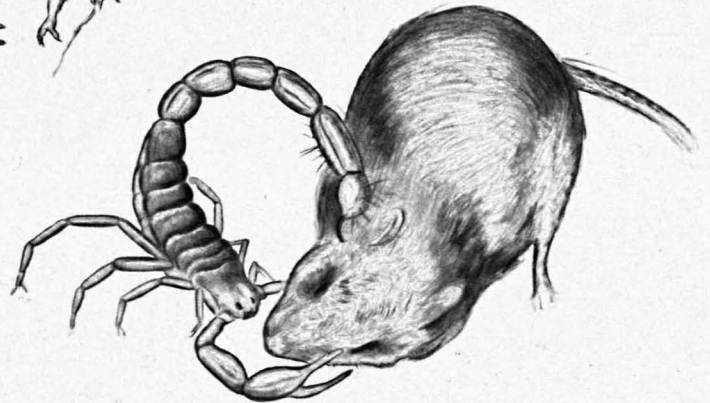
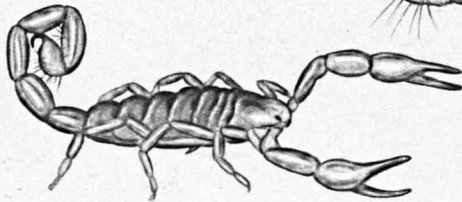
Grasshopper mice even howl like wolves, standing on hind legs, heads thrown back. Their ghostly, prolonged squeal wavers over southwestern desert scrub, often just before a kill, perhaps conveying information to other family members, perhaps in spontaneous delight.

Parents teach young how to hunt, sometimes stalking pocket and harvest mice—and then dispatching them with a swift bite to the neck. Coming across the outlandish clown beetle—standing on its head prepared to blast a foul liquid from repugnatorial glands—the southern grasshopper mouse is unfazed. In a quick snap of paws, it shoves the toxic abdomen of the beetle into the sand and then makes a leisurely meal of the more palatable head and thorax. While their diet does consist of many grasshoppers, even scorpions are not safe from the grasshopper mouse. With a practiced feint, the mouse circles its quarry, disables the stinger-bearing tail, and dines.

The behavior of this tiny carnivore has led ecologists to speculate that the dynamics of hunting are universal—regardless of size. ☾



Text by Joshua Brown, Wild Earth's assistant editor. Rachel Ivanyi is a freelance illustrator in Tucson, Arizona. She specializes in natural history subjects, with an inordinate fondness for reptiles and amphibians. Her clients include National Geographic Magazine, Scientific American, the Arizona-Sonora Desert Museum, and The Nature Conservancy. These illustrations were created in graphite and colored pencil.



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Photos: prairie by John & Teresa Harris, FilmCore N.H.U., prairie dog by Juan Carlos Gutiérrez

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