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Suggested citation: Foreman, Dave, ed., *Wild Earth* 2, no. 4 (Winter 1992/93).
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Wild



EARTH

Volume 2, Number 4

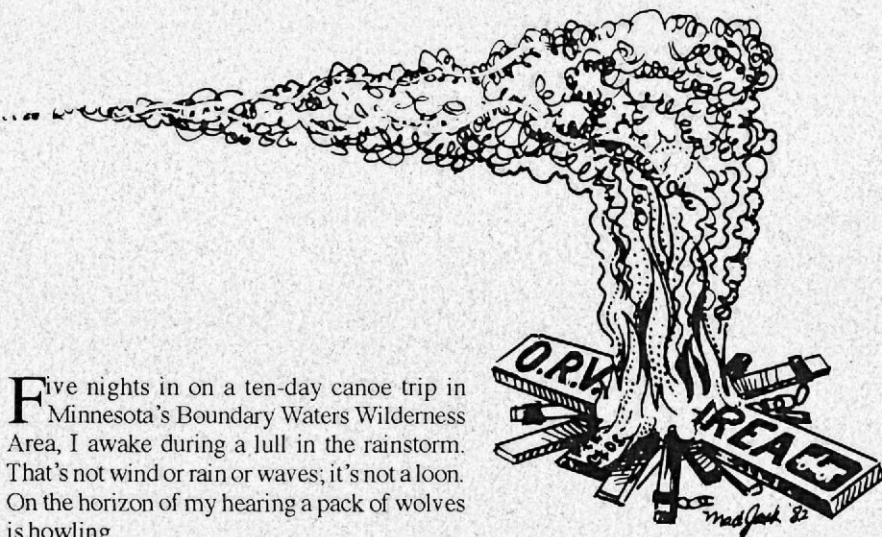
Winter 1992/93



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Around The Campfire



Five nights in on a ten-day canoe trip in Minnesota's Boundary Waters Wilderness Area, I awake during a lull in the rainstorm. That's not wind or rain or waves; it's not a loon. On the horizon of my hearing a pack of wolves is howling.

A week later, the muddy trail in Michigan's Isle Royale National Park tells of the passage of wolves. The big, splayed, four-toed prints are unmistakable as Nancy and I kneel beside them.

Two weeks after that, Nancy, John Davis, and I stand in an October snow squall on the shores of Wolf Pond in the heart of the wildest corner of New York's Adirondack State Park, amidst the largest stand of old-growth Northern Hardwood forest left in the United States, in the Five Ponds Wilderness Area, and dream of Gray Wolves once again whittling swift legs of Moose here, once again filling the Adirondack air with the call of the wild.

I am a Western chauvinist. My heart and soul belong to the sunburnt naked rock of the desert Southwest, to the shining mountains of the Rockies, to the unfenced sky of the high plains. But the North Woods call to me, too, now that I've dabbled my paddle in their waters and soaked my boots in their trail-mud. The North Woods call with a wildness that is, and with a deeper wildness that once was and will be again.

It is only because of the vision of past generations of conservationists that Gray Wolves still roam and eat Moose in Boundary Waters and Isle Royale, that four-hundred-year-old trees still grow unscarred by Bunyan's ax in Five Ponds, and that the smell of gasoline and Ford dust doesn't gag dozens of wild comers from Minnesota to Maine. It will be only because of the vision of our generation that this great dance of life continues in these places, and that the wild tempo recovers its "chesty bawl" throughout the North Woods.

Wild Earth magazine exists to translate that wildwood howl into modern English prose. It's here aplenty in this issue. I especially encourage you to look at Paul Martin's discussion of his Overkill Hypothesis, Frank Forench's "*Homo carcinomicus*," and Bron Taylor's review of grassroots conservation activism in the Third World. If this trio doesn't stir up some controversy, I'm not sure what will.

One of the things that differentiates *Wild Earth* from other conservation periodicals is our long view. Nearly all of us are involved in immediate brush fire battles. Conservation biology is a crisis discipline and we are in the middle of the Mother of All Crises. Nonetheless, it is important to step back from the fire line (or is it the firing line?) now and then, take a deep breath, remember what we are really fighting for, and set our eyes on that distant vision.

It is the task of *Wild Earth* to spread that vision of a wild Earth. Every issue of *Wild Earth* does that, but a special issue of *Wild Earth* discussing the North American Wilderness Recovery Plan should arrive in your mailbox about the same time that this regular Winter 92 issue arrives. It's our slightly belated Yuletide gift to you. Cherish it, dream it, and midwife the unfolding of a grand and glorious vision of our beautiful, buzzing, blossoming, blue-green, living Earth rewilding itself.

continued on pg. 2

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WILD EARTH (ISSN 1055-1166) is published quarterly by the Cenozoic Society, Inc., 68 Riverside Dr., Apt 1, Canton, NY 13617 (315)379-9940. The Cenozoic Society is a non-profit educational, scientific, and charitable corporation.

Cenozoic Society Board: Tom Butler (VT), John Davis (NY), Dave Foreman (AZ), David Johns (OR), Reed Noss (OR), Kris Sommerville (CO).

Membership in the Cenozoic Society is open to the public and includes a subscription to *Wild Earth*. Non-membership and institutional subscriptions are also available. The basic rate for membership and non-membership subscriptions is \$20. Subscriptions to Canada and Mexico are \$25 per year, overseas subscriptions are \$30 (surface mail) or \$35 (air mail).

Second-class postage paid at Canton, NY. POSTMASTER: send address changes to WILD EARTH, PO Box 492, Canton, NY 13617.

Subscriptions to Canada and Mexico are \$25 per year, overseas via surface mail, \$30 per year; overseas via air mail, \$35 per year.

Manuscripts and drawings should be sent to John Davis, *WILD EARTH*, POB 492, Canton, NY 13617. Writers who use computers should include a disk (we prefer Mac to MS-DOS) as well as paper copies. Queries in advance of submission are recommended. Writers and artists who want their work returned should include a stamped, self-addressed envelope. *WILD EARTH* assumes no responsibility for unsolicited materials.

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Wild Earth is available on microfilm from University Microfilms, Inc., 300 North Zeeb Rd., Ann Arbor, Michigan 48106-1346.

On the cover: Bobcat, Fast Walk Track Pattern by Heather K. Lenz

You should soon be noticing a higher level of efficiency in this magazine and in the business operations of its parent, the Cenozoic Society. That is partly due to our new business manager, Marcia Cary. Marcia comes from graduate school (biology), but is an immensely capable and competent manager as well. Welcome, Marcia. Believe me, we've needed you!

My dear friend Kris Sommerville is another part of this dawning of responsible efficiency. Kris is the former business manager for the once-upon-a-time *Earth First! Journal*, and is now the business manager for a micro-brewery in Durango, Colorado. Kris is the chair of the Cenozoic Society Board of Directors' Finance Committee and is working closely with Marcia. Just as I'm a professional uncle, Kris is a professional big sister. It's wonderful to be working with you again, Kris!

Finally, let me shine a well-deserved spotlight on Kathleen Fitzgerald, *Wild Earth's* assistant editor. I'm constantly asked by college students how they can get a job with a conservation organization. I tell them to volunteer for a group, get involved, work as an intern. Conservation jobs are few and the competition is fierce. You've got to earn a job by toiling in the trenches first. Kathleen proves that approach. As a senior at St. Lawrence University, she volunteered last year for *Wild Earth* as an intern. She was very good and very dedicated; John and I noticed, and we hired her. Welcome to the staff, Kathleen!

Finally, thanks to all of you readers and supporters of *Wild Earth* who have responded generously to our Research Fund pleas this fall. Subscription income cannot cover even modest payments to our talented writers and artists. It is only through your contributions to our Research Fund that we can keep them keeping you enlightened, entertained, activated, and inspired. On their behalf, and that of all of us at *Wild Earth*: Thank you, friends. Your support feeds us in body and spirit! Happy Trails.

—Dave Foreman, Cockscomb Jaguar Reserve, Belize

EDITOR'S NOTE:

At the Campfire this issue, Dave gently reminds you of our need for money. I wish to remind you less gently here of our need for gastropods: Send Slugs! *Wild Earth* is 2 years old now, and we've not yet received any drawings of pearly mussels, snails, or slugs. *Wild Earth* art director Tom Butler—whose good aesthetic sense is responsible for the right natty appearance of our recent issues—has issued a clarion call for illustrations of gastropods and other seldom-sketched creatures. Tom operates our Vermont office, but please send your art to him c/o the Canton office (POB 492, Canton, NY 13617).

—John Davis

Father Knows Best, Or Does He?

by George Wuerthner

When I was a kid there was a popular TV show called "Father Knows Best." In this situation comedy, dad was the wise patriarch who held the family together and guided it through daily crises.

The way most scientists and government bureaucrats relate to the Earth reminds me of *Father Knows Best*. Typically, we feel there is a crisis that will not resolve itself unless we step in and take control, and almost always we feel we know how to solve the problem. Bugs in the trees. No problem—cut the trees down. Wolves killing off Moose. No problem—kill the wolves.

Unfortunately, people with this parental attitude often approach problems in isolation with little regard to the ecological consequences of their actions. Few foresters stop to ask whether "bugs" may have some important role in nutrient cycling or whether they may support insect and bird predators. Biologists shooting wolves seldom ask whether perhaps even low numbers of Moose can be too many for a particular ecosystem at a particular time.

Today we hear about "New Forestry," "Holistic Resource Management," "Change on the Range" and "Ecosystem" approaches to correct past failures to successfully "manage" our natural "resources." We fail to recognize that it is not so much a failure of technique as it is a failure of attitude or philosophy. We practice the "Father Knows Best" approach to management. Until this patronizing attitude is changed, "better" forestry techniques and "better" livestock or wildlife management will fail, as earlier attempts to control the environment have failed. We don't need better techniques or technology; we need a new relationship with the Earth.

Writing in *Conservation Biology*, David Orr summed up his feelings about natural resource management: "The salient fact is not our knowledge, but our ignorance." Orr's skepticism about the ability of foresters or anyone else to manage any "resource" such as timber, much less something as complex as ecosystems, is not shared by those who would tinker with our planet. It is increasingly apparent that our knowledge base is inadequate to even ask the right questions, much less provide the right answers.

Not long ago, for example, foresters considered all old trees as "overmature" and "decadent." We have only recently realized that the forest is far more than trees. It is an intricate assemblage of biotic and abiotic components and processes which includes everything from geochemical breakdown of soils to soil invertebrates. How many foresters know even the birds and mammals in a particular forest stand, let alone the insects, bacteria, and lichens there?

Yet each of these influences the overall health of the forest. Contrary to foresters' assumptions, forest health is not the absence of disease, insects, windfall, fire, and other influences, but is actually dependent upon these ecological processes.

I believe many of the current debates over how best to protect our environment stem from two radically different paradigms. One school of thought holds that we have

the capacity to "manage" the planet—we only need greater knowledge and better access to information. According to this view, global environmental problems can be solved by fine tuning present technologies and management schemes. Hence we have "New Forestry" which seeks to mimic natural processes while still permitting extraction of timber; and we have Holistic Resource Management for range ecosystems which uses livestock as a "tool." These "new" approaches assume that we now have at least enough of the answers that mistakes we made in the past will not be repeated: Father knows best.

Given our limited knowledge of ecosystems, such a view is exceedingly optimistic. Furthermore, this view assumes that we will rationally apply what we know. Yet, history is replete with examples of humans applying knowledge in irrational ways.

Is it wise to harvest timber at 10,000 feet, as we do on many Rocky Mountain National Forests, where the rotation for eight inch trees is 150 years? Does it make sense to grow cows in the Nevada desert, where it takes 200 acres to support one cow, compared to 1 acre in eastern Texas or Georgia? Is it rational to destroy Bison, grazers adapted to the arid West, and replace them with cattle, whose evolutionary heritage is moist woodlands in Eurasia?

While New Forestry and Holistic Resource Management may indicate a new recognition that old management methods have failed, they are still molded within the "management philosophy" paradigm. We hear about the need for "wise stewardship." Yet stewardship still assumes a parental attitude toward the land. It may be a benign attitude, but it is nevertheless based upon the concept that we are managing the land and that we know what is good for it. Until we break free from this paradigm, we will never understand natural systems. We need a new "way of thinking."

We need a new philosophical basis for our relationship with the Earth: one tied to the role of mutual support and caring, rather than manipulation and control. We don't necessarily need new forestry or new range management techniques or even new or "better" information, although all of these may assist us in the philosophical transition. Aldo Leopold was right when he suggested we need a land ethic. Leopold cautioned that the first rule of intelligent tinkering is to keep all the parts. A further caution might be to manipulate as small an area as possible, and always assume that everything has a role. Such caution does not exist among most resource managers.

For example, it was recently revealed by biologists studying wolf-prey relationships in Alaska that Gray Wolves can suppress prey populations for extended periods of time. The reaction of the professional "wildlife biologist" was to shoot wolves—to "help" Moose recover. Someone not in the manipulative paradigm would ask: "What role does suppression of prey have in the ecosystem?" Perhaps sustained suppression of prey allows browse plant species to recover. A minimum of three relationships is important here. With wolves suppressing Moose for several years, aspen, birch, and willows can grow without substantial Moose browsing pressure. No one at the Alaska Fish and Game Department had investigated such a possibility before "wolf control"—killing—was implemented.

How do we make a transition to a second school of thought, a new philosophy regarding management? One place for new beginnings is in our natural resources schools, where present curricula are heavily biased toward resource extraction. The average forestry school graduate has had more than a dozen courses in things like wood products and industry, road construction, harvesting techniques and other technical skills needed to exploit forests; but he or she is lucky to have had one course in forest ecology.

Armed with their degrees in forestry, range science, or wildlife biology, such natural resource graduates sincerely believe they understand forest, range, or wildlife "ecology." These are dangerous people.

Of course, mere exposure to ecology courses does not guarantee that anyone will have a greater appreciation of their own ignorance. Beyond knowledge of how ecosystems work, we need to instill new philosophical concepts among our natural resource students. A healthy dose of environmental ethics, readings from land based philosophers like Muir and Leopold, and exposure to conservation history would all improve the curriculum.

This is not to deny that technical skills such as road-building or harvesting techniques may be useful in minimizing impacts associated with timber harvest, that water developments might better distribute cattle, or that knowing how to radio collar an Elk can provide useful knowledge. But foresters should ask if it's right to build a road in the first place. Range managers should ask whether we should even have cattle, much less water developments, on our rangelands. And biologists should wonder if it's ethically right or necessary to radio collar one more Elk or Grizzly Bear. Such questions should precede all actions.

A change in paradigm would entail a reevaluation of resource use: a recognition that conservation of resources is better than finding new ways to exploit them. Conservation and efficiency, though, go hand in hand. You cannot limit manipulation to a small part of the Earth if you do not also reduce consumption of resources. With a change in paradigms, foresters might begin urging us to waste less paper and wood. Only with deep consideration and regret would they log a forest. Range managers might tell us to reduce our meat consumption rather than using rangelands for domestic livestock production.

Changing paradigms means shifting how we view our place on Earth. Attempts to reform forestry, range management, or any other resource extraction industry will fail to bring about meaningful changes unless we change our relationship with the Earth. Until we have "New" philosophies, New Forestry and other innovative approaches to resource use will only provide a new way to accomplish the same old goal. Until we cancel the "Father Knows Best" show that dominates our current philosophy, we can expect our new efforts at resource management and manipulation to fail just as assuredly as our past methods failed.

George Wuerthner (P.O. Box 273, Livingston, MT 59047) is a wildlife biologist and freelance environmental writer based in Montana.

Risk Assessment In The Northern Rockies

by Mary O'Brien

Through the Hells Canyon Preservation Council, I've been learning a lot during the last couple of years about the Northern Rockies Ecosystem Protection Act's proposed Hells Canyon/Chief Joseph National Park and Preserve. But much of my work over the last ten years has been with alternatives to use of toxics: pesticides throughout society, chlorine in the pulp and paper industry, and currently the potent ozone depleting fumigant, methyl bromide.

During these years, I have come to hate the use of risk assessment, which is used obsessively here in the U.S. to determine how much of a toxic substance will be dumped into the world: How much pesticide will be allowed on the apples you eat; how much dioxin Stone Container can dump in the Clark Fork River; the size of an air pollution permit one company can buy from another in a polluted urban area. Now the U.S. Environmental Protection Agency is aggressively teaching other countries like Mexico and the Ukraine how to do quantitative risk assessment so that everyone will use the same language for global free trade in toxics.

The whole point of risk assessment is to determine how much damage people will be permitted to do to the world. The alternative, largely ignored, is to figure out how little damage people can do to the world.

But risk assessment is not confined to toxics, and I want very briefly to describe five behaviors characteristic of toxics risk assessors and then relate these to what risk assessors do in the world of natural resources and wildlands. These can be risk assessors in the Forest Service, Bureau of Land Management, Sierra Club, Audubon Society, or other agency or big environmental group.

1. Toxics risk assessors act as if they know what damage a toxic chemical does, and as if they can, on the basis of this knowledge, determine some safe or "insignificant" level of exposure to the toxic. But of course they don't know this. They may know what kind of chronic damage or birth defects a single chemical causes in a genetically pure line of healthy laboratory rats. They generally have no information on whether it causes immune suppression, endocrine disruption, or nerve damage in infants; or chronic damage in people who already are damaged in some other way.

2. Toxics risk assessors focus on one chemical at a time. When I recently asked the Director of the National Institutes for Environmental Health Sciences about the possibility of switching the focus of the subsumed National Toxicology Program from testing a handful of individual chemicals for cancer a year to looking at the types of mixtures of chemicals faced by people living near multiple industries or incinerators or hazardous waste dumps, he indicated that studying mixtures of chemicals is "too hard." The problem, however, is that we and wildlife are exposed to mixtures of chemicals and indeed are born with them,

our mothers having passed on many to us.

3. Toxics risk assessors focus on whether the world can withstand a particular activity. The assessors try to figure out, for instance, whether you will survive if Stone Container uses chlorine to make cardboard blinding white. They may ask whether fish at the end of the mill's nine-mile "mixing zone" will be able to reproduce.

4. Toxic risk assessors decide what levels of risk and damage and killing are acceptable for other people. But can anyone decide an acceptable risk for you? Isn't it premeditated murder to give permits to industries with the estimate that one in 100,000 people will get cancer? Other, perhaps more vulnerable, species are seldom considered in the permits.

5. Toxics risk assessors focus on the risks and damages caused by business-as-usual, not business-as-it-could-be. The alternative to determining how much damage people will be permitted to do in the world, is to determine how little damage people could do in the world.

Let's look at the analogous activities of risk assessors in the world of wildlands, wildlife, and natural resources, and what they could do differently.

1. Land management risk assessors assume they know what damage clearcutting or road-building or grazing or pesticide spraying or mining does to an ecosystem's web of life. Do Forest Service risk assessors know what is happening to bats on lands they oversee? Do they know the needs of rare butterflies on that land? Do they know what organochlorines are doing to reproductive success of Peregrine Falcons? Land managers and users need to admit they don't know enough to say what human activity is safe. They can only have an inkling of the damage humans do. They don't know what the rare butterflies and the bats need. They don't even know what butterflies and bats are out there.

2. Land management risk assessors focus on one activity, one timber sale, one stream, maybe one watershed, or one Congressional bill at a time. Do the risk assessors know what happens when a watershed is subjected to grazing and clearcutting and pesticides and road-building at the same time? Do they know what happens when Peregrine Falcons are faced with reduction in prey and loss of solitude and organochlorines in the food chain, all at once. Land managers and users need to focus on cumulative effects and the interdependence of various elements of the ecosystem. Cumulative effects are often impossible to quantify; and risk assessors get nervous when they can't reduce decisions to numbers. Yet, effects are cumulative.

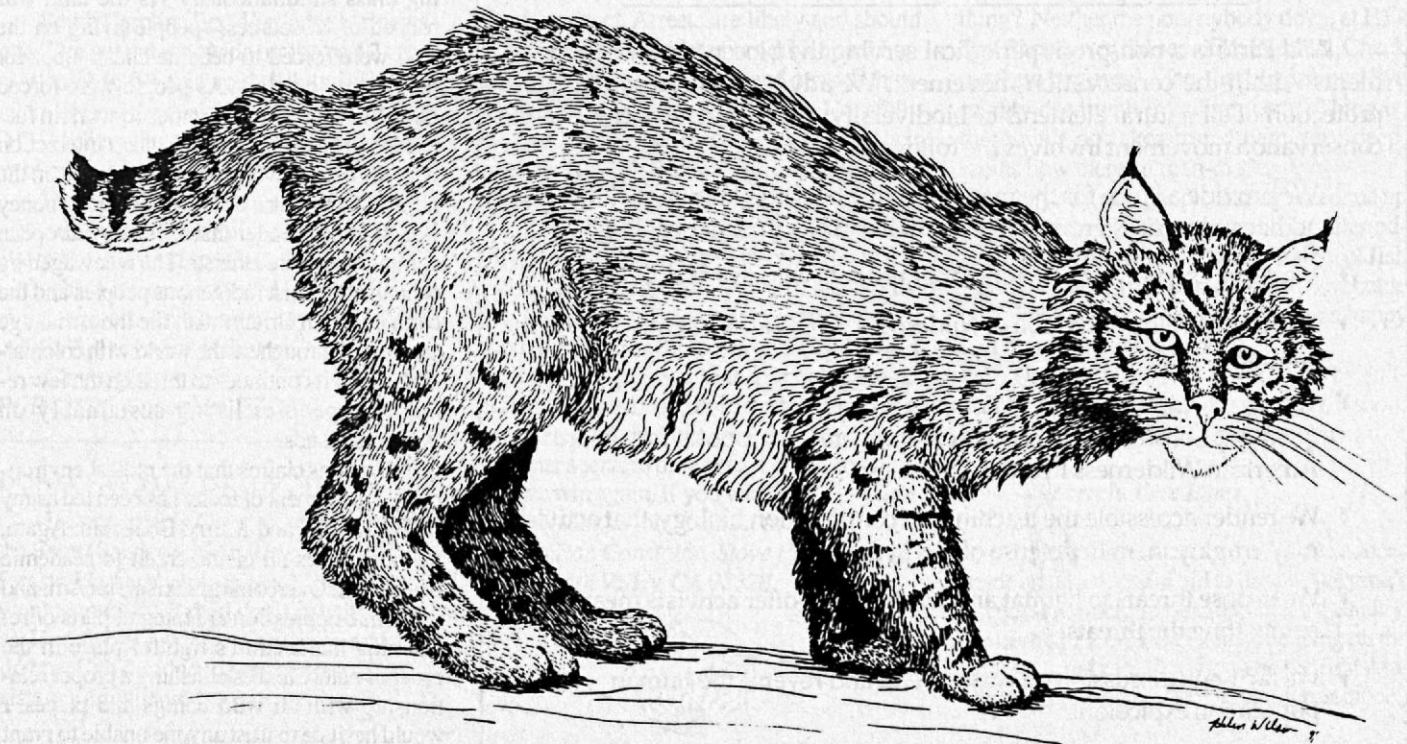
3. Land management risk assessors focus on whether the land can withstand a certain action. For a year and a half, the Wallowa-Whitman National Forest convened a citizens committee to suggest management of the Snake River. The committee was called the Limits of Accept-

able Change Committee. How many more jet boats could the river stand? Could airports fit within the "limits of acceptable change"? How many domestic sheep allotments are compatible with Bighorn Sheep in Hells Canyon? What is the minimum acreage of roadless areas in Montana that must be protected to constitute a Wilderness bill? Rachel Carson asked a different, more appropriate question in *Silent Spring*: "Who would want to live in a world which is just not quite fatal?" Land managers and users need to focus on what the natural world needs and what our options are for living in accordance with those needs. As Aldo Leopold wrote in *Sand County Almanac*, "The practices we now call conservation are, to a large extent, local alleviations of biotic pain. They are necessary, but they must not be confused with cures. The art of land doctoring is being practiced with vigor, but the science of land health is yet to be born."

4. Land management risk assessors assume they can define acceptable damage for society. In the March 1992 edition of the Northern Region Forest Service paper called "Our Approach to Sustaining Ecological Systems," the Forest Service says that the Desired Condition (DC) of a landscape at any scale must account for the goods, services and amenities desired by society." Who is "society?" What "society" demands salvage logging? What amenities will our children want? The risk assessors in some environmental groups ask, "What level of conservation is acceptable to our members? To our granting foundations and corporations?" Land managers need to face their responsibility to advocate for the land and educate the public regarding the benefits of behaving well toward the land. Instead of acting as if they know what damage is acceptable to society, they need to sell the public and Congress on the social, environmental, spiritual, and economic benefits of wildlands.

5. Land management risk assessors focus on business-as-usual rather than business-as-environmentally-responsible. Again, risk assessors do not look at how our society might treasure, and benefit from forests that are whole and wild. They do not look at the best forestry that could be done. They do not present the uses of our National Forests that would be least damaging, most protective, most restorative. Instead, they look at business-as-usual: They uphold timber, grazing, and mining interests. Land managers need to constantly search for the most environmentally responsible alternatives for behaving on public and private lands. The Forest Service and environmental organizations need to go beyond looking at incremental improvements in mining, grazing, predator killing, and tree cutting. They need to systematically consider what behaviors are truly compatible with diverse plant life, clean water, recovering fish populations, and silence. In all of our work with the Northern Rockies lands and peoples, we need to reject the process of figuring out the limits of acceptable degradation. We need to reject the current dominant role held in our society by risk assessment and replace it with alternatives assessment. We need to take the high scientific, ecological, political, and moral ground and advocate for the best possible behaviors of people toward the Earth. Always.

Mary O'Brien (Environmental Studies, University of Montana, Missoula, MT 59703) teaches public interest science and environmental advocacy in the graduate Environmental Studies department of the University of Montana, and serves as President of the Board of the Hells Canyon Preservation Council. She presented a longer version of this paper at the Alliance for the Wild Rockies Rendezvous, Missoula, MT, 2-4 October 1992.



Bobcat (Felis rufus) by Helen Wilson

Letters

A LETTER TO OUR READERS

Below, we publish again our statement of purpose, which explains the objectives and role of *Wild Earth*. An essential purpose of *Wild Earth* must be highlighted once again: to inspire our readers to become actively involved in environmental issues. Every season *Wild Earth* prints proposals, stories, and accounts of crises, events and victories. We all need to go out and pursue proposals, relive stories, solve crises, attend events and celebrate victories. *Wild Earth* has gone half way down the path by providing information; you must complete the path by turning readings into actions. Cursing at developers will get us about as far as a cougar caught in a trap. So, print controversial ads in local papers like Sandy Shea did ("More Precious Than Money"), go down the Toxic Trail as does Dr. Dioxin, and write to your President-to-be urging the protection of wilderness. As Edmund Burke stated, "Nobody made a greater mistake than he who did nothing because he could only do a little!"

—Kathleen Fitzgerald, for the WE staff

THE LAND ETHICS OF RACISM, SEXISM, AND CAPITALISM

As a leftist, ecofeminist Earth First!er with a social conscience, I must take issue with George Sessions's article *Radical Environmentalism in the 90s*, *Wild Earth*, Fall 92. Contrary to Sessions's insinuations, I find that having a background working on peace and justice issues is an invaluable asset to my work for the earth, not a detriment.

Racism, sexism and capitalism are land ethics that have been practiced for centuries to the disadvantage of humankind's relationship to the natural world.

Sessions's viewpoint is decidedly white and male. According to Sessions, the theoretical groundwork for radical environmentalism and deep ecology was laid by Henry David Thoreau and John Muir in the 19th century. With all due respect to such thoughtful white men, it should have been noted that it was also in the 19th century that Chief Seattle* gave his oft-quoted speech, an eloquent description of a deep ecology world view. The context of Seattle's speech was the removal of the

Duwamish people from their traditionally held land. "We will consider your offer. For we know that if we do not sell the white man may come with guns and take our land." Seattle sums up succinctly a deep ecologist's view of private property. "How can you buy or sell the sky, the warmth of the land? This idea is strange to us... The white man treats his mother the earth, and his brother the sky, as things to be bought, plundered..." As Thoreau and Muir "laid the foundation" for the deep ecology movement, Seattle and the Duwamish people were saying goodbye to a centuries old way of life based on a deep ecology perspective.

In Renaissance Europe a woman found guilty of practicing witchcraft automatically forfeited land to the church. Her family paid for her trial execution often by giving up land to her persecutors. Nine million European women were killed in a reign of terror that entrenched patriarchy and made genocide for control of the land a sacred right. In the Renaissance, not the Stone Age, a pantheistic identification of god with nature was purged from our culture by the mass killing of women. This is the base from which colonialism and industrialism were launched.

During the industrial revolution, industrialists devastated the land and created a working class simultaneously. As the land was robbed of "resources," people living on the land were forced to become cheap labor for the new ruling class. As people were forced off the land and into the cities to work in factories, survival shifted from direct interaction with the natural world to a dependency on the ruling class. Nature was no longer god, money was. It is no wonder that the early European communists were atheists. The war waged by capitalists against indigenous peoples and the earth began in Britain with the industrial age and spread throughout the world with colonialism. Today it continues to threaten the few remaining peoples living sustainably on traditional lands.

Sessions claims that the radical environmental movement of today has been led astray by Karl Marx and Murry Bookchin. Again, Sessions gives all of the credit to academic white men. Overcoming sexism, racism, and economic oppression are integral parts of reclaiming humankind's rightful place in the order of nature and establishing a proper relationship with all wild beings and places. I would hesitate to trust anyone unable to grant justice to fellow members of his own species

STATEMENT OF PURPOSE

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

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

to truly live justly with bears and spiders.

—Peggy Sue McRae, Lopez, WA

* I use the common Seattle when referring to the Duwamish Chief often called Sealth. Although neither pronunciation is correct by Duwamish standards it is just as well, as the Duwamish believed that if your name was spoken after death you would be restless in your grave. The famous chief of the Duwamish is undoubtedly churning fitfully no matter how English speaking white people pronounce his name but it is out of respect for him that I choose the least correct.

ECO-VIGILANCE

With the contentious Endangered Species Act reauthorization looming in the coming year, it is high time we asked ourselves how we can become politically more effective at the national level. So the country is run by special interest groups? OK—let's become a network of local special interest groups lobbying on national ecological issues.

As supporters of public lands protection, we already have the depth of concern it takes to be effective. What we lack is timely, relevant legislative information to hold our members of Congress accountable.

South Carolina *Eco-Vigilance* is a newsletter I've put out statewide for the past 2 years to attempt to fill this void. While I am well aware of how the deck is stacked against us in D.C., I believe that the *Eco-Vigilance* idea has a lot of potential, particularly east of the Rockies.

I am looking for groups and individuals who are engaged in similar efforts, or would like to be, on an independent, volunteer basis. Let's share information, and give each other moral support. As the signs say on the buses in DC: "Information is Power."

Contact James Irwin, S.C. *Eco-Vigilance*, POB 42006, Columbia, SC 29206.

DON'T PAY FOR EXTINCTION

Last summer in Oregon I told a friend that the Forest Service uses our taxes to butcher our forests. He simply told me, as Henry Thoreau would have, "Well then don't pay them." So, as I've grown weary of appeals and lock downs, I've decided to use the idea of tax resistance. I invite you to join me.

Tax resistance would open a new front in the war for the woods. It would take the fight to the big bureaucrats. There is a benefit for the timber industry and the Forest Service from lock downs, tree sits, marches, and blockades. These activities are good and necessary and I will continue to participate in them but often they force us into a bad situation; environmentalists vs. loggers. The old divide and conquer tactic. We are fighting their peons, not them. The Freddies and timber beasts have us fighting the wood products workers. We should be in union with these folks, fighting the powers that be. Tax resistance would take the battle away from the innocent foot soldiers in this war and to the generals.

Here's the plan. I have made a list of demands (write for a copy). We refuse to pay the portion of our taxes that goes to the Forest Service, about .16% (about a fifth of a penny for every dollar owed). The IRS will then inform us that they have disallowed this deduction (probably about a dime if your income is like mine) and assess us this additional tax, a penalty, and interest. The IRS is required to send a Notice of Deficiency, giving us ninety days to petition the US Tax Court for redetermination of the IRS's assessment. It is likely that the court won't see things our way. We will then continue to refuse to pay until our demands are met. Arrests are likely and should take place on timber sale sites in National Forests. Then we sell ourselves and our sob, hunger-striking, jail stories to the media. Hopefully Joe and Judy America come to realize their taxes are funding the destruction of their own forests.

The Forest Service and the IRS can be wily, though, and may see through this scam, especially since it's all in print. This and the small amount of money withheld (if I can get enough people involved, we can withhold a whole dollar) may cause them not to take action. In this case we win and encourage more resistance and, perhaps, still sell the story. In the other scenario they get a mess of bad press and we win again. If you want more information, or want to join, contact me:

— Ron Constable, *Stove Pipe Wells Village*, Death Valley, CA 92328.



DEAR WILD EARTH:

Just when things were lookin real bad, ya'll saved the day.

First: the spring in my Timex Camper watch went "boing", leavin me flat outta time.

Second: a couple of plumbers snuck into the Rustic Society Headquarters and left bugs on the furniture. My opponents will stop at nothin to keep me outta Washington. There goes the election....*

Third: Thelma Lou took off on Rip Crenshaw. That fool lost what little sense he had and stole Sheriff Calhoun's patrol car. The one with them red lites on top.

I looked outta them bay winders in my double wide and there goes Rip with the siren screamin like a pack of wild animals. Good thing for him I was able to git him to slow down long enough to listen to some turkey. When he done seen how much trouble he was in, well...nervous ain't the word.

Guess where we put the Sheriff's 86 Ford LTD? Yup, 60 feet down on the mud bottom of Lake Logan Martin. They still ain't solved that mystery!

That was a week to forgit, and I did thanks to you folks. See, soon as Homer delivered the mail and I seen that weird fish on the cover of Vol. 2 Issue 3, I bout flipped! What IS that thing? Neither me nor anybody down at BJ's Bait Shop never did see a fish like that. Check out them bug eyes! Man, that bugger must live mighty deep with eyes like them. Thing is, there ain't no lakes round here very deep, seems how there all man-made.

Anyway, you people shore perked me up on that one. We all sat round the trailer admiring that funny fish. Course, a slew of fish stories started comin; so did a brand new bottle of Rebel Yell. For you knew it, I was happy as a blew tick hound in heat.

Thanks ya'll. That cover outta be suitable for framin or somethin. Anyway, it shore looks good pinned up next to my picture of Elvis.

—Sincerely, Pete Jones

* (note: On November 3, 1992, Pete Jones made an unsuccessful bid to unseat Alabama's pseudo-Democratic Senator Richard Shelby. As he did in 1990 Pete is now focusing on the gubernatorial race, hoping to be the first Alabama Rustic to assume that state's highest office.)

Science Editor's Response to Seidman

by Reed F. Noss

In the Letters section of the fall issue of *Wild Earth*, Mike Seidman raised what might be the most contentious issue in biocentric conservation today: to what extent should humans "manage" natural ecosystems? He also requested a response from "a credible biologist with biocentric leanings," suggesting me as a possible person to "take Diamond on." I immediately passed the buck to two biologists whom I know to be both biocentric and intimately familiar with the specific problem that prompted Jared Diamond's essay in *Natural History*: overbrowsing by deer in forest fragments. The response by University of Wisconsin ecologists Bill Alverson and Don Waller speaks for itself. I hope their logic will convince Seidman and other readers that ecological management is a regrettable necessity in many situations today. Knowing that thorny issues such as this are not resolved easily, I offer a few additional observations.

First, it is unfair of Seidman to suggest that Diamond has been co-opted by and is an apologist for "the System." Anyone who has followed Diamond's important contributions to the science of ecology (among other fields) and the art of conservation over the years will know better. I will not defend all of Diamond's arguments in the *Natural History* article; some I cannot accept. However, the basic point that nature reserves must be managed if we wish to maintain biodiversity in a deteriorating biosphere is incontrovertible. To stand idly by while ecosystems collapse and species go extinct—all because of changes in ecological context traceable to habitat fragmentation, annihilation of predators, and other human actions—is irresponsible. For example, a patch of prairie, oak savanna, or longleaf pine forest in a fragmented landscape will not experience lightning strikes often enough to burn out invading hardwood trees and shrubs. If we fail to apply management burns, thinking such actions unnatural, we will watch as the community loses its natural structure and native species drop out one by one.

Most *Wild Earth* readers will agree that protection and restoration of native biodiversity is an ethical obligation, arguably our most important mission as a society. For at least some of us, protecting biodiversity is a goal more meaningful than any purist notion of hands-off preservation. We may aspire to minimal interference for the future, after the human population has been brought into line with ecological reality and large landscapes have been restored to wilderness character; but for the short term, management is necessary to substitute for natural processes that have been disrupted. For better or worse, we have the power to make such a choice. If we choose hands-off preservation, we consign many species to extinction and many regions to domination by exotic weeds.

Where I disagree with Diamond has to do with an example he draws from the Greater Yellowstone Ecosystem (GYE). Diamond accepts the conventional anthropocentric argument that Yellowstone National Park is an island reserve with too many elk and other herbivores due to a paucity of large predators and therefore those herbivores must be controlled for the convenience of humans:

The National Park Service can't just allow its elk and bison to breed without limit and then let those animals become someone else's problem when they invade adjacent ranches in the winter. With justice, ranchers hold strong views about those invasions, especially because brucellosis carried by bison can infect cattle (Diamond 1992, p.8).

Later, he even questions the goal of restoring healthy populations of predators:

But Yellowstone's grizzly bears already pose public relations problems and constitute real dangers to the safety of hikers. The National Park Service is reluctant to compound this problem by bringing in wolves and therefore outraging neighboring ranchers (Diamond 1992, p.8).

It may be that some control of native herbivores in the GYE is necessary in the short term. But the GYE comprises 19 million acres, 75% of it in public ownership. It is the flagship wilderness of the lower 48 states, and wilderness must be considered first and foremost for its ecological values, and only secondarily as a place to backpack or see pretty views. If there is anywhere we should be able to restore a complete ecosystem with natural predator-prey dynamics, it is the GYE. Ranchers be damned! Most of the affected livestock are on public lands, subsidized by public funds for no good purpose. Livestock management poses a threat to native species, not the other way around. The herbivores most in need of control (i.e., elimination) are cows and sheep, not elk and bison. The problem of native herbivores in the GYE is more one of distribution than of absolute numbers; natural migration routes have been severed and the animals are artificially concentrated in certain riparian zones, valleys, and other wintering sites not preempted by human development. Restoring migration corridors and reestablishing predators to keep the animals moving seems preferable to bowing to the demands of those who abuse our public lands.

Resolution of the debate over management lies in a long-range view. Some regions, such as the GYE, are big enough to manage themselves in terms of most ecological phenomena, if livestock, roads, critical inholdings, and other intrusions can be phased out. If linked by broad habitat corridors to other wildlands in the northern and central Rocky Mountains, a reasonable objective for the near future endorsed by groups ranging from the The Wilderness Society to Alliance for the Wild Rockies, viable populations of grizzly bears, wolves, and other large mammals can be maintained. For other regions, say the tallgrass prairie, restoration of self-managing ecosystems may take centuries; it must await the inevitable decline of the human population and collapse of industrial civilization. The Wildlands Project, for which *Wild Earth* is the primary voice, recognizes the need for interim management, in some places for centuries, while we work for long-term recovery of whole ecosystems everywhere. Can we agree? 🐾

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Is It Un-Biocentric To Manage?

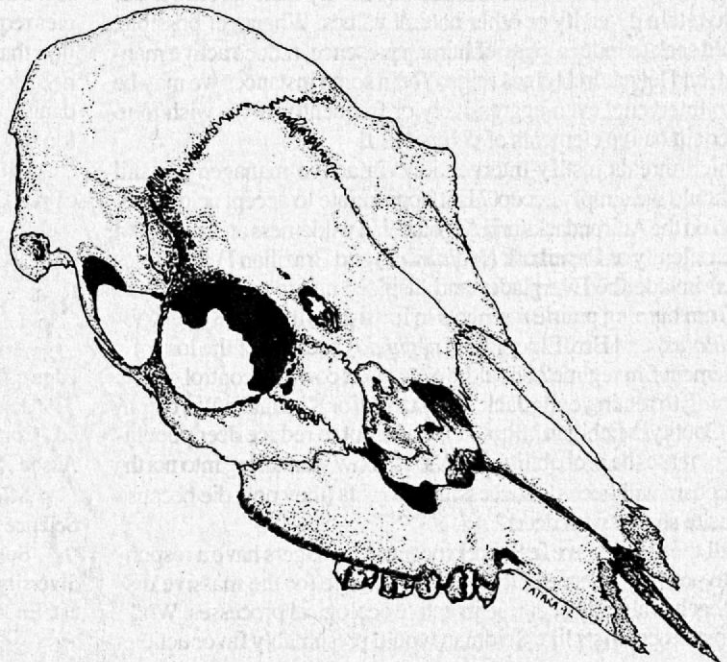
A RESPONSE TO MIKE SEIDMAN'S LETTER IN WILD EARTH, VOL.2(3)

by WS Alverson and DM Waller

In an essay for *Natural History* conservation biologist Jared Diamond asks "Must we shoot deer to save nature?" He ponders the difficult choices faced by managers of natural areas, focusing on the Fontenelle Forest Reserve near Omaha, Nebraska, a 1300 acre remnant of flood plain forest now isolated from other forest stands and surrounded by a matrix of suburban development and farm fields. Browsing by White-tailed Deer in the Fontenelle has eliminated regeneration in many tree species, reduced understory vegetation needed by many songbirds and butterflies, and, in all likelihood, eradicated several sensitive herbaceous species. Despite desires on the part of both the Forest managers and Diamond to avoid interfering in natural processes, Diamond reluctantly comes to the conclusion that shooting deer is necessary in this "tragic situation." The problem, Diamond argues, lies with context: this forest and many others have lost their large carnivores and are too small to sustain the natural ecological processes that might once have kept deer and other species in check. Super-normal densities of keystone browsers such as deer, in turn, have cascading effects that threaten diversity throughout the community.

Seidman disagrees with Diamond's assessment that management is necessary in such cases. He accuses Diamond of being an apologist for a "System" that invariably promotes the active management of natural and semi-natural habitats out of a desire to subjugate nature. Seidman deplors the compulsion evident in many land managers to actively manage their lands, arguing instead that leaving land alone will help us to shed our anthropocentrism. Perhaps inadvertently, he therefore sides with the animal rights activists who have opposed the shooting of deer so vigorously and effectively as to cancel deer control programs for the Fontenelle and elsewhere. Finally, he pleads for biocentric conservation biologists to speak out against what he sees as revisionist principles advanced in Diamond's essay.

As conservation biologists involved in a strenuous effort to convince the US Forest Service to adopt a minimal interference approach to managing substantial fractions of the two Wisconsin National Forests, we might seem appropriate candidates to accept



White-tailed Deer skull by Jay Tatara

Whenever possible, we should seek to reduce signs of human presence, reduce active management, and let natural forces reign. Yet in some instances we may be forced to intervene, even aggressively or frequently, if we wish to retain certain native elements of diversity.

Seidman's charge. For the past seven years, we have struggled through conversation, writing, negotiation, appeals, and litigation to convince the Forest Service that they could best and most cheaply meet federally mandated concerns to maintain biological diversity by abandoning active management for timber and game species in several large (50,000+ acre) "Diversity Maintenance Areas" (Solheim et al. 1986; Mlot 1992). Notably, Diamond wrote a strong letter in support of our attempts to create these DMAs, indicating clearly that he is not in favor of active management for its own sake. Finally, for the past three years we have conducted a large-scale research project into the key interaction that prompted Diamond's essay: the effects of deer browsing on sensitive plant species (Alverson et al. 1988). We can only agree with Mr. Seidman that land management policies of both public and private agencies show an overwhelming predilection toward manipulative management. Many public land managers shun the idea that leaving land alone might be good for it, considering it instead irresponsible or even immoral. This, of course, is nonsense. It is just as nonsensical, however, to assume that we should never actively manage land if our goal is to retain diversity or other natural values. Whenever possible, we should seek to reduce signs of human presence, reduce active management, and let natural forces reign. Yet in some instances we may be forced to intervene, even aggressively or frequently, if we wish to retain certain native elements of diversity.

Which threats justify intervention via active management and which should we simply accept? Is it appropriate to accept acidic precipitation on the Adirondacks and Appalachian wilderness areas? Should we watch silently as Paperbark (*Melaleuca*) and Brazilian Pepper trees (*Schinus*) invade the Everglades and displace native trees? Shall we refrain from burning prairie remnants in Iowa growing into Sweet Clover (*Melilotus*) and Box Elder (*Acer negundo*) because of the loss of a pre-settlement fire regime? Should we abandon cowbird control efforts and burning to retain young Jack Pine stands for Kirtland's Warbler in Oscoda County, Michigan? Should we attempt to reduce deer populations to increase the probability that Moose now wandering into northern Wisconsin will become successful colonists (they now die because of a parasite shared with deer)?

In all these cases, we feel that biocentric managers have a responsibility to actively intervene to help compensate for the massive disruption that has already occurred in native ecological processes. While even purist biocentrists like Seidman would presumably favor actions

to shield reserves from direct assaults like acid rain, it is difficult to argue that there is any real distinction among the threats mentioned above. No natural area in today's world is free of the "eternal external threat" posed by human disruption of local, regional, and global ecological processes (Janzen 1986). Edge-, area-, and isolation-sensitive plant and animal species are suffering in most parts of their range. External impacts, including perambulatory deer, penetrate to the core of small- to medium-sized reserves. While individuals may be unable to prevent global warming, conservationists do have the power and, correspondingly, the responsibility to protect reserves from threats they understand and can control. In such instances, *not* managing actively to control these threats is equivalent to accepting unwanted external interference. In this context, biologically informed and motivated efforts to minimize disruption of natural processes constitutes a far preferable form of interference.

In the case cited, stewards of the Fontenelle Forest face a restricted set of choices. They can: 1) allow overpopulation by deer to continue and label it "natural" (as Seidman seems to suggest); 2) drive the deer out and fence the area (very expensive but a realistic management option); 3) attempt to impose birth control on the deer (also expensive and usually unreliable); or 4) seek to control deer populations via hunting (effective and relatively cheap). All these alternatives have been thoroughly tried in dozens of forest preserves across the Northeast and Midwest and there is general agreement among natural areas managers which is preferable.

We would propose that the goal of biocentric land managers be to minimize interference in natural processes as far as possible. In general, larger nature reserves will require far less intervention and active management than small areas, one of many arguments in their favor. But if we are to retain diversity and the natural processes diversity depends upon, we will need to accept the obligation to manage smaller areas in accord with our best knowledge of what their constituent species require. Thus, we face the ironic (and, to some, unpalatable) situation that in order to achieve our goal of minimal interference, we will need to actively intervene in cases where we see a clear and present danger. In some cases, of course, we will not perceive a threat until it is too late. It is also likely that our efforts to actively manage natural areas will occasionally precipitate unintended consequences (one thinks of predators introduced onto islands to control mice and rats). Nevertheless, such errors do not justify inaction when clear and present dangers are recognized. ☺

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Natural World News

ADFG CONDEMNS WOLVES

In November of 1992 the Alaska Game Board announced the Alaskan Strategic Wolf Management Plan. The stated goal of the plan is to conserve Alaska's wolves and their prey. The "conservation" method to achieve this goal is the aerial gunning by Alaska Department of Fish and Game personnel of 300-400 wolves. The motivation behind the plan was described by Bruce Bartly, project assistant for the Alaska Department of Fish and Game (ADFG): "Some hunters feel short-changed. They think a few more moose and caribou should die by bullets instead of teeth."

The Strategic Wolf Management Plan calls for wolf control actions in three areas of Alaska: the Fortymile, Delta, and Nelchina

Basin. For each of the control areas, Governor Walter Hickel of Alaska has offered the excess wolves to any state or federal agency willing to pay for their capture and transport.

Numbering more than half a million in the 1920s, the Fortymile Caribou herd has since declined to 22,000. The goal of the Fortymile control plan is to increase the herd to 60,000 by the year 2000. To accomplish this, Gray Wolf numbers are to be decreased by 70-80 percent for five years. Habitat conditions in the Fortymile are described as capable of supporting Caribou numbers in the hundreds of thousands. David Kellyhouse, the division director of Wildlife Conservation for the Alaska Department of Fish and Game, believes the wolf removal plan can, "create a wildlife spectacle on a par with the major migrations

of East Africa."

The Delta Caribou herd declined from over 10,000 in 1989 to less than 6000 in 1992. To increase the Delta Caribou herd to 7000-9000, Department personnel will aerial gun wolves for three years. The Department acknowledges that current habitat conditions will not support the additional Caribou and habitat improvements will be necessary.

The Nelchina Basin, proximate to Anchorage and Fairbanks, is one of the most heavily hunted areas in Alaska. Presently the supply of Moose and Caribou in the basin does not meet the demand, even though for most of the last two decades wolf numbers have been controlled. To meet the harvest demand, ADFG plans to continue limiting Gray Wolf numbers and to increase the harvest of Grizzly Bears.

The Strategic Wolf Management Plan is, of course, idiotic to anyone with a rudimentary understanding of predator/prey dynamics. Dr. Gordon Haber, a biologist with 27 years of experience studying wolves in Alaska, said ADFG's plan "is bad biology all around, almost insulting from a scientific standpoint." It is most insulting to Gray Wolf, Caribou, Moose, Grizzly Bear and all the life and the very places of the Fortymile, Delta and Nelchina Basin.

The plan demonstrates the lack of ecological consciousness of the Alaska Department of Fish and Game, in particular, and the wildlife biology profession, in general. The Department and much of the profession it represents is stuck in the agricultural science of wildlife management. Technological advances abound—telemetry, remote sensing, aerial gunning—but deep ecological understanding ADFG lacks. Aldo Leopold once shot wolves, and describes witnessing the "green fire die" as the awakening moment necessary for his own thinking like a mountain ecological consciousness. The ADFG aerial gunners will not see the green fires they destroy.

It really isn't useful to be angry at the



gray wolf (*Canis lupus*) by Jay Tatar

Natural World News

politicians and the bureaucrats of the Game Board and the Fish and Game Department, they are after all politicians and bureaucrats. We should however, be angry at the ADFG employees who developed this Strategic Plan and at those who do nothing to expose it yet continue to call themselves biologists or ecologists. Quoting from Buddy Red Bird, "the bastards are winning because the good guys are cowards... until individual courage is put on the line, evil will have its way." Only when individual biologists begin doing the real work of ecology, and not the pimping for recreation dollars, will nonsense like the Strategic Wolf Management Plan stop.

The hunters of Alaska should also be expressing their discontent with the Alaska Fish and Game Department. A true hunter does not want to rid the hunting grounds of the more skilled four-legged hunters. The ADFG is catering to recreation sport hunters.

What to do? The Strategic Plan is for short-term economic gain. So don't go up there. Avoid anything that results in dollars going to Alaska. Boycott. Write Governor Walter J. Hickel (POB 11001, Juneau, Alaska 99811-001 or call 907-465-4195) and tell him there are no excess wolves. Tell him you were planning to visit Alaska to spend your vacation greenbacks, but not now. Don't buy magazines that advertise Alaska. If you subscribe to one that does now, cancel and explain why. Write your Congress types and tell them to make sure Alaskan crude is not allowed to be sold out of this country. If the environmental group you pay dues to is not creating a fuss, ask why.

The public outcry against the wolf shooting has already grown loud. It must, however, be intensified and sustained to have a lasting effect. ☛

—Dennis Sizemore, executive director,
Round River Conservation Studies

Update from the Alaska Wildlife Alliance: Governor Ilickel has called a Wolf Summit to be held January 16-18 and until that time the plan has been suspended. The Governor has invited 100 people, mostly from Alaska, to attend the meeting, including legislators, conservation leaders and people from the tourist industry. At the end of the summit the Board of Game will meet to determine the future of the Gray Wolf. Put the pressure on!

LAWSUIT SEEKS TO HALT LOGGING OF EASTSIDE OLD GROWTH

September 10, 1992 the Natural Resources Defense Council (NRDC) filed suit on behalf of seven conservation organizations seeking to halt the logging of remaining old-growth forests on the Winema National Forest, located on the east side of the Cascades in south-central Oregon. The suit, filed in federal district court in Portland, argues that continued logging of old growth threatens the viability of species that inhabit these forests.

A report of the Scientific Panel on Late-Successional Forest Ecosystems (the "Portland Panel" or "Gang of Four") found that "relatively little" old-growth Ponderosa Pine remains on the eastside, which "increases the urgency" to establish a functional old-growth reserve system. "Continued logging of old-growth on the 'eastside' presents a grave threat to the marten, pileated woodpecker, northern goshawk, white-headed woodpecker, and other species."

NRDC attorney David Edelson blamed the Forest Service: "Rather than attempting to protect the remaining old growth and establish a viable reserve system, the agency is replicating its discredited management strategy for the northern spotted owl by protecting only small, isolated old growth stands and logging all the rest. The few protected areas are too small, too far apart, and contain inadequate habitat to support viable old growth ecosystems."

The old growth management plan challenged in the case was based on regional guidelines adopted on all ten National Forests in eastern Oregon and Washington. "The Winema National Forest is just one example of a flawed approach to managing old growth forests utilized throughout the region. This suit, if successful, could provide a precedent for protecting old growth throughout the eastside," said Edelson.

The lawsuit specifically challenges an amendment to the Winema Forest management plan that will allow the vast majority of old-growth Ponderosa Pine forest to be logged. The suit also argues that the Forest Service has failed to consider and disclose the adverse effects of logging on the old-growth ecosystem, as required by the National Environmental Policy Act.

In addition to NRDC, (71 Stevenson Street, San Francisco, CA 94105), the plain-

tiffs include Forest Conservation Council, Oregon Natural Resources Council, Concerned Friends of the Winema, National Wildlife Federation, The Wilderness Society, and Portland Audubon Society. Conservation Biologist Dr. Reed Noss issued a declaration supporting the suit, in which he said, "Old-growth Ponderosa Pine must be considered an endangered ecosystem. No further logging of such stands is justifiable anywhere in Oregon."

Contact: David Edelson 415-777-0220 or Judy Martinez 213-892-1500. ☛

SURE HE CAN PLAY THE SAXAPHONE, BUT CAN HE SAVE THE ALABAMA STURGEON?

On 26 October 1992, the Biodiversity Legal Foundation (BLF), the Friends of the Alabama Sturgeon, and attorneys Edward W. Mudd Jr. and Ray Vaughan sent to the Department of Interior a 60-day notice of intent to file suit over the Fish and Wildlife Service's failure to list the Alabama Sturgeon as Endangered under the Endangered Species Act (ESA). This sturgeon (*Scaphirhynchus suttkusi*) is "one of the rarest unprotected native fish species in the United States and is on the threshold of extinction," the BLF charges. Individuals remain only in portions of the Cahaba, Alabama, and Tombigbee Rivers in the state of Alabama.

Several key issues, in addition to the fate of the sturgeon, surround this threat of legal action. Because of the timing, the case could be the first test of the new Clinton Administration's commitment to protect natural diversity in this country. Also, because of the fish's specific habitat needs, the case involves important questions about the designation of Critical Habitat under the ESA and about the US Army Corps of Engineers' dredging and maintenance of channels for commercial traffic in the Alabama and Tombigbee Rivers. Furthermore, the case presents one of the best-documented examples to date of the way large business interests and state and federal officials are attempting to circumvent the ESA.

For over a decade the Alabama Sturgeon has remained a candidate for possible listing as a Threatened or Endangered species. During this period, the degradation and destruction of sturgeon habitat by gravel dredging and mining, water flow rate regulation, and maintenance of river channels for navigation, have continued.

In the Federal Register Notice of Review, in 1982 and 1985 the species was recognized as a Category 2 candidate; and in 1989 as Category 1 (substantive information supports listing under the ESA). On 3 October 1991, after the US Fish and Wildlife Service (FWS) field office had recommended listing and the designation of Critical Habitat, FWS regional director James Pulliam Jr. signed and submitted a proposed rule to FWS director John Turner in Washington, DC. The FWS Washington office returned the listing proposal to the regional office saying that they would not sign the rule until the Region obtains additional documentation of the continued existence of the species.

Why the rejection? As the BLF points out in its "notice of intent," "it appears that factors other than biological ones have been responsible for the inordinate and unreasonable delays." Through the Freedom of Information Act, the BLF has obtained letters and documents detailing efforts by economic interests in Alabama and Mississippi and by some members of Congress from these states to derail the listing.

They include a letter of 22 April 1992 from Alabama Governor Guy Hunt to Dan Quayle as chairman of the Council on Competitiveness. The letter states: "I request that you review an imminent regulatory initiative of the Department of the Interior which will have a devastating economic impact on the State of Alabama and adjacent states." Among his unsubstantiated economic claims, "Preliminary, very conservative estimates from only ten affected companies show an increase in transportation costs alone of more than \$2 billion over twenty years."

Such figures are "distorted and inflated," BLF charges. "In fact, sturgeon are usually considered to be a commercially valuable species."

With the ESA coming up for reauthorization in 1993, the case of the Alabama Sturgeon illustrates how the opponents of the Act plan to try to amend it such that economic interests will be placed into the listing process under section 4. Currently, the decision on whether a species receives protection under the Act must be based only on the best available scientific evidence. The placing of an economic cost-benefit analysis in the listing section of the ESA could cripple the Act's capacity to protect species and habitat.

The sturgeon case represents a litmus test for the Clinton Administration's commitment

to protecting intact ecosystems and natural diversity, especially where "glamorous" megafauna are not involved.

For information on how to help the sturgeon, write the Biodiversity Legal Foundation, POB 18327, Boulder, CO 80308, or call Ray Vaughan, attorney for Friends of the Alabama Sturgeon, 205-265-1298. ☐

This article is based on a BLF press release, a copy of the notice of intent to sue, a copy of the Hunt-Quayle letter and an update by Mudd and Vaughan.

—Mary Byrd Davis

THE BIG IVY BIODIVERSITY RESERVE: A CRUCIAL CONCEPT AT A CRITICAL TIME

On the Toecane Ranger District, Pisgah National Forest, in western North Carolina near Asheville, an irreplaceable gem exists. Known as the Big Ivy area, it offers a unique opportunity for the establishment of a biodiversity reserve.

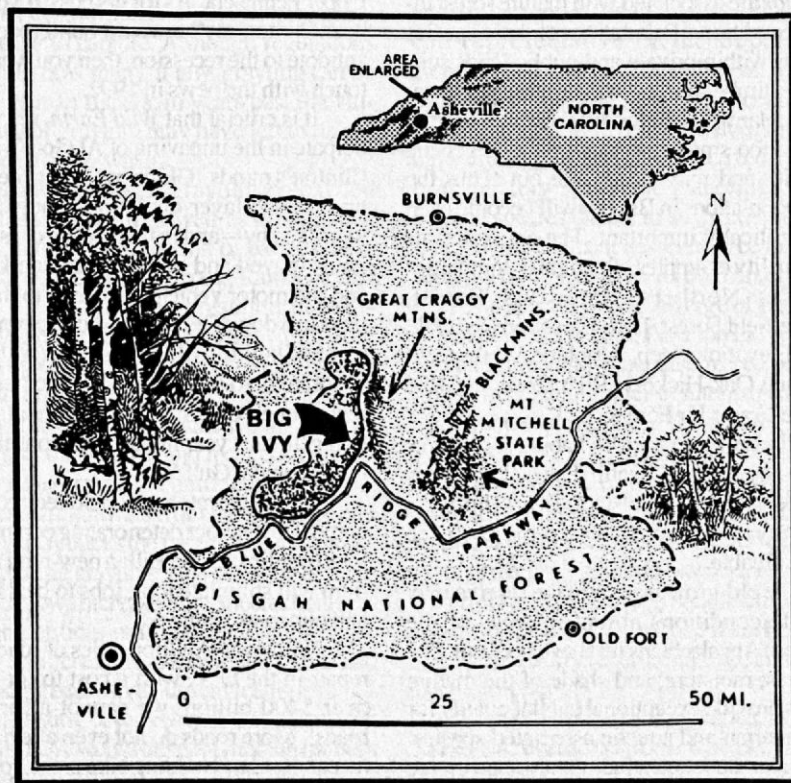
Big Ivy is an approximately 14,000 acre area of exceptional diversity, rare species, and old-growth forest. At least 47 rare species of

plants and animals have been documented here.

The forests are generally mesic and varied. Unique underlying geology creates different community types, some more dry and acidic, some more mesic and of higher pH and diversity. The exact amount of old-growth forest is as yet undetermined, but indications are that the area may well contain the greatest extent of unprotected old growth in the Southern Appalachians. The list of rare plant and animal species may be more extensive than those of many state and national parks in the region. Many of the rare species present are associated with mature forests and would be seriously affected by logging.

In the last two decades, much has been irreplaceably lost in the Big Ivy area. Timber sales took out precious old growth, and fragmented remaining forests. Road construction altered hydrology, and impacted populations of rare species. As recently as five years ago, an old-growth stand was logged, even though a state endangered species associated with mature forests was present. A sale is presently pending in which logging units contain old-growth forest and an abundance of rare species.

Through the years, Special Interest Areas and certain Management Areas have been es-



MAP BY BRIAN EVANS

established by the Forest Service (FS) as a reaction to the public's desire for protection of specific biological resources. A designation of "Biodiversity Reserve" has not yet been established.

The FS now espouses the long-term maintenance of biological diversity. A FS publication on biodiversity states: "By virtue of its size and geographic breadth, the National Forest System ranks among the country's most important reservoirs of biodiversity. Indeed, the majority of non-marine species in the United States probably occur somewhere on national forest lands".

Big Ivy has known populations of 22 state-listed plants (some with federal listing also), 17 plants on the state watch list, and 8 state-listed animals. Populations of some of the rare species are numerous and healthy. Most of the land area is relatively inaccessible and rugged. Very little of the area has been thoroughly explored by botanists or zoologists; the probability of occurrences of other rare species is quite high.

Numerous rare plant species such as *Disporum maculatum*, *Silene ovate*, *Hydrastis canadensis*, *Aconitum reclinatum*, *Stellaria corei*, *Streptopus amplexifolius*, *Dryopteris goldiana*, *Trillium rugelii* and *Hybanthus concolor* are associated with mature forest interior conditions. Populations of these species in areas within private and public lands suitable for timber harvest will continue to be reduced. Many populations of these rare species may be too small to contain enough genetic diversity and may slowly die out. Thus the large populations in Big Ivy will become even more critically important. The area contains high quality examples of natural communities such as Northern Hardwood Forest, Boulderfield Forest, High Elevation Red Oak, High Elevation Seep, Montane White Oak, Montane Oak-Hickory, Rich Cove and Red Spruce-Fraser Fir Forest.

Big Ivy also provides habitat for species whose populations' health depends upon low road density, such as Black Bear. Big Ivy's proximity to other roadless areas makes it even more valuable.

The old-growth areas in the reserve may provide conditions absent in areas of the Southern Appalachians that have been cut. The coolness, moisture, and shade of the mature forests provide exceptional habitat quality for both riparian and aquatic associated species. Here salamanders, including rare species, are diverse and abundant. Clearcutting radically

reduces the abundance and diversity of salamanders.

If a reserve were established in Big Ivy, old-growth forest would remain intact, and surrounding forests could continue succession. The potential for forest interior species to return to previously logged forests still exists as long as healthy populations remain. However, most of Big Ivy is still designated in Management Area classifications that allow for timber harvest. Thus there is still pressure for logging. Those interested in the conservation of Big Ivy are welcome to contact Karin Heiman or Mary Kelly at 704-649-3804 or 704-258-8737. Also, write to the planning team at National Forests in North Carolina, PO Box 2750, Asheville, NC 28802. ☺

—Karin Heiman, 50 Rector Branch Road, Marshal, NC 28753

MORE ROADS ON CLINTON—GORE AGENDA

A CALL FOR ACTION FROM THE ALLIANCE FOR A PAVING MORATORIUM:

Yes, Gore is the environmentalist compared to Quayle. But on 27 October 1992 he called for a freeway to be built in Michigan's Upper Peninsula. As for his boss, if you didn't hear Clinton say he would build roads as the antidote to the recession, then you were out of touch with the news in 1992.

It is crucial that *Wild Earth* readers participate in the unpaving of Al Gore's and Bill Clinton's minds. Global warming, deforestation, ozone layer depletion, smog... all are worsened by—and in fact mostly caused by—roads (paved and unpaved) and parking lots and the motor vehicles that take to them like fleas to a dog. The paving moratorium movement is key to wilderness preservation and restoration, to creating auto-free cities, and to reducing oil consumption, which, at 115 billion gallons a year in the U.S., contributed to the genocidal Gulf War.

A road moratorium could redirect development toward our deteriorating communities. Read our lips Al and Bill: a new-road moratorium will stimulate jobs, jobs to heal the land and our communities.

With over a million miles of roads out of repair in the U.S., with a cost to fix them at over \$400 billion, we cannot afford more roads! More roads do not even alleviate traffic congestion. Building bike paths, foot paths and renewable energy powered passenger rail

would better solve mobility gridlock. And those "avenues," along with repairing roads, are better for generating employment than firing up Earth-destroying machinery.

Send your suggestions to: President Bill Clinton, The White House, 1600 Pennsylvania Ave., Washington, DC 20500

Please support our paving moratorium campaign with a \$30 subscription fee, or more—we're tax deductible. Tell any environmental group to which you belong to pressure Clinton and Gore and their aides to spare us the extra asphalt! ☺

—Jan Lundberg, Publisher, *Paving Moratorium Update*, ALLIANCE FOR A PAVING MORATORIUM, POB 4347, Arcata, CA 95521

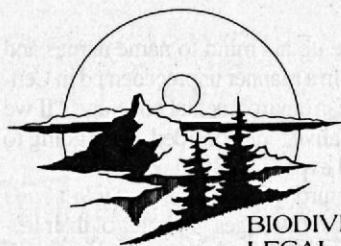
LUJAN VIOLATED THE MEXICAN SPOTTED OWL

Secretary of the Interior Manuel Lujan and the US Fish and Wildlife Service (FWS) violated the Endangered Species Act in their failure to list the Mexican Spotted Owl as Threatened, the Biodiversity Legal Foundation (BLF) and Dr. Robin Silver charged in November in separate notices of intent to sue. They point out that from a biological point of view, the Mexican Spotted Owl (*Strix occidentalis lucida*) is even more endangered than the much publicized Northern Spotted Owl.

The Mexican Spotted Owl, which has darker background plumage and larger white spots than the northern bird but otherwise resembles it, lives in forested mountains and canyons from the Rocky Mountains in Colorado and the Colorado Plateau in southern Utah, south through western Texas, New Mexico, and Arizona, into Mexico. It needs uneven-aged, multi-storied, mixed conifer forests with closed canopies, and prefers the older and denser forests, although field data suggest that it may have adapted to a more diverse range of habitats than its northern cousin. Ninety percent of its habitat is in the hands of the US Forest Service.

The chief threats to the subspecies are destruction of its habitat by logging, and increased predation and competition from the Great Horned Owl and the Red-tailed Hawk due to habitat fragmentation. According to the FWS, between 2100 and 2200 Mexican Spotted Owls survive, one-third as many as Northern Spotted Owls.

As a result of a December 1989 petition to list the Mexican Spotted Owl under the



BIODIVERSITY
LEGAL
FOUNDATION

Endangered Species Act, FWS determined that such a listing was warranted and, 4 November 1991, published a proposed rule to list the owl. The ESA requires a final determination and publication within one year of the publication of the proposed regulation. As of 9 December, a final determination had not been made. Meanwhile, the US Forest Service continues to allow the logging of owl habitat in Colorado, Arizona, and New Mexico.

Jasper Carlton of BLF reports that there is so little functional old growth left in the Southwest that we do not know "whether it can provide the habitat for the area's old-growth associated species," even if no more old growth is cut. In addition to the Mexican Spotted Owl, species threatened by the fragmentation and destruction of mature forests in the Southwest include the Northern Goshawk, Flammulated Owl, Spotted Bat, Occult Bat, Jemez Mountain Salamander, Wood Lily, and Goodding's Onion.

BLF intends to call attention to the plight of the whole ecosystem. It also plans to be ready to respond to criticism of the owl's listing from those who fear unemployment. To lessen the impact of preserving old growth on residents of small towns dependent on the timber industry, BLF is working with Forest Guardians on ideas for economic conversion, such as small-scale selective cutting of second growth to support micro-industries in wood products.

Asked whether BLF and Silver will join forces to file a single suit if the Mexican Spotted Owl is not rapidly listed, Silver promised, "We will do whatever is necessary to make sure that the owls and the canopied habitat that they require survive." He suggests that readers call the FWS director (202-208-4717) to encourage the agency "to behave more consistently with its mandate."

For additional information contact the Biodiversity Legal Foundation (303-442-3037) or Dr. Robin Silver (602-246-4170). ☛

—Mary Byrd Davis

BLF THREATENS LEGAL ACTION TO PROTECT FLUVIAL ARCTIC GRAYLING

In a formal 60-day notice of intent to sue, filed with Secretary of the Interior Lujan November 4, the Biodiversity Legal Foundation (BLF) and George Wuerthner charged the Secretary, and Fish and Wildlife Service Director John Turner, with illegally delaying the listing of the Fluvial Arctic Grayling (*Thymallus arcticus*) under the Endangered Species Act (ESA). The Fluvial Arctic Grayling is one of the rarest unprotected native fish species in the United States and is on the threshold of extinction.

Unless Secretary of the Interior Lujan takes the necessary steps to make a petition finding on whether the listing of the Fluvial Arctic Grayling under the ESA "may be warranted" within 60 days, the prospective plaintiffs will file suit in Federal District Court to compel the Secretary to meet his statutory obligations. George Wuerthner and the BLF had filed a formal petition with the Secretary on 2 October 1991 requesting that the Fluvial Arctic Grayling be listed and protected under the ESA.

At least three major reasons are cited for its overall decline in Montana. First, the grayling is easy to capture. Although regulations today limit how many, if any, grayling can be kept by human fishers, in years past the vulnerability of grayling may have led to its extirpation in many waters.

Second, although grayling co-existed with Cutthroat Trout as well as other native species, human introduction of exotic, more aggressive fish, like the Brook, Rainbow, and Brown Trout, may have resulted in overwhelming competition for the grayling. Both overharvest and competition are thought to be responsible for the loss of grayling in the Madison River within Yellowstone National Park.

Third, the greatest and most easily rectified threat to grayling is dewatering of rivers. Irrigation withdrawals from the Big Hole and other rivers reduces the habitat available to all fish, including grayling. This lowering of natural water flows increases interspecies conflicts and competition and reduces overall water quality by increasing water temperature and introducing excessive nutrient loading.

The listing of the Fluvial Arctic Grayling under the ESA would increase funding for both research and the restoration of instream flows. It would give agency officials legal authority

to better maintain river flows by reducing irrigation losses. A cooperative, adequately funded effort by state and federal agencies working with private land owners will be needed to achieve the conservation of *Thymallus arcticus*. For more information, contact the BLF. ☛

—Jasper Carlton, BLF, POB 18327, Boulder, CO 80308

BLF PETITIONS FOR ROCKY MOUNTAIN LIMPET SNAIL

On 30 September 1992 the Biodiversity Legal Foundation (BLF) and Dr. Shi Kuei Wu of the University of Colorado formally petitioned the Department of the Interior to emergency list the Rocky Mountain Limpet Snail, *Acroloxus coloradensis* (Henderson) as Endangered and to designate Critical Habitat for it.

Scientists believe that *Acroloxus coloradensis* was once widely distributed over North America. Now populations exist at only two sites in the United States: Peterson Lake in Colorado and Lost Lake in Montana; and six sites in Canada: two in Alberta and four in the East¹.

This limpet is of particular interest to scientists, because it "is the only North American representative of the Superfamily Acroloxeacea and is believed to be the most primitive pulmonate snail in this continent"², i.e., the most primitive snail belonging to the large order Pulmonata, characterized by a lung or respiratory sac. Some authorities believe that the species differs to such a degree from other mollusks that it deserves to be in its own separate family, or even its own order³.

The species is on the verge of extinction in half of its US habitat, Peterson Lake. In 1992 Wu and three assistants discovered only one limpet in ninety minutes of intense searching, and found that the shore the species had favored is now heavily polluted. The lake suffers from removal of water for snowmaking; salting, sanding, and grading of adjacent roads; and a chlorine wastewater treatment plant upstream. Colorado law does not protect invertebrates, and no government agency monitors the privately owned lake. Four-season water quality records have apparently not been compiled.

Limpet snails are more numerous at Lost Lake, but, even though the lake is in Glacier National Park, their future is not assured. The lake is only a few hundred yards west of the

overlook for Wild Goose Island, along the heavily-used Going-to-the-Sun road. Apparently local people and employees of park concessions swim in and camp next to the lake. These activities threaten the limpets, since they usually live on rocks and logs near shore, in shallow waters. To learn how secure these limpets are, population and water quality studies need to be done.

Whatever the status of the Lost Lake limpets, the species cannot be safe in the US if only a single population exists here. "*Acroloxus coloradensis* is one of the rarest unprotected mollusks in this country and is now rarer than many invertebrates already designated as endangered under the ESA," Jasper Carlton, director of the Biodiversity Legal Foundation points out.

For more information, contact the BLF, POB 18327, Boulder, CO 80308-8327.

1. Shi-Kuei Wu, "Colorado freshwater mollusks," *Natural History Inventory of Colorado*, No. 11 (Boulder, CO: Univ. of Colorado Museum, Nov. 1989), p. 9.

2. Arthur H. Clarke (ECOSEARCH, Inc.), *Status Survey of Selected Invertebrates of Utah*, Third Progress Report (30 June 1992), p. 4.

3. See Clarke, p. 4; and BLF and Dr. Shi-Kuei Wu, "Petition for a Rule to emergency list the Rocky Mountain Limpet Snail . . .," 9-30-92. The petition is the major source of information for this report.

—Jasper Carlton

BLF WINS PROTECTION FOR HUNDREDS OF SPECIES

The Bush administration and conservationists have reached a "satisfactory" out-of-court settlement of the multiple-species suit brought against the US Fish and Wildlife Service for failure to adequately implement the Endangered Species Act. Jasper Carlton of the Biodiversity Legal Foundation (BLF) characterized the suit, in an article in the winter 1991-92 issue of *Wild Earth*, as "the first broad-based generic lawsuit, involving hundreds if not thousands of species across the country." The settlement will affect some 2800 species, Carlton now says.

Crucial to the success of the suit were eight grassroots conservationists representing all regions of the country. The BLF devised the legal strategy for the case. Media reports have tended to overlook the role of the grass-

roots and to underestimate the impact of the settlement. *Wild Earth* plans to run a full article on the case in its spring issue.

—Mary Byrd Davis

LOGGERS ASSAULT GUATEMALAN CONSERVATIONISTS

In an incident that promises to be as controversial as the death of Chico Mendez, the beating of journalist Omar Cano Herrera and two conservation officials from Guatemala's CONAP agency has resulted in an international uproar which may give both environmental activists and reporters more rights in Central America. Following their torture by *contrabandista* woodcutters and soldiers in the Mayan Biosphere Reserve, Cano and the two CONAP protected area managers were showered with support from the International Committee for the Protection of Journalists, the Foreign Press Club, Guatemala's own Human Rights Office, the Archbishop of Guatemala, Greenpeace, Defenders of Wildlife, and 20 other organizations. The evidence of wrongdoing on the part of soldiers and loggers was so immediately obvious that 7 of the alleged attackers were arrested within a week. The implications that they were "following orders from above" (in the military) are being seriously investigated by the governor of the Department (Province) of Peten, Carlos Asturias, himself an outspoken conservation advocate.

The incident occurred between December 1 and 3, when *Siglo Viente Uno* ("21st Century News") reporter Cano traveled into the Maya Biosphere Reserve to document illegal logging with Reserve manager Spencer Dempsey Ortiz Kreis and his supervisor, Alberto Luna Franco, both age 24. They were delayed overnight near the site of the illegal woodcutting, then confronted early in the morning by 60-80 loggers and several soldiers, who beat them with cameras confiscated from Cano. (Only one of the cameras has since been recovered, but newspapers have printed aerial photos of the clandestine logging operation in the protected area.) After being tortured and interrogated, the three conservationists were finally released by their armed kidnappers when the governor intervened on their behalf. The captors assumed the young men had been taught a lesson and would be too scared to report the incident. But as Alberto Luna later related, Cano had al-

ready made up his mind to name names and cite details in a manner unprecedented in Central American environmental coverage: "If we leave here alive," he confided, "I'm going to make a full exposé by Sunday."

By Saturday December 5, *Siglo Viente Uno* printed 6 full pages of photos of their lacerations as well as eye-witness accounts, selling a record number of copies in the Peten. This was in part because Conservation International's Pro-Peten office was hosting an exposition of ecologically-produced arts and crafts which had attracted environmental activists to the area from a dozen countries. The Peten governor, who briefly appeared at the exposition, publicly promised to bring to trial not only the clandestine loggers but their accomplices in the military and central government.

The incident came just two weeks after the Guatemalan Congress granted permits to harvest "previously felled trees" in the Peten, against the governor's will—thus sanctioning all kinds of logging out of sight of officials. It also followed a demonstration by Guatemalan journalists on government office buildings, demanding more freedom in reporting controversial incidents, a demand met with contempt by officials.

—Gary Nabhan



The War in Lebanon

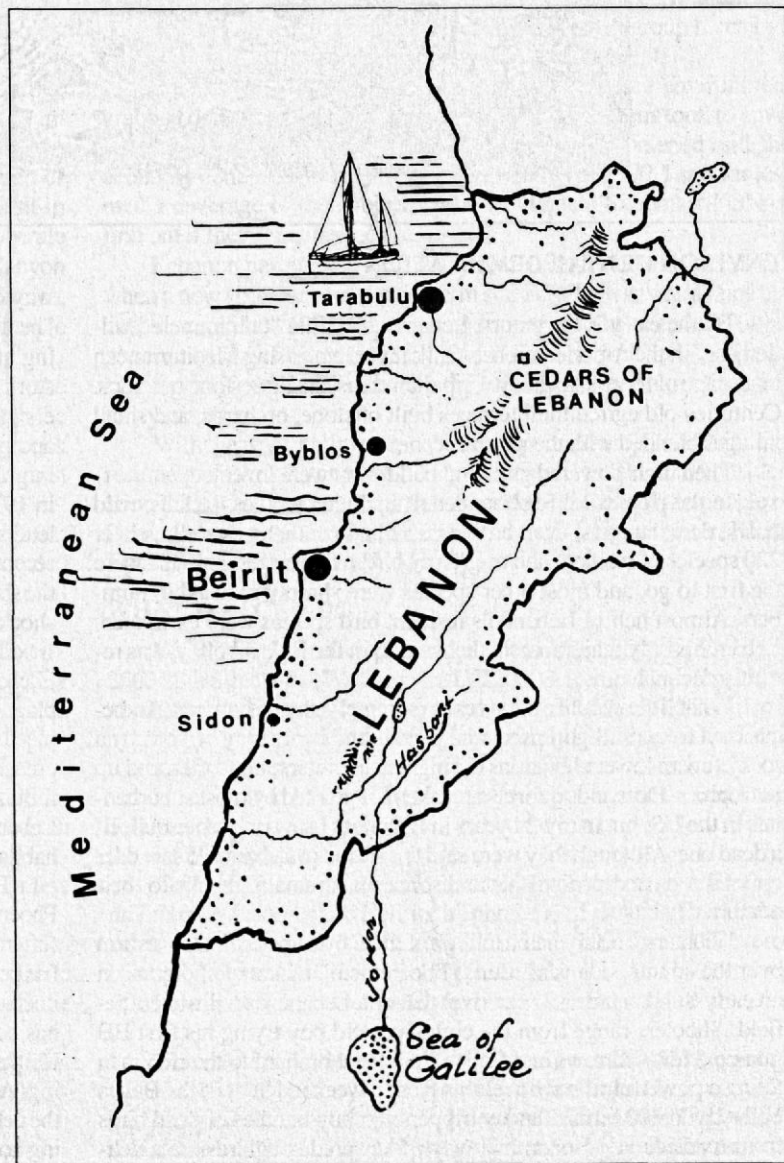
by Fareed Abouhaidar

OVERVIEW OF THE COUNTRY

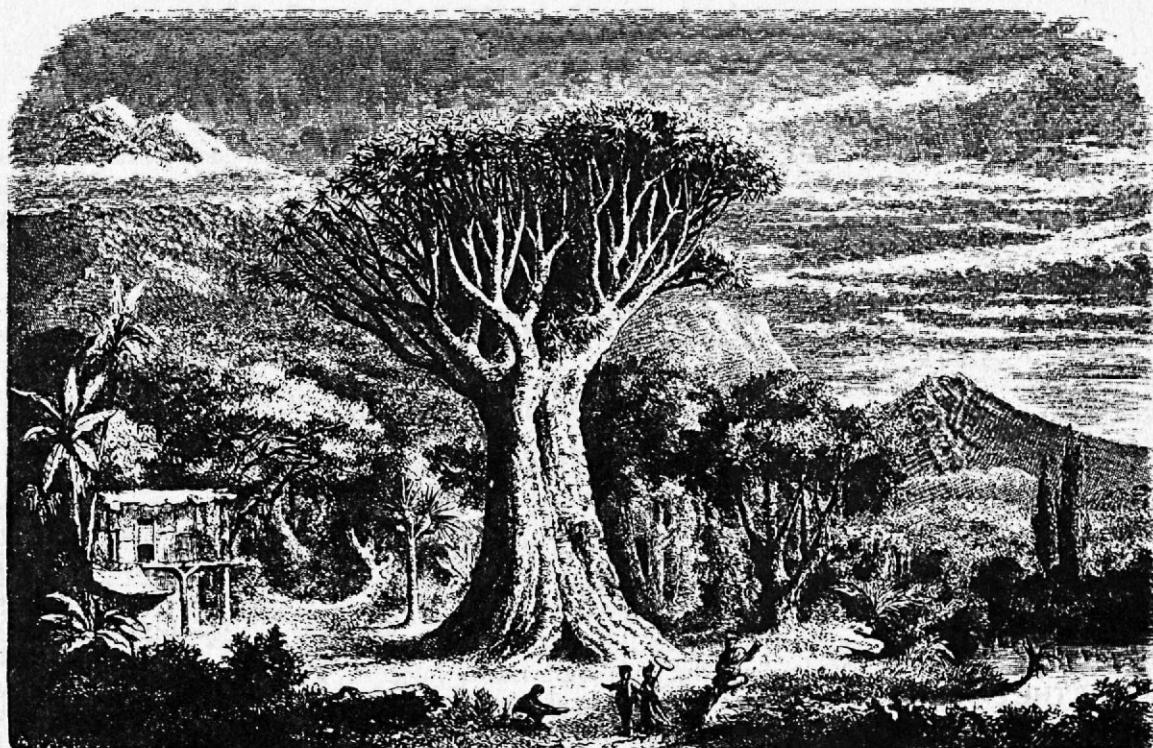
Lebanon. The very word conjures images of war and anarchy. What most people are not aware of is the enormous environmental devastation taking place there as well. This article will attempt to introduce to Americans the little-known, diverse natural environment of Lebanon and the threats facing it.

Lebanon is situated at the eastern end of the Mediterranean Sea, at the crossroads of Europe, Asia and Africa. The Lebanon Mountains run parallel to the coast, in places abutting the sea, and attaining heights up to 10,131 feet and intercepting most precipitation. Deep, narrow canyons hold seasonal streams. The Bekaa Valley separates these mountains from the more-arid Anti-Lebanon range. Precipitation ranges from 30 to 40 inches of rain on the coast to over 50 inches, mostly as snow, in the higher elevations. The name "Lebanon" is derived from a Semitic word meaning "white as milk," for the snow-covered ranges beckoned desert travelers from afar. The country's rugged topography and varied climate result in several life zones defined by elevation; some 2600 to 4200 species of plants (depending on reference) grow in this tiny country.

The country has been inhabited since the dawn of human civilization. Not surprisingly, the land shows the wear and tear of several millennia. Historically, the Lebanon range was covered with extensive forests of cedar of Lebanon (*Cedrus libani*). Most were logged in ancient times for export to build temples and naval fleets. Although the Romans eventually imposed a logging ban on what remained, only a few small groves have survived to the present. The former cedar forests were replaced by other Mediterranean vegetation such as stone pine (*Pinus pinea*), aleppo pine (*Pinus halepensis*), turkey oak (*Quercus cerris*), kermes oak (*Quercus coccifera* var. *calliprinos*), and smaller numbers of cypress (*Cupressus* spp.), juniper (*Juniperus phoenicea*), fir (*Abies cilicera*), and carob (*Ceratonia siliqua*). Above 6500 feet is a barren area with desert-like plants.



map by Brian Evans



Cedar of Lebanon

ENVIRONMENTAL DEVASTATION

By the early 20th century, Lebanon had little “untrammled wilderness” in the American sense. Still, it was a pleasing Mediterranean landscape of forests, meadows, riparian areas, and limestone outcrops. Centuries-old agricultural terraces built of stone, orchards, and small villages blended with the natural scene.

Then high-powered guns and bulldozers were invented.

In the past, wildlife abounded. It included wolves, jackals, wild boars, deer, badgers, even brown bears and panthers, as well as over 220 species of resident and migratory birds. The largest animals were the first to go, and most other species were sharply reduced in numbers. Almost half of Lebanon’s resident bird species were extirpated. Lebanon’s only major marsh, the Ammiq in the Bekaa Valley, was recently decimated.

What little wildlife survives is extremely shy of humans. An occasional fox is still glimpsed, and jackals and boars may be seen by a lucky few in lower elevations during harsh winters; they often end up as trophies. Deer and squirrels are taken for granted by most suburbanites in the US, but in my 24 years in Lebanon, I saw only one squirrel; a dead one. Although they were said to survive in Lebanon, I saw deer only in zoos and parks. Bats and some owls remain, thanks to their nocturnal habits.

“Hunters,” nearly half a million of them by some estimates, swarm over the countryside year-round. The non-stop racket of shotguns on an early Sunday morning can rival that of a Lebanese civil war battlefield. Shooters range from the eight-year-old boy trying his first BB gun on a few sparrows and finches in a local orchard to the rich man toting a powerful rifle who returns from a weekend hunt in the Bekaa Valley with 400 birds. Sunday trippers can buy bundles of dead birds from roadside vendors on highways. Skewed songbirds are a delicacy served in many Lebanese restaurants.

Unfortunately, Lebanon is strategically located along a major flyway connecting Eurasia with Africa. Each spring and fall, hordes of “hunters” step into their backyards and point at anything that flies, shooting at random until something falls, often using machine guns. The storks, hawks, and other birds brought down are not eaten; the poachers merely use them to show off in their villages, parading the victims and posing in front of cameras. By some estimates, 15 to 20 million migratory birds a year are brought down. Even before the war started in 1975, the situation was so dismal that newspapers received angry letters from Germany complaining about the decimation of storks. More recently, a Finnish group wrote to the President of Lebanon protesting the shooting of raptors. In 1982, invading Israelis hardened by war were shocked to see stuffed birds everywhere they went.

The decimation of birds has triggered a disastrous chain reaction. Each spring, whole forests of Aleppo pines and both species of oaks are plagued by tent caterpillars. Even the cedar of Lebanon, the centerpiece of Lebanon’s flag, is vulnerable to insects. Forest cover has decreased in part due to insect attacks, leading to erosion from the mountains. After an intense storm, the sea turns murky brown as Lebanon’s streams bleed topsoil from denuded slopes. As a result, fish habitat has silted up, affecting marine birds not accessible to poachers.

Forests have been under constant assault since the days of the Phoenicians. They have been decimated by human-caused summer fires (often started by smoking “hunters”), by logging for single-use wooden fruit crates (before the advent of the reusable plastic version), and by uncontrolled goat browsing. In the last several decades, deforestation has accelerated. In many Third World countries, most deforestation results from destitute peasants cutting firewood and from cattle ranching. Although firewood gathering is a problem in Lebanon, much of the deforestation is due to antiquated environmental laws facing a building boom not unlike that of a typical American sunbelt city. Even while the war—which ended in 1990—raged in frontline areas, construction

boomed elsewhere, radiating like a cancer around Beirut and other cities. Developers subdivided wild land in the mountains, and villages fused into amorphous masses of ugly apartment buildings. Hardest hit were overcrowded areas northeast of Beirut where many people sought refuge during the war. Ironically, the Shouf area southeast of Beirut, racked by past sectarian fighting, remains relatively unspoiled.

Much of Lebanon is privately owned; most of what little public land there is receives no formal protection. Weak zoning laws and laissez-faire private-property rights allow such monstrosities as five-story buildings on forested slopes. Large areas are owned by various religious institutions; these are reserved for the "benefit" of followers, who are often invited to cut wood.

Lebanon was blessed with spectacles that in the US would have been set aside as National Parks. One mountainous area, with its huge, razor-sharp limestone outcrops (karst), resembles Bryce Canyon in Utah. Due to its proximity to the Faraya skiing center and popular summer resort towns, it has been scarred by subdivisions and rock quarries.

The famed Adonis Canyon penetrates the mountains north of Byblos (from which "bible" was derived); sycamores line a stream hemmed in by steep cliffs and slopes rivaling those of Hells Canyon in the US Northwest. A huge gravel quarry mars the walls in one part of the canyon, and nearby factories foul the riparian area. Despite a sit-in at its entrance by environmentalists, the quarry continued to operate because the President of Lebanon had an interest in it. This canyon contains rare plants endemic to Lebanon. Another area with endemics, near Sofar, is inhabited by *Iris sofarana*, a delicate flower with purple variegations, now gravely threatened by ignorant pickers.

For millennia, invaders left records of their passing carved on the face of a strategic rocky promontory near the Dog River. Although the inscriptions survive, the famous rock has been gouged by a huge rock quarry in recent decades. This is akin to blowing up half of El Morro in New Mexico for gravel.

In the sea, dynamite is the illegal fishing method of choice. Occasionally, someone catches a dolphin or sea turtle which then is paraded around town. Seals lived in a limestone cave underneath Beirut until recently.

Many other problems plague Lebanon. Here is a brief rundown:

- Lebanon has become a Western-style consumer society. Recycling is limited and littering is widespread. Garbage is dumped next to roads in scenic valleys. At a popular promenade in Beirut, disposable beverage bottles cascade down a limestone cliff into the sea.
- Rural road-widening work, euphemistically dubbed "beautification projects," is a favorite recipient of parliamentary pork even in war-ravaged ghost towns.
- Tax codes discourage people from maintaining large (i.e. a few acres), private "nature reserves."
- Beaches are being destroyed by luxury resorts and illegal sand mining. The coast between Beirut and the Dog River was filled in to create real estate. Untreated sewage from coastal cities fouls the sea.
- Overpopulation is a politically sensitive subject and is rarely discussed, even though some 3.5 million people cram the 4000-square-mile country.

ENVIRONMENTAL ACTIVISM

Most Lebanese have been indifferent to the environmental havoc around them. Many spend their leisure time mainly on sedentary activities such as going to movies, driving around, sunbathing on polluted beaches (where they've grown accustomed to balls of tar and globs of trash), and shooting birds. It may be relevant to mention that a large majority of the population smokes.

Still, the appearance of an environmental movement was inevitable, and in the late 1970s, the Friends Of Nature (FON) came into being. Even as the war simmered, FON succeeded in bringing about the formation of a Ministry of the Environment. The Ministry, in turn, created Bentaa'el National Park, Lebanon's first and only such park, a tiny, two-square-kilometer patch in the mountains. FON stopped four more proposed quarries in Adonis Canyon. The founders tirelessly toured schools, giving lectures; the antiquated official curriculum still does not include environmental education. They led group hikes in a country where hiking for recreation was a novel concept.

Thanks to FON's efforts in the early 1980s, the environment grabbed daily headlines in the media, and many citizens took to environmental activism. In the late 1980s, the war worsened and the economy collapsed. On my last trip to Lebanon in 1990, I saw far less media coverage of the subject, and I was unable to contact FON or find out if they remained active.

Lebanon has not had a Ministry of the Environment since 1982, when a new six-year presidential term started. The war was a lame excuse since, in late 1982, the war was supposed to have ended. A new government was formed last May, minus Environment. Lebanon has a Ministry of Tourism even though the country stopped attracting visitors years ago.

With the war finally over, Lebanon is poised to repair damage and resume growth. Master plans being drawn need to take into consideration the natural surroundings that shaped the culture of the people of Lebanon and gave the world Lebanon's most famous writer, Khalil Gibran, who is often likened to Henry David Thoreau.

WHAT YOU CAN DO

Write to Lebanon's ambassador to the US: Lebanese Embassy, 2560 28th Street NW, Washington, DC 20008. Remind him that Lebanon harbors unique ecosystems, and that if the Ministry of Tourism is important in a war-ravaged country, then surely a Ministry of the Environment is at least as important. In the past Lebanese tourism emphasized a few cultural sites while ignoring the countryside around them. Tell him that post-war visitors will not come just to see a few spots if the rest of the country is an eyesore.

For more information on Lebanon's environment, see *Ecologie du Liban* by Georges and Henrietta Tohme (1985. International Publications Service, 114 E. 32nd St. New York, NY 10016), and "Battered Birds of Lebanon" by Rick Boling in *Audubon*, 1-86. The former is available in Arabic, as well as French, for your reading pleasure.

Fareed Abouhaidar (1628 W. Millagro, Mesa, AZ 85202) grew up in Lebanon where, as a six-year-old, he once dumped in water a BB gun being used to shoot songbirds. He moved to Arizona in 1985 mainly due to the war. He has an MS from Arizona State University in Environmental Resources in Agriculture.

Mexico's Cienega de Santa Clara

"Green Lagoon" Reborn and Threatened Once Again

by Dale S. Turner

Here is a tale of wilderness lost, restored, and threatened again. It's a story of biological beauty and industrial sterility, of untamed water and concrete canals. Most striking, it's also a story of the U.S. Bureau of Reclamation doing something very right, quite by accident, and how they might soon reverse this precedent.

Our story centers around the delta of the Colorado River, one of the natural wonders of North America. Until this century, the gathered waters of the Colorado spread out across this 3325 square mile plain, creating a lush green landscape in the driest heart of the Sonoran Desert. Marshes and thickets, saltgrass prairies and gallery cottonwood forests all grew within a stone's throw of a sea of barren sand dunes, the immense Gran Desierto. The air was full of birds, the water full of fish, and jaguar roamed the land.

In addition to wildlife, the untamed land had human inhabitants. Several thousand native Americans, known as the Cocopas, lived in small bands scattered across the delta. Dwelling in hemispherical huts of stick and mud (the primordial dome home), they thrived in a fat land—growing squash, beans and corn, gathering grass seed in season, catching fish and hunting small game.

Even in 1922, Aldo Leopold found it to be a "milk-and-honey wilderness." In his essay, "The Green Lagoons" (part of *A Sand County Almanac*) he called it a "home in the remote fastnesses of space and time; we were both back in the Pleistocene."

The river was not a gentle provider for this land, however. Flows could range from a relative trickle (1200 cubic feet/second was recorded in September 1924) to a raging torrent (186,000 cfs in June 1921). The primary river channel writhed like a snake, looping and curling all the way down the delta, "for he could not decide which of a hundred green lagoons offered the most pleasant and least speedy path to the Gulf," according to Leopold. But in flood stage the river was more like a stampeding herd, often spreading a shallow torrent across the entire delta. Such floods were reliable summer events, watering the vegetation and distributing a load of sediment and organic matter comparable to that carried by the greatest rivers in the world.

As U.S. Lt. George Horatio Derby described the mouth of the delta in 1850, "Thousands of trunks of trees lie scattered over its surface as far as the eye can reach, showing that it must be entirely overflowed at the season of freshets."

Such floods would also rearrange the channel bed, leaving aban-

doned meanders scattered across the countryside like the string of broken hearts left by a wild woman. One such cutoff channel, the Cienega de Santa Clara, would become the most important wetland in the Sonoran Desert.

The Cienega de Santa Clara was a huge marsh in 1875, when U.S. Navy Commander George Dewey mapped the shores of the Gulf of California. It was supplied in part by the very shallow water table of the delta, but got its primary supply from the regular floodwaters.

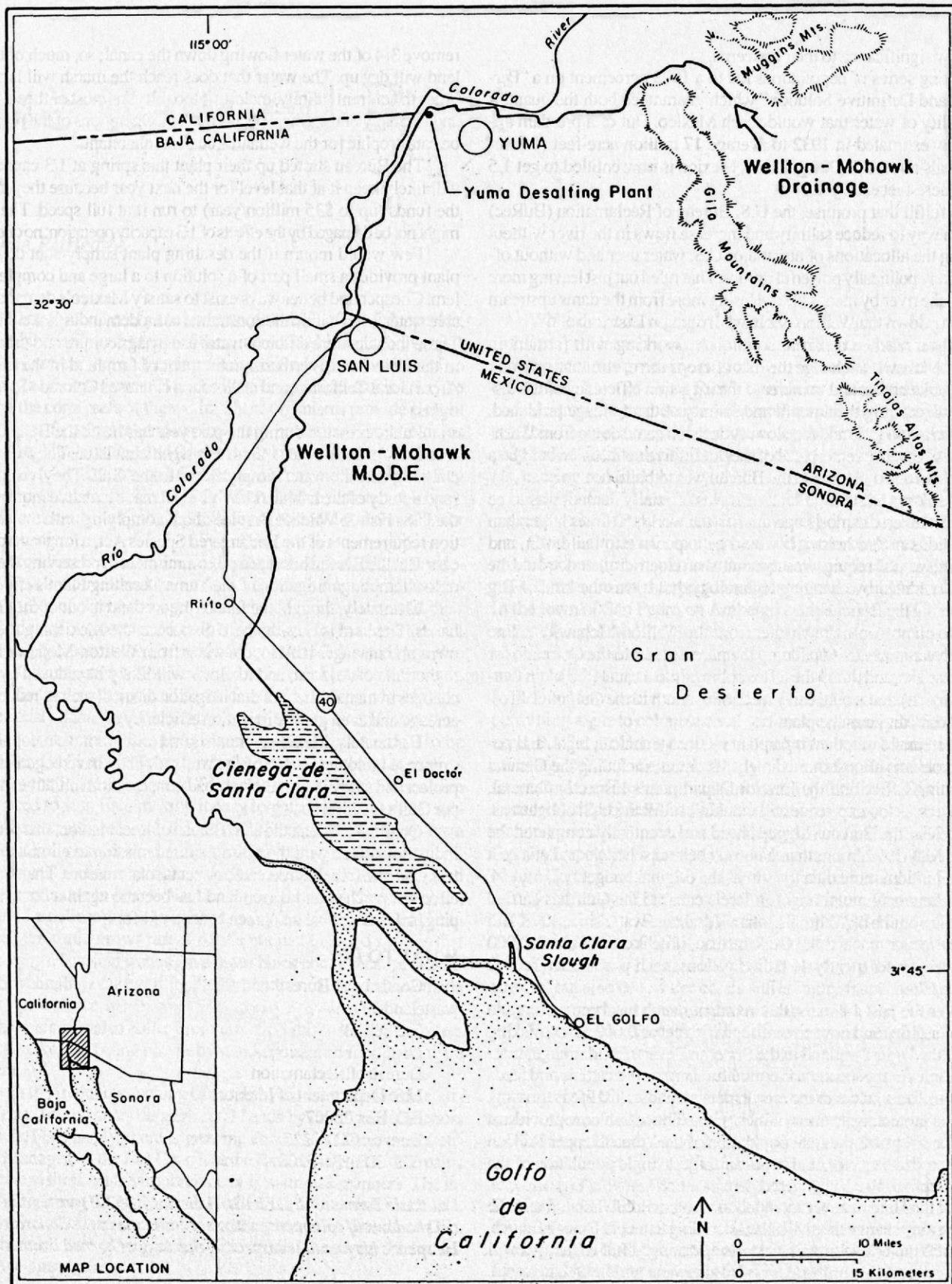
Humans began their attempts to tame the delta in 1901, with levees and diversion canals to protect farm fields and a railroad line, and to support new farming operations in the Imperial Valley. Large patches of the delta were cleared for agriculture, but the real domestication of this wilderness came with the giant dams upstream. Starting with Boulder (Hoover) Dam in 1935, then followed by concrete plugs like Parker Dam, Imperial Dam, and Glen Canyon Dam, the Colorado River was trained to the yoke, bled of its waters and robbed of the sediment that provided its name. Most of the delta was converted to giant rectangular fields of cotton, wheat and vegetables: Big Agriculture. The rest, down near the Gulf, has become barren, saline mudflats.

Without regular supplies of floodwater, the Cienega began to shrink. It was down to about 75 acres in 1975, but upstream politics would deliver a new source of water and restoration of the marsh.

In the 1950s, east of Yuma, Arizona, farmers organized one of the last big irrigation districts to suck subsidized water from the Colorado. Called the Wellton-Mohawk Irrigation and Drainage District, they struck it rich by making the desert bloom with cotton, citrus, and lettuce. Their only problem was salinity in the soil, aggravated by poor soil drainage and mineral-laden water from the river. To solve the problem, they began pumping the residual water out from under their farm fields and dumping it back into the Colorado via a tributary, the Gila River.

This solution caused new problems for farmers downstream, because suddenly the Colorado River water was too salty for crops before it reached their fields. This was further complicated by the location of all the downstream farmers—they were all in Mexico and so couldn't seek any simple solutions.

Mexican officials had complained since the 1930s about the steadily shrinking amount of water in the river, and the sudden rise in salinity made it a serious international issue. The U.S. had largely ignored earlier protests, but the discovery of large Mexican oil reserves



gave new significance to their concerns.

A long series of negotiations led to a 1973 agreement on a "Permanent and Definitive Solution" which guaranteed both the quantity and quality of water that would reach Mexico. Out of a pre-dam annual flow estimated in 1932 to average 17 million acre-feet (1 acre-foot equals about 326,000 gallons), Mexico is now entitled to get 1.5 million acre-feet each year.

To fulfill that promise, the U.S. Bureau of Reclamation (BuRec) sought a way to reduce salinity and increase flows in the river without reducing the allocations of any major U.S. water user and without offending any politically powerful groups. That ruled out just leaving more water in the river by means like releasing more from the dams upstream or closing down the Wellton-Mohawk Irrigation District.

BuRec reached a partial solution by working with farmers in Wellton-Mohawk to change the mix of crops there, eliminating water guzzlers like citrus, and to increase the irrigation efficiency of the district, thus reducing the amount and salinity of the drainage produced. But that was too little and too slow. A decision came down from Washington DC that the centerpiece of the "definitive solution" would be a giant desalination plant, and the Bureau was to build it.

The Yuma Desalting Plant, as it was officially named, was to be the largest reverse osmosis operation in the world, 50 times larger than the previous record holder. It would be expensive to build, run, and maintain, would require vast amounts of electricity, and would be quickly outdated by changing technology, but it was the kind of Big Engineering the Bureau likes.

The plant would draw water from the Wellton-Mohawk's saline drainage water, clean it up, dump the pure water into the Colorado for Mexico to use, and dump the leftover brine into a canal (the Main Outlet Extension) that would carry it 50 miles south to the Gulf of California. At least, that was the plan.

As it turned out, the Yuma plant ran into technical, legal, and political problems almost immediately. Its critics, including the General Accounting Office and the Interior Department's Inspector General, claimed it was too expensive and wouldn't fulfill the U.S. obligations. Nonetheless, the Bureau slogged ahead and eventually completed the plant in May 1992, more than a decade behind schedule and at a cost of \$258 million, more than five times the original budget.

In the meantime, though, BuRec's canal to the Gulf has carried the whole volume of Wellton-Mohawk drainage water since 1978. But the canal never reached the Gulf. Instead, it delivered about 140,000 acre-feet of water (nearly 46 billion gallons) each year to the Cienega de Santa Clara.

Over the past 14 years, that remnant marsh has been restored to its former glory and now covers approximately 50,000 acres, making it by far the largest wetland in the Sonoran Desert. The drainage water is too saline for most common agricultural crops, but cattails and reeds have done fine and cover the area in dense stands. Bird life is thriving, as are the protecting swarms of mosquitos. The marsh now provides a home for 1/4 to 1/2 the total population of the Yuma Clapper Rail, an Endangered subspecies, and hosts the largest single population of the Desert Pupfish, also Endangered.

But the Bureau never intended to create wildlife habitat, and the situation may change dramatically. According to recent Bureau figures, when the Yuma Desalting Plant starts operating at full capacity it will

remove 3/4 of the water flowing down the canal; so, much of the wetland will dry up. The water that does reach the marsh will have three times the current salinity, making it too salty for most of the vegetation and for many of the other species present. Operations of the plant could be catastrophic for the wetland's current inhabitants.

The Bureau started up their plant this spring at 1/3 capacity and will likely keep it at that level for the next year because they can't get the funds (up to \$35 million/year) to run it at full speed. The habitat might not be damaged by the effects of 1/3 capacity operation; no one knows.

Few would mourn if the desalting plant simply shut down. The plant provides a small part of a solution to a large and complex problem. Cheaper and better ways exist to satisfy Mexico's demand for usable water, even within the constraints of modern industrial civilization. These include more efficient water use by agriculture and urban areas in the Colorado River basin, retirement of farmland in the deserts of Arizona and California, and reallocation of unused Colorado River water rights.

Public pressure during the past year has made the Bureau recognize the Cienega de Santa Clara as a significant issue. They've stopped claiming that the water simply flows to the Gulf. They've agreed to fund a study of the habitat. They've even made tentative inquiries with the U.S. Fish & Wildlife Service about complying with the consultation requirements of the Endangered Species Act, a long-overdue process. But the Bureau has made no commitment to preserving the marsh, or to attempting mitigation of the Yuma Desalting Plant's effects.

Ultimately, though, the fate of the wetland is out of the Bureau's hands. The land is outside the U.S. border; the Mexican government owns and manages it. Also, the water from Wellton-Mohawk belongs to the state of Arizona, and its flows will likely be reduced by further changes in management of that irrigation district (such as reductions in acreage and even greater irrigation efficiency).

Fortunately, Mexican scientists and officials have recognized the immense biological value of the wetland. They have begun efforts to protect and study it as part of a broad conservation initiative in the upper Gulf of California.

Quite by accident, the U.S. Bureau of Reclamation, that perversely industrious force with the self-appointed mission to eliminate all waters wild and free, has recreated a spectacular treasure. Thanks to their efforts, a parched and barren land has become again a buzzing, flapping, splashing, blue and green beacon of life. ☘

WHAT TO DO:

Contact the Bureau and tell them you like wetlands more than wastelands.

Joe D. Hall
Deputy Commissioner
Bureau of Reclamation
U.S. Department of Interior
P.O. Box 25007
Denver, CO 80225
(Tel: 303-236-9208)

Dale Turner (315 E Elm St, Tucson, AZ 85705) writes and naps in the shadows of columnar cacti, near his home in the Sonoran Desert. He spends his free time inspecting the dung of horned lizards.

The Ragged Reef

by Steve Rutledge

Although coral reefs are home to one-third of all fish species, this is only one aspect of their incredible biological diversity. Nowhere else on the planet can one find representatives of so many phyla of organisms. All told, about one million species may be found on the coral reefs of the world. These organisms provide elegant illustrations of ecological and evolutionary processes. Their complex interrelationships have fostered the development of many chemical strategies that have great potential for use in modern medicine, including possible cures for cancer and AIDS. When used in a sustainable way, the reef community can provide millions of tons of food annually for human societies.

Yet coral reefs do not receive the respect or protection they deserve. Reefs are threatened on a number of levels. Consider first several examples of direct damage. Many nations have decimated their reef fisheries by overconsumption. In Madagascar, for instance, the total harvest has decreased; the size and variety of the fish netted has also declined. Other countries have destroyed their reefs by using techniques far more destructive than mere lines and nets. The Philippine reefs have been seriously damaged by extensive use of sodium cyanide, a powerful poison that immobilizes fish. Some fish survive this ordeal to be gathered and sold in the aquarium trade, but many others, as well as the nearby corals, are poisoned. In Tanzanian waters, dynamite has been widely used to stun fish, making it easy to gather them from the surface. A number of reefs slated for World Heritage designation have suffered literally explosive deterioration from this practice.

Nearly all reefs near human population centers show a decline in certain species due to over-collection. In Asian waters the giant clam, considered a delicacy, is now in short supply; while in the Caribbean the green sea turtle grows rare. And it's not just the food species that are declining. Hawaiian waters have fewer black corals because of zealous collection for jewelry, while shell collectors in Florida have made many species scarce.

The reefs can also suffer from affection misapplied. Snorkelers and reef walkers kill coral polyps by standing on corals and kicking up sediment.

Even the frequent touching of corals by divers can have deleterious effects. Tourist boats damage coral heads by casting their anchors over reefs. Fortunately, there is growing concern over proper reef etiquette. Managers at the Hol Chan Marine Reserve in Belize take pains to educate visitors on the importance of low-impact manners. The island of Bonaire, in the Netherlands Antilles off the coast of Venezuela, has provided an extensive system of mooring buoys for dive boats. Dive boats there can leave their anchors behind, and the divers are forbidden to use spear guns.

While direct damages to the reef are serious, more widespread and insidious problems arise from human activities on shore. Logging and development cause massive erosion, with subsequent increased siltation on the reef. Most of Costa Rica's Caribbean reefs, for example, have been destroyed by excessive soil runoff resulting from tropical deforestation. These sediments in the water clog the feeding tentacles of coral polyps. Elevated water turbidity also decreases light available to corals, causing reduced photosynthetic activity in the algae endogenous in coral tissues. If the resultant stress does not kill the coral outright, it makes the coral more vulnerable to a variety of pathogens.

Other sources of pollution also originate onshore. Burgeoning coastal populations harm reefs through sewage discharge. Even when the effluents are not dumped directly into the sea, problems can arise. In the town of San Pedro on Ambergris Caye in Belize, for example, sewage has polluted the groundwater. Residents are forced to drink rain water or imported water. The rainy season flushes contaminated groundwater into the sea; reef damage ensues. This is because corals are adapted for life in a low-nutrient environment. Sewage causes eutrophication, permitting algae to colonize coral surfaces, eventually suffocating the coral. Similar problems of nutrient enrichment occur when there is runoff of agricultural chemicals. Many of the reefs off southern Florida, for example, suffer eutrophication caused by fertilizers. Obvious solutions to such problems include stringent erosion control and conversion to agricultural practices less dependent on industrial chemicals. Equally important is preservation of key lands close to the reef. The Nature Conservancy is active in land acquisition in southern Florida as part of a strategy of reef preservation. (See *Nature Conservancy*, 7-8/91, "Deep Ecology: Rescuing Florida's Reefs," p.8-17.)

Another form of pollution hazardous to reefs comes from oil spills. Recent research in Panama indicates that not only the corals near the surface, but also deepwater corals suffer injury from oil, even though they do not come in direct contact with the spill.

How does the reef respond to these many impacts? Reefs are resilient, often making a strong comeback after finally being left alone; but ecosystems are complex and we often do not understand the full consequences of our actions. Sometimes we disturb the ecological balance of the reef without realizing it. Often we are unsure of how big a role human-induced perturbations play in sudden changes we observe. How much have human activities influenced the cycles of population explosions of crown-of-thorn starfish that have plagued Australia's Great Barrier Reef? What about the sudden boom of sea urchins in Kenya or the recent bust of sea urchins in Hawaii? Why have epidemics plagued sponges in the Caribbean and corals in the eastern Pacific? The unfortunate and humbling answer is to admit how little we know.

Clearly we need to devote more energy and funding to understand coral reef ecology. Of particular concern is recent evidence that coral reefs are sensitive to global climate change. Recent years have seen several episodes of extensive bleaching of corals in the Caribbean and the Pacific. It appears that these episodes are correlated with the seawater warming phenomenon known as El Niño. Increased water temperatures induce corals to expel their symbiotic zooxanthellae, the algae that live in relationship with the coral polyps. Corals bleached in this way are vulnerable to disease and death. It is likely that significant global warming would increase the extent and magnitude of coral-bleaching episodes throughout the tropical seas.

What can concerned individuals do to protect coral reefs? Those visiting tropical seas should be educated in ways to minimize deleterious impacts. Tourists should avoid purchasing sea shells collected on reefs and jewelry made from live coral. Diners should avoid turtle meat, conch, and other meals made from rare reef organisms. Wisely spent dollars on ecotourism can encourage the local economy in the direction of reef preservation rather than reef exploitation or destruction. Snorkelers and divers should avoid standing on or near corals. Souvenirs should be restricted to photographs and memories.

It is also important to support reef conservation with your time and money. One can participate directly in research that benefits the reef through organizations like Earthwatch, as well as through university research programs. Many conservation groups—from international organizations like The Nature Conservancy to local projects like Reef Relief in the Florida Keys—are involved in reef conservation. Pick your favorite reef and find a way to help it!

Steve Rutledge (334 College Ave. #E, Palo Alto, CA 94306) writes and swims about coral reefs.

The Reef Has The Blues

by Steve Rutledge

I've always said that blue was my favorite color, but no one has asked me to be specific. Maybe that's good, because it would be hard to make a choice among the many wonderful hues and saturations included in this single color. We should all get better acquainted with these blues, and tropical seas provide a good introduction. The blue sky, the blue sea: at first it seems to be a monochromatic world broken only by soft white clouds and sands. But a fringing reef around an island adds new elements to the sea-scape. Beyond the reef the sea is luminous ultramarine, while inside the lagoon the shallow water glows an intense turquoise. It is a pleasure to walk along a sugar-white beach gazing at the pale lagoon mottled with darker corals. Yet a casual stroll reveals the palette of the sea in only one of its moods. These colors are mercurial, fluctuating with conditions of light and weather. The soft light of a cloudy dawn blends silver and aquamarine across the lagoon, while the same scene at a cloudless noon is dominated by a dazzling azure.

But even a hundred walks cannot capture the tropical world of the blues. To sample the full spectrum, it is necessary to venture beneath the waves. The names of the sea creatures we find there hint at their royal colors and elegant designs. This is exemplified by several reef fishes that have been given the appellation "queen". Consider the queen angelfish, boldly arrayed in aquamarine, viridian, and gold. On its forehead is a crown of black markings inside a sapphire halo. Another monarch of the blues is the queen triggerfish. Although it can change colors to suit its mood, it typically bears a dark blue starburst pattern around its pale blue eyes. Equally striking are its blue-violet smile lines. The queen parrotfish is understated in comparison. Mottled with sky blue and turquoise, it features demure highlights of a rich yellow.

The queen parrotfish is but one of the family of parrotfishes, among the most colorful creatures on the reef. These large and placid browsers are often seen munching on coral, seeking the algae that live upon and within the coral. Their strong plate-like beaks are well-suited for such chomping, as well as giving them a fanciful resemblance to parrots. You can find them gliding among coral towers and across the white sands that carpet the lagoon. The male stoplight parrotfish grows to nearly two feet in length, and sports highlights of green, red, and yellow against a background of robin egg blue. The midnight parrotfish, approaching three feet, is a vivid shade of ultramarine. One of the larger members of its family at up to four feet in length, the blue parrotfish is, not surprisingly, simply blue.

Before returning to dry land, we might find the yellow-tailed damselfish defending territories in the vast fields of elkhorn coral that grace the leeward shallows of the reef. The adults have brown bodies sprinkled with subtle blue spots to offset their yellow tails, but it is the juveniles we are seeking. The best place to find one is among the young polyps of elkhorn coral. The pale orange and rich russet of this coral, aglow with sunlight washing across its roughened surface, provide the perfect background for witnessing one of the crown jewels of nature. Just an inch or two long, this fish makes the ultimate fashion statement. Electric cobalt spots are scattered across a skin of lapis lazuli. Watching such a fish play in the sunshine has a way of awakening all your senses. You might notice the velvet texture of the warm water and the tangy taste of the sea. You might find that these blues have a way of elevating your mood to new heights.

Ask me again about my favorite color.

Reef Resources

by Mary Byrd Davis

In terms of attention from environmental groups, coral reefs may well be the "rainforest issue" of the nineties. So many groups across the world are now working to preserve coral reefs that we can give only a sampling of the North American-based organizations here. For additional addresses, including organizations abroad, see *Greenpeace Book of Coral Reefs*, by Sue Wells and Nick Hanna (Sterling Publishing, New York City, 1992).

Coral Reef Coalition has as its purpose the comprehensive and lasting preservation of the biodiversity and productivity of Florida's coral reef ecosystem. Members include the Environmental Defense Fund, The Wilderness Society, National Audubon Society, The Nature Conservancy, Defenders of Wildlife, the Izaak Walton League, National Wildlife Federation, the Florida Chapter of the Sierra Club, and many local organizations. At present the Coalition is concentrating on obtaining intelligent regulations for the Florida Keys National Marine Sanctuary, established in 1990. In April 1993 in Florida, the Coalition will hold a conference on coral reefs, which will be open to the public. For information contact the Coalition's Washington coordinator, the Center for Marine Conservation (1725 DeSales St. NW, Suite 500, Washington, DC 20036; 202-429-5609).

From Florida, Project Reefkeeper (16345 W Dixie Highway, Suite 1121, Miami, FL 33160; 305-858-4980) coordinates the Reefkeeper Network through which 150 groups across the world support legislative and other initiatives for reef preservation; and runs Reef Tap, which provides information and referrals to organizations worldwide. Currently Reefkeeper is seeking additional groups for the Network, in order to increase lobbying clout. With branch offices in Puerto Rico and Hawaii, Reefkeeper is an offspring of the American Littoral Society, which has devoted itself to wetlands and near-shore waters since 1969.

Two organizations centering their attention on Florida are Reef Relief (POB 430, Key West, FL 33041; 305-294-3100) and Ocean Watch Foundation (POB 462, Ft Lauderdale, FL 33302; 305-474-7744). A continuing project of Reef Relief is the establishment of mooring buoys to which boats can tie instead of dropping anchor in coral. It also operates an environmental education center in Key West, carries out research, and distributes coral reef awareness brochures Keyswide. To spread the word beyond the Keys it sets up information booths at dive shows around the country. Ocean Watch in Fort Lauderdale works to protect coral communities offshore in Broward County (these communities are actually corals on rocky ledges, rather than reefs). When the organization formed, members intended to secure Marine Sanctuary status for the communities, but this proved difficult. While retain-

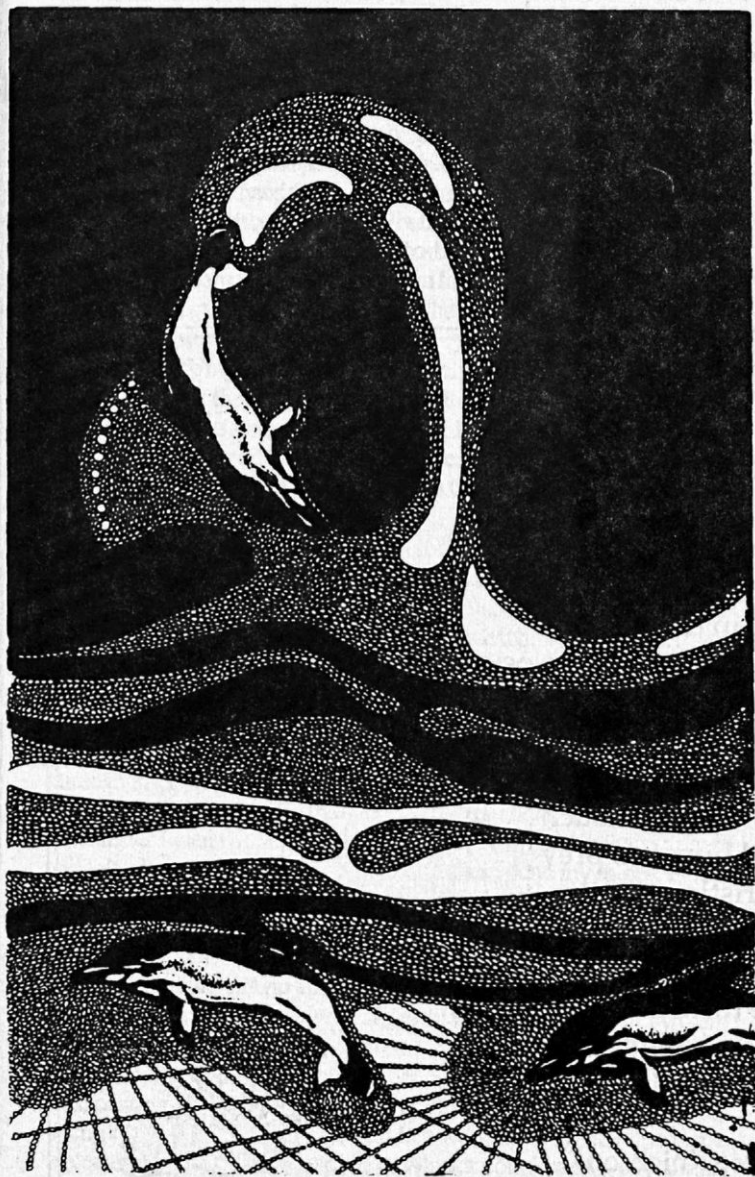


illustration by Jim Nollman

ing Sanctuary status as a long-term goal, Ocean Watch installs mooring buoys, organizes an annual Reef Sweep during which divers remove trash from reefs, and uses slide shows to teach the public to conserve coral communities.

The research, education, and information organization Global Coral Reef Alliance (324 N Bedford Rd., Chappaqua, NY 10514; 914-238-8788), made up of scientists and environmentalists, is working with Reef Relief to employ moorings as monitoring points. Diving groups that regularly use the moorings are encouraged to obtain data on a continuing basis for the reefs where they swim. The Alliance hopes to establish a photographic database on the reefs. The Alliance conducts research on the three major threats to reefs worldwide: sewage, sedimentation, and bleaching (which may be a result of anthropogenic ocean warming); and works with local groups in Jamaica and elsewhere to effect needed policy changes.

The Nature Conservancy (2699 Lee Rd., Suite 500, Winter Haven, FL 32789; 407-628-5887), along with the National Oceanic and Atmospheric Administration, offers divers a course in collecting scientific data about coral health for use by staff at the Keys Sanctuary. The contact for this program is Mary Enstrom, Florida Keys Sanctuary, 9499 Overseas Highway, Marathon, FL 33050 (305-743-2437).

Earthwatch (POB 403, Watertown, MA 02272; 1-800-776-0188) invites divers to participate in scientific expeditions to study coral reefs. The trips, which generally last two weeks, include mapping reefs off Bonaire in the Netherlands Antilles, studying hurricane damage to coral in Fiji, and investigating park management for Belize's barrier reef. The cost of participation ranges from \$1495-1995, at least part of which is tax deductible.

Among the projects of Ocean Voice International in Canada (2883 Otterson Drive, Ottawa, Ontario K1V 7B2; 613-990-8819) and the US-based International Marine Life Alliance (201 W Stassney, Suite 408, Austin, TX 78745; 512-389-4646) is working in the Philippines to stop the use of sodium cyanide to catch reef-inhabiting fish, for aquaria and food. They are training fishermen to use fine-mesh nets instead of poison, and have inaugurated a program of testing food fish for cyanide. Peter Rubec says the Marine Life Alliance focuses on the Philippines and Southeast Asia because reefs off the Philippines and Indone-

sia are believed to shelter even more biological diversity than those in other areas. Ocean Voice International is producing a status report on coral reef fishes of the world for the International Union for the Conservation of Nature (IUCN) and providing information on coral reef fishes to the Geographic Information System (GIS).

The Center for Marine Conservation (address above) works for the designation of coral reefs as National Marine Sanctuaries and for the adoption of good regulations for Sanctuaries. The Cousteau Society (870 Greenbrier Circle, Suite 402, Chesapeake, VA 23320; 804-523-9335) educates the general public through films and tv programs, several of which have documented coral reefs. A recent film shows cyanide and dynamite fishing in the Philippines.

Wildlife Conservation International, the New York Aquarium, and Osborn Laboratories of Marine Sciences, all branches of the New York Zoological Society, have launched a Coral Reef Conservation Initiative (World

Conservation International, New York Zoological Society, Bronx, NY 10460; 212-220-5100) which involves studying and formulating protection strategies for reefs. The Society has helped government agencies in several African countries to assess their coral reefs.

Coral reefs are among the areas for which the Coastal Resources Center, a branch of the University of Rhode Island with a practical bent, develops strategies (U. of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882; 401-792-6224). In March of 1992 the cabinet of Thailand adopted a national coral reef management program prepared by the Center in conjunction with Thai government agencies. The program will provide national funding to support work with local groups. In cooperation with Greenpeace's Pacific Campaign and the Caribbean Natural Resources Institute in Santa Lucia, the Center is preparing a book of case studies on community-based coral reef management.

Coyote/Jackal/Dingo

Apache/Zulu/Arunta
native hunters
evolved in dreamtime
slaughtered by euranglos
and their farmer's
unearthly god
heaven's invasion claimed
prairie/veldt/outback
replaced hunter's prey
with christian sheep
coyote/jackal/dingo
haunt flocks of
this ape turned herdsman
refuse to surrender
the pagan earth

—Jose Knighton



The Mighty Jellyfish: Hunters and Lovers Unsurpassed

by Christopher Manes

Like most people who grew up near the sea, I have a long and painful history with jellyfish. It began during a vacation my family took to the central coast of California when I was a boy. This was in the groggy resort of Morro Bay, famous for the titanic rock that sits inexplicably in the center of the harbor like some fantastical insurance company logo. As we made the tourist cruise around the rock, I counted a couple hundred jellyfish basking in the water—strange, violet-colored hemispheres as large and delicate as a Southern lady's parasol.

When we got back to shore, I stood on the sea wall lobbing stones at any jellyfish foolhardy enough to float within range. One lucky rock hit a pulsating dome with a plop and the hapless creature turned inside out like a used gym sock and sank into the murk. I could almost hear it gurgling as it went down.

This prank must have angered the jellyfish gods because several times since then these aquatic invertebrates have almost done me in. Snorkeling off the Aegean isle of Naxos, I blundered into a school of pinkish peach-sized jellyfish the Greeks simply call *medusae* (singular=*medusa*) after the mythological Gorgon whose hair consisted of writhing serpents and whose gaze turned people into stone (the name stuck and is now the zoological term for the free-swimming phase in the life cycle of phylum Cnidaria). Though their sting is relatively mild, their crystalline bodies are virtually invisible, so my face and arms were lashed with burning stingers before I knew what hit me. I flailed, foun-dered, and probably would have drowned if the captain of the boat I was with hadn't jumped into a zodiac and plucked me out.

Worse was a trip to the Bahamas when I swam into a school of what looked like crimson-and-blue party balloons. They were Portuguese men-of-war, which are not individual animals at all, but colonies of medusoid and polypoid individuals that trail behind them forty feet of tentacles laden with toxic nematocysts. I got tangled in their stingers and felt what seemed like a carving knife slice round my thighs. Fortunately, a friend was there to drag my poor, cringing flesh to dry land.

These and other unpleasant encounters with jellyfish expiated the sins of my youth, and now I admire these species as perhaps the most beautiful, enigmatic, and unfairly maligned of ocean predators next to sharks. How many other invertebrates have been singled out by Congress at a hearing dedicated solely to their annihilation? The Senate Merchant Marine and Fisheries Subcommittee did just that in the late 60s, passing a bill to promote "the eradication of jellyfish and other such pests." (Needless to say, it didn't work.) During the hearing, a squeamish Senator E.C. Bartlett of Alaska could hardly contain his moral pique at the hydroids that had ruined so many of his constituents' summer vacations, deploring the "foul means which these jellyfish employ in seeking out and attacking their prey."

The phylum Cnidaria to which jellyfish belong, along with hydras, sea anemones, and corals, includes some of Nature's most ancient and successful predators, possessing an elegance and simplicity of design that has flourished for half a billion years. The ancestors of these animals plied the warm, shallow seas of the Cambrian period much as their progeny do today, devouring zooplankton and other small creatures unlucky enough to get caught in their poisonous tentacles. If alien scientists with a long-term research grant to observe the evolution of life on Earth had to sum up their results in one word, it might be "jellyfish."

Cnidarians were among the first animals to develop venom. Theirs is a stupefying cocktail of proteins and enzymes injected through stingers housed in capsules called nematocysts that explode on contact. This deadly efficient system requires almost no effort on the part of the jellyfish, which merely drifts along with the ocean currents, an aimless, lethal argosy with statistics that would make any predator envious. For instance, more Australians are killed each year by Sea Wasps, a particularly virulent South Pacific jellyfish, than by sharks (though you probably couldn't get an Aussie to admit the fact). Some Indian Ocean varieties are nastier still.

The possession of disagreeable venom is made all the more valuable by gaudily making the fact known to potential predators. While most medusae have little or no pigment, the more poisonous varieties are often flushed with deep reds, greens, oranges, and blues, a vibrant palette of warnings to other hungry animals. Paradoxically, jellyfish themselves can't see colors, though many types do have eyespots arranged around the lip of their domes like rhinestones on the brim of a dimestore sombrero. These rudimentary organs of sight cannot focus, but they do allow jellyfish to detect light, another evolutionary innovation that may have had its debut with this phylum. With its 160 bright red eyespots, the common Bell Jelly is perhaps the most lavishly purblind creature in Nature.

Even in death, jellyfish retain their pugnacity. Their poisonous barbs—which cover their entire bodies, not just their tentacles—continue to sting long after the animal perishes and washes up on shore. You have to wonder why we use this creature's name to denote cowardice rather than undying belligerence.

Besides perpetual hunts, the life of a jellyfish is occupied with—what else?—sex. Medusae are the fleeting, extravagant, sexually mature blossoms of tiny polyps similar to coral which lead drab monkish lives on the ocean floor. Polyps reproduce asexually, then burgeon into the jellyfish, which, like waterborne morning glories, last only a few months. This is just enough time for them to feed and breed before the currents unceremoniously cast them up on land with other flotsam. Not given to intimacy, they mate at arms length, releasing sperm and ova

into the open water in response to cryptic flirtations scientists have yet to decipher. The larvae resulting from the fertilized eggs attach themselves to the sea bottom, grow into polyps, and begin the cycle again.

The imagery is thought-provoking: jellyfish as the flowerlike expressions of hunting and sex, love and war, the two pursuits that figure most prominently in human history and myth. Just imagine the libido of the Lion's Mane, a North Atlantic species made up of lavish tentacles and a throbbing gelatinous disc that can span six feet in diameter. I once saw one of these in Iceland scooped in a 15 gallon bucket, and it still sloshed over the sides like a wet napkin stuffed in a wineglass. Or consider the bloodlust of its cousin, *Cyanea arctica*, a purplish-red jellyfish with tentacles 120 feet long, making it the longest animal ever to roam the planet, surpassing even the great Blue Whale. In 1865 a *Cyanea arctica* washed ashore on New England's Cape Ann measuring 245 feet in tentacular length. Another species, a hydrocoralline jelly, doesn't even bother to eat; this blissful creature simply has sex and dies. No doubt it would do so with a smile on its face, if it had one.

Despite their ancient pedigree, however, these are unsettled times for Cnidarians. Most medusae prefer shallow, plankton-rich coastal waters, just those spots people mercilessly pollute, smother with silt, overfish, and crisscross in motorboats. In seaside resorts, hundreds of thousands of dollars are spent on eradication programs every year. Drift nets rip apart the few types of jellyfish, such as the coronate medusae, that prefer the high seas. Increased ultra-violet light from atmospheric ozone depletion may, according to some scientists, decimate the plankton on which most jellies depend.

In some places, especially the South Pacific, all this is taking its toll. Ironically, elsewhere, a jellyfish boom is under way, apparently caused by ecological imbalances of our own making. The numbers of Sea Nettles, a common jellyfish painfully familiar to many East-coasters, especially around Chesapeake Bay, have reached near Biblical proportions in recent years, despite costly attempts to exterminate them. The cause, according to some scientists, may be the lack of oysters which normally compete with Sea Nettles for food, but have been devastated by pollution and overharvesting. Just a decade ago, the Jelly Comb, and iridescent native to American shores, found its way to the Russian Sea of Azov, probably in a ship's ballast water. Their new Soviet home agreed with them so well they now swarm in vast numbers, consuming an estimated half of the zooplankton biomass in those waters. (In a stroke of poetic justice, a one-eyed, spined predatory species of zooplankton from the Sea of Azov has, in turn, been brought to Lake Superior, where it's now devouring American plankton.)

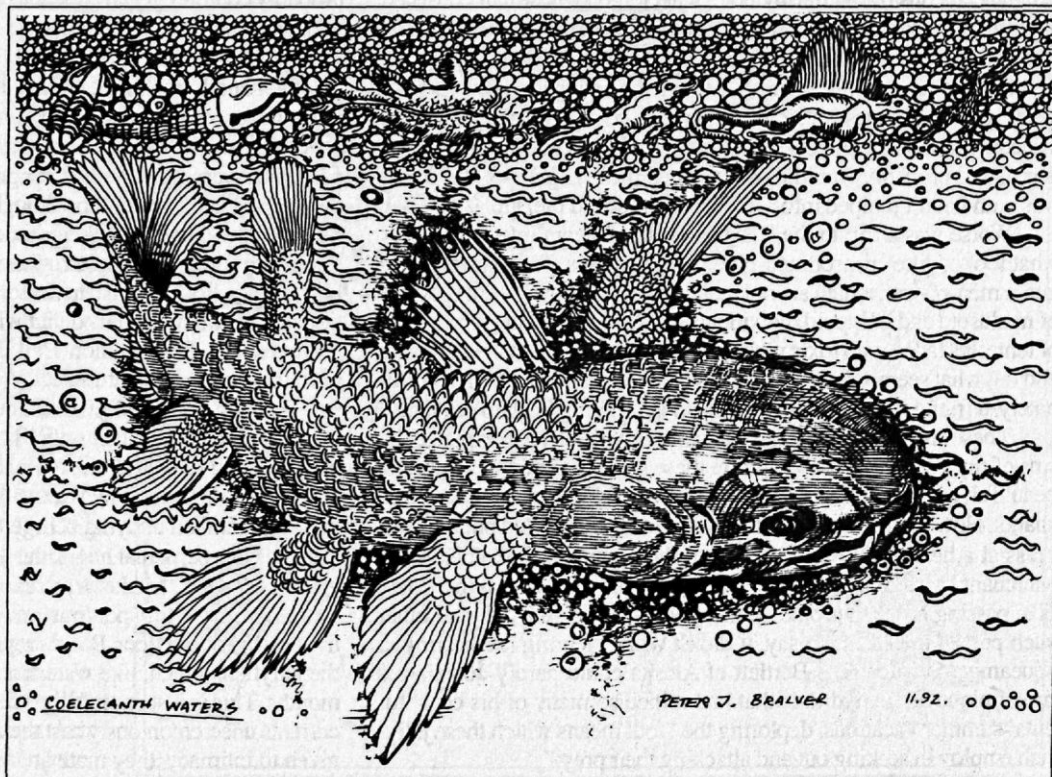
Regrettably, most people, especially avid snorklers like me, think of jellyfish as a form of aquatic poison ivy and ignore their wave-tossed mysteries. Meandering and ephemeral, jellyfish belong to one of the most difficult phyla of the animal kingdom to classify, and scientists know little about these creatures. Nonetheless, their age-old relationship with zooplankton, among the building blocks of Earth's biota, suggests that like fungi and beetles they belong to the fundamental stuff of ecology.

Some supporting evidence: their gelatinous bodies, which are over 95% water, are food for seabirds, sunfish, and sea turtles — not to mention a few Japanese connoisseurs. (Sadly, many of these animals die when they mistake plastic bags for a jellyfish repast.) Medusae play host to an odd menagerie of crustaceans and fish that seek protection in their arsenal of stingers. The kindly Mnestra Jelly, for instance, helps the immature form of a nudibranch mollusk by ferrying it through the plankton clouds on which it feeds. Once it gets big and fat, however, the ungrateful slug repays its benefactor by devouring it.

Whatever role these primordial creatures play, they deserve our respect as formidable survivors. Give them some leeway, appreciate their alien, gossamer beauty as they drift by on their pain-inflicting voyages to who knows where, and remember they'll probably be swimming languidly around the planet long after our species has perished.

And by the way, the best remedy for most jellyfish stings is still vinegar.

Christopher Manes (411 Stannage Ave # 9, Albany, CA 94706), the author of Green Rage, will soon take his bar exam. Assuming he passes, he may be expected to file a phylum action suit on behalf of coelenterates soon thereafter.





The Last Entire Earth

by Paul S. Martin

In his explorations around Concord, Massachusetts, Henry David Thoreau, whose eye for prehistoric artifacts was unexcelled, never found a fossil mastodon. Unlike the mires of Orange County and other parts of New York State, New England harbors few, if any, fossil Proboscidea (elephants).

Nevertheless, Thoreau thought about them, perhaps stimulated by reading *Voyage of the Beagle* where Darwin mentions the extinct megafauna of South America. During a Philadelphia visit (21 November 1854) Thoreau saw the huge molars of a mastodon from Missouri, housed in the Academy of Natural Sciences. For whatever reason, Thoreau kept an eye out "looking" for images of the extinct beasts. Few naturalists since have bothered.

The stump fences of the Corner Road west of Walden Pond reminded him of fossil remains of mastodons (Journal, 19 July 1851). A pair of boulders in the woods, great slumbering masses of rock, invoked an image of mastodons (3 November 1857). When thaw came, tracks of dogs in thin snow on ice expanded to a foot in diameter, he wrote on 23 January 1860, "with all the toes distinct, looking like the track of a mammoth or a megatherium" (giant ground sloth).

Extinction was still a new idea in Thoreau's day. Not long before, Thomas Jefferson entertained the romantic view that proboscideans might be found alive in the Wild West. The dream vaporized when Lewis and Clark and other explorers with instructions to keep a look out failed to find any. Cuvier, the French paleontologist, used the absence of living Proboscidea in America as evidence of extinction of the American mastodon and of extinction as a fact of life. Part of Jefferson's denial was based on his belief in a great chain of being in which all species depended on each other. Take one away and the whole of creation would collapse. Soon dinosaurs were discovered, fossils much larger and considerably older than those of the ice age megafauna. The great chain of being was a myth. Extinction had become irrefutable.

Thoreau's musings appeal to me. In the shadows along the trail I keep an eye out for the ghosts, the beasts of the ice age. What is the purpose of the thorns on the mesquites in my backyard in Tucson? Why do they and honey locusts have sugary pods so attractive to livestock? Whose foot is devil's claw intended to intercept. Such musings add magic to a walk and may help to liberate us from tunnel vision, the hubris of the present, the misleading notion that nature is self-evident.

Archie F. Carr, the magnificent Florida naturalist, caught the drift when he decided that cattle and even earth movers are understudies for the extinct megafauna. Heavy equipment he was watching dig a ditch attracted snowy egrets that flew up in the wake of the drag line to snatch grubs uncovered by the bucket. Adjacent fields held buff backs (cattle egrets) following cattle, another proxy for the ice age way of life that persists in Africa. "There is a growing emptiness around us, and we fill it in with noise, and never know anything is gone. But the buff back remembers times, with great game thundering through all the High Masai. And back at home you come upon a raging dredger with a wisp of snowy heron there, dodging the cast and drop of the bucket as if only mammoth tusks were swinging — and what can it be but a sign of lost days and lost hours that the genes of the bird remember?" (Ulendo, *Travels of a Naturalist in and out of Africa*, 1964).

To get the true picture, it helps to know more about our prehistoric "game park." It has a remarkable African flavor. The extinct fauna from ice age North America consists mostly of large herbivores. The casualty list of flagship species, large impressive beasts best known by paleontologists, includes mammoths and gomphotheres, the mastodon, horses, camels, ground sloths, giant peccaries, shrub and musk oxen, several bison species, four-horned antelope, giant beaver, tapir, glyptodonts, a giant armadillo, and capybara. Carnivores and omnivores also lost include a giant bear, the dire wolf, two types of machairodont (saber-tooth) "cats," a lion akin to the African lion and a cheetah. The

illustration is of *Smilodon*, the New World sabertooth

disappearance of a grand total of at least 30 genera and 50 species of large creatures up to the size of the imperial mammoth in North America, with even more losses of megafauna in South America, is one of the great mysteries in the deep history of our hemisphere.

Geological evidence indicated that the mammoths and the other animals vanished toward the end of the Quaternary [near the end of the Pleistocene epoch, 10,000-12,000 years ago—Sci. Ed.], long before the Europeans arrived. The last ice age saw many comings and goings of polar ice sheets. Out of all the ferment—a rise and fall of sea level, changes in carbon dioxide gas content and dustiness of the atmosphere, changes in sea surface temperature and in seasonality of the climate accompanied by prehistoric human and other animal invasions—it may not seem surprising that so many extinctions took place. In the 1950s, when I began to look into some of this, there were casual speculations on what caused the end of the golden age of mammals, whatever that meant. But the matter lay dormant for the most part, as it had for many years. No one knew just when or how fast the animals disappeared. Without fixing these extinctions in time, speculations on cause or consequences were fruitless.

With the advent of a new and powerful method of dating, matters began to change. The touchstone was carbon-fourteen, a slowly decaying radioactive isotope with a half life of 5700 years produced by cosmic ray bombardment of nitrogen. Measurements of the amount of carbon-fourteen remaining in organic matter after death of an organism provided direct dates on the last 40,000 years. Wood from trees dated by dendrochronology is used to calibrate the method. Now geologists could determine when the extinct animals were last around. What would the pattern look like? Would the disappearances be independent of each other, as many expected? What forced the change?

The start was shaky. Into the 1960s and even later, paleontologists sought data on all sorts of fossils; most proved to be poor carbon sources and ill-suited for accurate measurements. Contamination was a serious problem. Bone is cancellous, spongy, and easily penetrated by ground water. Ground water may contain dissolved organic carbon, a vexing source of contamination. Initial measurements of fossil bone from buried sites yielded variable results. If taken literally, the dates (some good, some bad; it was impossible to know) indicated that extinctions had dragged out over at least 10,000 years. At the time no one objected to that. Although many of the extinct beasts, mainly large herbivores plus their associated predators and commensals, suggested potential human prey, there were few good associations between bones of the large extinct animals and human artifacts. With only a few possible kill sites, it seemed unlikely that human activity drove many of the extinctions, especially since they seemed to drag on for thousands of years. This was enough to dissuade most archaeologists that prehistoric people had anything to do with it.

In Arizona and adjacent states, those of us interested in good radiocarbon dates on extinct animals had a golden opportunity. We had carbon-rich fossils in dry caves. We did not have to worry about secondary contamination which complicates the dating of bone or ivory from open sites. From suitable desert caves, we could obtain not only collagen-rich bones but even perishable tissues such as hair, hide, horn sheaths or claws, and the dry excrement of extinct animals—ideal material for reliable dates. The dung, the keratin, and the dry tissues were preserved only because they had never been exposed to water or even to damp air and so escaped being consumed by dermestid beetles and other reducers. There was little, if any, danger of contamination of the carbon-fourteen content of the animal manures we would date. At lec-

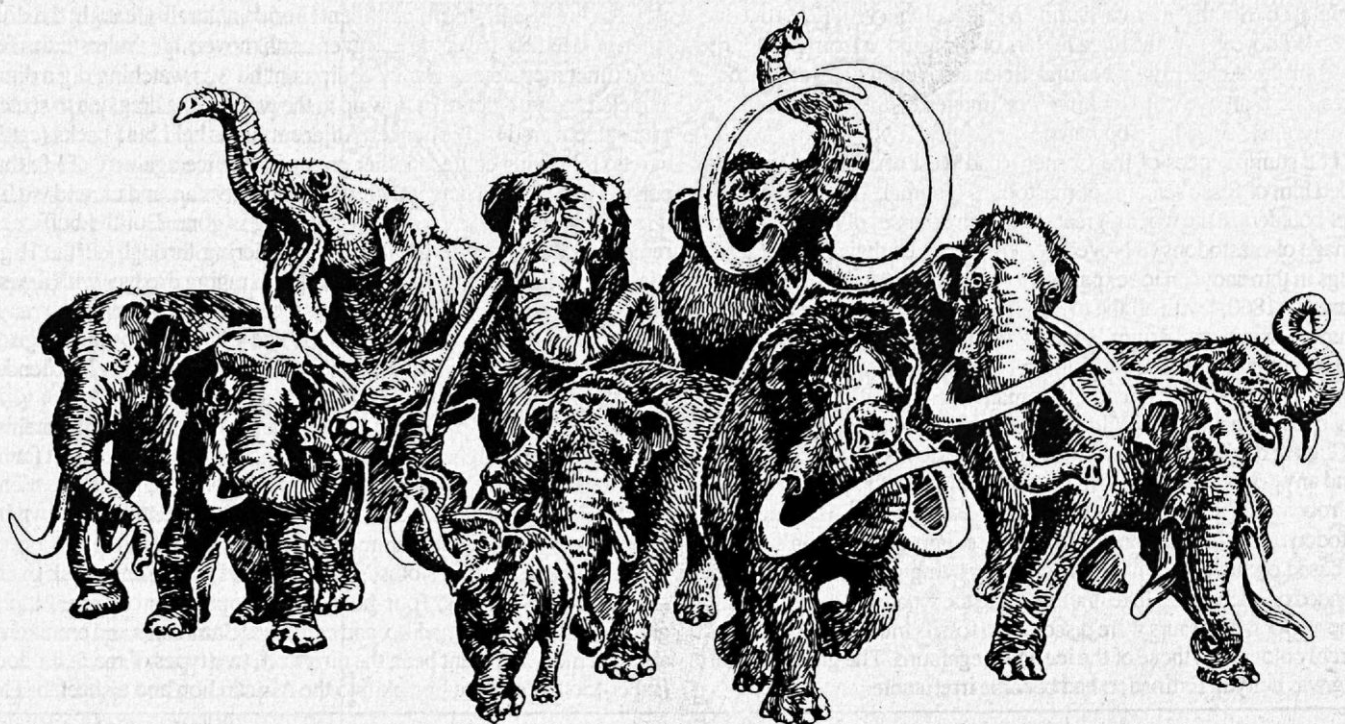


illustration by Peter Murray, based on a painting by Barbara J. Hoopes in Zoobooks, ©1980

tures I began to brag to audiences that in Arizona we "knew our shit" and thanks to it we could determine with confidence when the extinct beasts were last around.

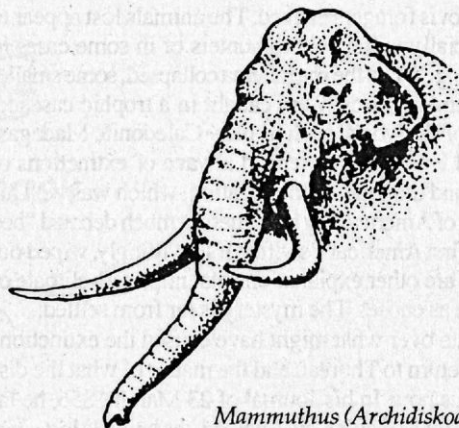
Given the youthful appearance of these organic treasures from the desert caves, one might imagine that the animals involved, Shasta ground sloths, Harrington's extinct goats, Colombian elephants, and native species of horses, might be no older than the prehistoric pueblo farmers or foragers who inhabited dry caves in the Southwest until only 500 to 700 years ago. At times potsherds could be found in close proximity to remains of the extinct megafauna. Perhaps Thomas Jefferson was off by only a thousand years in thinking that New World ground sloths were still living. No one could refute the idea given the fresh looking body parts and fecal remains in desert caves that we were about to date in the radiocarbon laboratory. How long did Shasta ground sloths live in the arid Southwest?

A team of Arizona students and faculty visited the sloth caves and probed museum collections for extinct animal remains, deliberately selecting the youngest when possible. Everything was old, the ground sloth dung, the horn sheaths and fecal pellets of extinct goats, extinct horse hooves, and even dung of mammoth from one unusual cave in Utah. Some specimens radiocarbon dated at 30,000 years or older. The youngest samples we could obtain were also ancient, between 12,000 and 10,000 radiocarbon years old. From carefully dated archaeological sites studied by geologist Vance Haynes, we knew that mammoths lived in the Southwest no later than 11,000 years ago. The disappearance, as we determined by radiocarbon dates from separate caves, of ground sloths, extinct goats, and horses along with the mammoths did not look gradual, as many paleontologists once imagined. It looked like the extinctions happened fairly quickly and all at once. Lewis and Clark had arrived 10,000 years too late to encounter a mammoth or a ground sloth.

We were running out of species suitable for critical dating and had no dates on carnivores. Luckily, fresh chronological support came from an unexpected quarter. Geochemists had refined their techniques on quality radiocarbon dating of bone from open sites, finding ways to remove organic contaminants. Petroleum residues from the Rancho La Brea tar pits ensured good preservation of the fossils they contained. Bitumen is a sealant against moisture. Once the oily sealants were removed, California geochemists Les Marcus and Ranier Berger obtained some 50 new radiocarbon dates on the extinct fauna from Rancho La Brea, most on the fossil bones of the saber tooth, *Smilodon*. As scavengers or predators capable of an explosive rush at vulnerable prey, the big cats would be closely linked to the abundance of the large herbivores. A gradual decline in the latter might result in saber tooth extinction even before the large herbivores were all gone.

No such change could be seen in the saber tooth radiocarbon dates obtained by the California geochemists. The youngest dates were slightly younger than 12,000 years old and matched the terminal dates we had assembled on mammoths, Grand Canyon ground sloths, and extinct goats. At least one large carnivore, the saber tooth, exited from the American range around the same time as the large herbivores.

Then radiocarbon dating was further improved. A new technique of carbon-fourteen measurement by accelerator mass spectrometry (AMS) meant only very small samples were needed. A University of Florida graduate student, Steve Emslie, used the Arizona accelerator to date not only bits of fossil condor bones from Grand Canyon caves but also condor eggshell fragments and even a chip of the keratinous



Mammuthus (Archidiskodon) meridionalis

condor beak found in place on a fossil condor skull from a remote unexplored Grand Canyon cave. Such fossils would have been too small to measure previously.

Once again freshness of the fossils suggested late survival. Did the prehistoric Anasazi people in northern Arizona a thousand years ago watch condors soaring over the Grand Canyon to feed nestlings in the great caves of the Redwall and Muav limestone? While some ornithologists imagined such a possibility, none of Emslie's 17 dates on condor remains supported it. The samples were all much too old: 10,000 radiocarbon years old or older. One fossil deposit in a cave in the Redwall could be reached only by ropes. It revealed food scraps brought to nestling condors. Identification of the scraps revealed that the condors feasted upon extinct goats, bison, camel, horse, and mammoth. When these animals disappeared from the Coconino and Kaibab Plateaus, the condors disappeared too. Evidently the surviving megafauna, mule deer and mountain sheep, were insufficient to maintain breeding California condors. The remnant herbivores pale beside the past natives of the region, Shasta ground sloths, mammoth, camels, extinct bison, extinct horses, and extinct goats. Had it survived, such a fauna might well distract Park visitors from the scenery. I hope this illustrates what I mean by the hubris of the present. To behold the Grand Canyon without thoughts of its ancient condors, sloths, and goats is to be half blind.

So the best dating evidence as far as it goes suggests that the extinctions came, for many at least, about 11,000 years ago. That date also marks the appearance of the first widespread archaeological sites, reflecting a New World invasion by Clovis foragers, with big game hunting skills detached from the Eurasian Paleolithic. My friend Jim Mosimann, a biometrician with the National Institutes of Health, had helped me model an imagined invasion, a "blitzkrieg," based on the assumption that the Clovis colonizers rapidly swept the continent, eliminating all of the more vulnerable species. Given a healthy, largely disease-free New World, and easy hunting, we reasoned that the first Americans would increase at two to four percent per year, as many people have historically under favorable circumstances. Within what is now the United States, the extinctions would run their course in about 200 years, the hunters laying waste to a biomass not much less than the weight of domestic livestock currently on the land.

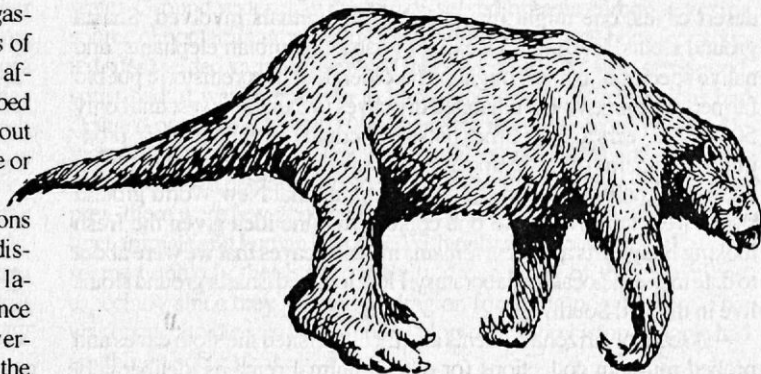
The blitzkrieg model dances along the edge of a narrow time slice. There is no reliable evidence of extinct mammoth, ground sloth, saber tooth or other disappeared species in archaeological sites younger than 10,000 years, and none shows that any of the Late Pleistocene species

disappeared before Clovis foragers arrived. The animals lost appear to have been those especially vulnerable to hunters or in some cases to side effects of the hunting. When the megafauna collapsed, some smaller species, such as scavenging birds, were caught in a trophic cascade. Islands in other parts of the world, such as New Caledonia, Madagascar, New Zealand and Hawaii, experienced a wave of extinctions of their native fauna around the time of colonization, which was well after Clovis colonization of America. My best guess, a much debated "bed time" story, is that the first Americans swiftly, if unwittingly, wiped out our megafauna. There are other explanations that implicate climate or disease or competition as causes. The mystery is far from settled.

Leaving the debate over what might have caused the extinctions to its partisans, let us return to Thoreau and the matter of what the disappearances mean to us now. In his Journal of 23 March 1856, he lamented historic losses. In Thoreau's New England, the animals lost since settlement in the 1600s included the cougar or panther, lynx, wolverine, wolf, bear, moose, deer, beaver and turkey. Seeking to discover the nature of life through nature herself, Thoreau reflected on the extinctions. "I cannot but feel as if I lived in a tamed and, as it were, emasculated country...I should not like to think that some demigod had come before me and picked out some of the best of the stars." The demigods (European settlers) had indeed driven cougar, lynx, wolverine, wolf, et al. from the woods of Concord. And earlier demigods, perhaps the first Americans, had destroyed the mastodons, mammoth, ground sloths, giant bison, and the other large mammals. The continent indeed had known better days, with a suite of large mammals on par with what can now be seen only in an African game park. Thoreau's words reach deeper than he knew: "I listen to a concert in which so many parts are missing... I seek acquaintance with nature—to know her moods and manners. Primitive nature is the most interesting to me. I take infinite pains to know all the phenomena of the spring, for instance, thinking that I have here the entire poem, and then, to my chagrin, I hear that it is but an imperfect copy that I possess and have read, that my ancestors have torn out many of the first leaves and grandest passages." Thoreau was not thinking of mastodons or giant ground sloths but he might as well have been. "I wish to know an entire heaven and an entire earth," he said. The last entire earth went with the mammoths, 10,000 years ago.

This, then, is our birthright, a continent whose wilderness once echoed to the thunder of many mighty beasts, a fauna that eclipsed all that remains, including the wild animals of Yellowstone and Denali. Those who ignore the giant ground sloths, native horses, and saber tooth cats in their vision of outdoor America sell the place short, it seems to me. This land is the mastodon's land. While "Home on the Range" commemorates buffalo, deer, and antelope, it misses the mammoth, glyptodonts, and camels. There was a wild America considerably wilder than any brought to us on TV. Our late Pleistocene legacy means we can imagine more, not fewer, *kinds* of large animals on public lands, on the western range and in our national parks. The mesquites, the honey locusts and Archie Carr's snowy egrets, to name a few, remember how it was. The rest of us are learning. 🐾

Paul Martin (Emeritus Professor of Geosciences, University of Arizona, Tucson, AZ 85721) is a leading proponent of the overkill hypothesis and co-editor of the classic Quaternary Extinctions. He is now writing a book on Pleistocene overkill for popular audiences, and studying pack rat middens in the Sonoran Desert.



Nothrotheriops, the Shasta Ground Sloth, hailed for its dung deposits in caves of arid North America.

Editor's Comment: Professor Martin's article has even more to tell us about our presence in North America than is immediately evident. If his overkill hypothesis—for which convincing evidence is mounting—is at least partly true, some important lessons can be drawn from it:

1) We must be exceedingly cautious in developing and employing new tools and technologies. If early human hunters on this continent exterminated scores of species with nothing more than Clovis points and fire, modern humanity's arsenal is entirely too deadly.

2) Introducing exotic species is inherently dangerous. The native megafauna of North America was susceptible to the depredations of *Homo sapiens* in part because this bipedal hunter was an invader with which the natives had not co-evolved. The one continent still blessed with a wide array of large mammals, Africa, is also the continent on which the other mammals have had the longest time to adapt to (and with) hominids.

3) Environmental ethicists might do well to shift some of their emphasis from developing new normative systems to addressing real-life questions. For example, should we reintroduce the condor to the Grand Canyon, or the lion to its former range in North America, given that these species are now absent here primarily or secondarily due to human overkill?

4) We should be reintroducing, not exterminating, large native mammals in North America. This will necessitate restoring vast wild areas throughout the continent.

—John Davis

Indigo BLUES

The Destruction of Gulf Hammock

by Bruce J. Morgan

Where have all the indigos gone? Not to cages one by one as their Threatened status might indicate. Reptile enthusiasts and market hunters for the pet trade can be blamed for part of the decline, but their depredations were concentrated in certain areas such as the Everglades, where indigos were particularly abundant. Here in north Florida the conventional view has been that indigo snakes have always been scarce, and that it is a rare and fortunate day when a herpetologist out looking for diamondback rattlesnakes sees a big blue streaking down a gopher hole. I held to this view for many years, but subsequently learned that it was my habitat preference, not the snake's, that prevented me from seeing more of big blue.

The eastern indigo snake (*Drymarchon corais couperi*) is a big active diurnal reptile with a larger home range than any other North American snake with the possible exception of the coachwhip. Though relatively slow due to its heavy build, it can easily crawl farther in a day than the average snake hunter is willing to walk. This means that an individual snake may utilize a disturbed habitat for a time; but, unlike the rat snake, which is as sedentary as a herpetologist, it is unlikely to hang around the old barn waiting for a snake hunter to come by to destroy its already disturbed habitat.

Paul Mohler has undertaken a radio telemetry study of indigos in Gulf Hammock, on the Gulf Coast of Florida. The sample size was small, but the results indicate that the average indigo in prime habitat has a home range of at least 400 acres. One particularly peripatetic individual (if such a word can be used to describe a legless creature) had a home range of 1300 acres. These figures represent the home range for approximately one year. Over a lifetime the snakes would no doubt range much farther. It seems to me that in a less favorable habitat, such as a xeric sandhill ecosystem where food is hard to find, the range would be larger still. Paul disagrees. He feels that the relative dearth of dinner would be expressed as a lower density of individuals, rather than a larger range. If the poor snakes had to crawl any farther their bellies would need retreats.

Most snake hunters are of the opinion that asphalt roads on a moonless night are the preferred habitat of all reptiles, but while they cruise the deathstrip blinking beady eyes, the indigo is safely at home in bed. The downside of this is that almost no place is left for a seven foot serpent to crawl without being run over during the day. Length x rate of activity x home range x road density = certain death. So if you would seek the indigo, go far afield, to a place where death is not so random and implacable.

The Hammock was once America's only real jungle, a forest of forbidding aspect, deep and dark, home to Florida black bears, Florida panthers, and the famous "wild" hogs that folk singers still sing about.

Many authorities have suggested that the indigo is an obligate dweller in gopher burrows; others, that it prefers wet prairie such as the Everglades. In my experience it is an opportunistic and adaptable creature that requires only sufficient space in which to escape its only major predator, man.

Most indigenous coastal plains whitetrash inhabitants, also known as rednecks, are incapable of distinguishing a water moccasin from any other cylindrical object. The subspecies known as the Florida Cracker, however, is unique in its ability to recognize the indigo as distinct from other snakes. Due to a unique synergy of folklore and legislation, the average Cracker will avoid killing an indigo snake. "They's good' uns," one might say. In the following anecdotal stories I have changed some of the particulars to keep some of the more brutally stupid of my readers from discovering the whereabouts of the last of the indigos. Anyone who can read a map should be able to find these places, but please don't, unless you have enough wisdom to simply look but not touch. These animals are protected by law. *Drymarchon corais couperi* is listed by the US Fish and Wildlife Service as Threatened under the Endangered Species Act. Show as much environmental awareness as the average hawk hunter who has the sense to leave them alone. If the game warden catches you with an indigo you will go to jail. If I catch you collecting for sale you will be transformed into a snake, i.e., become legless and endowed with a bifurcated penis.

The cognoscenti know (redundant?) that big indigos are most often found on warm sunny winter days, for two reasons. First, a large black animal that basks in the sun is an efficient solar collector. Due to size, it can run on residual heat, and thus can be an effective predator even in winter. Second and even more important is the primal urge. Indigo snakes mate in fall and winter. Females tend to remain near food and shelter, so males, which are bigger, must roam. This is why male indigos have larger ranges than females, and are most often found on warm winter days. As the Scottsman said, "when the frost is on the punkin, tis the time for dinky dunkin" (for snakes I suppose that should be "double dinky dunkin").

It was one of those glorious days when a Floridian couldn't help but rub in the fact that, while his yankee visitors dwelt for the most part in frigid hell, here all was well. Eighty degrees on a mid February day was all the excuse I needed to suggest a magical mystery tour in the ruined wilderness of Gulf Hammock to my frozen friends. The omnipresent mosquitoes had been knocked back by a recent frost, and hunting season was over, so we donned flip flops and shorts, grabbed a cooler, and headed for the woods.

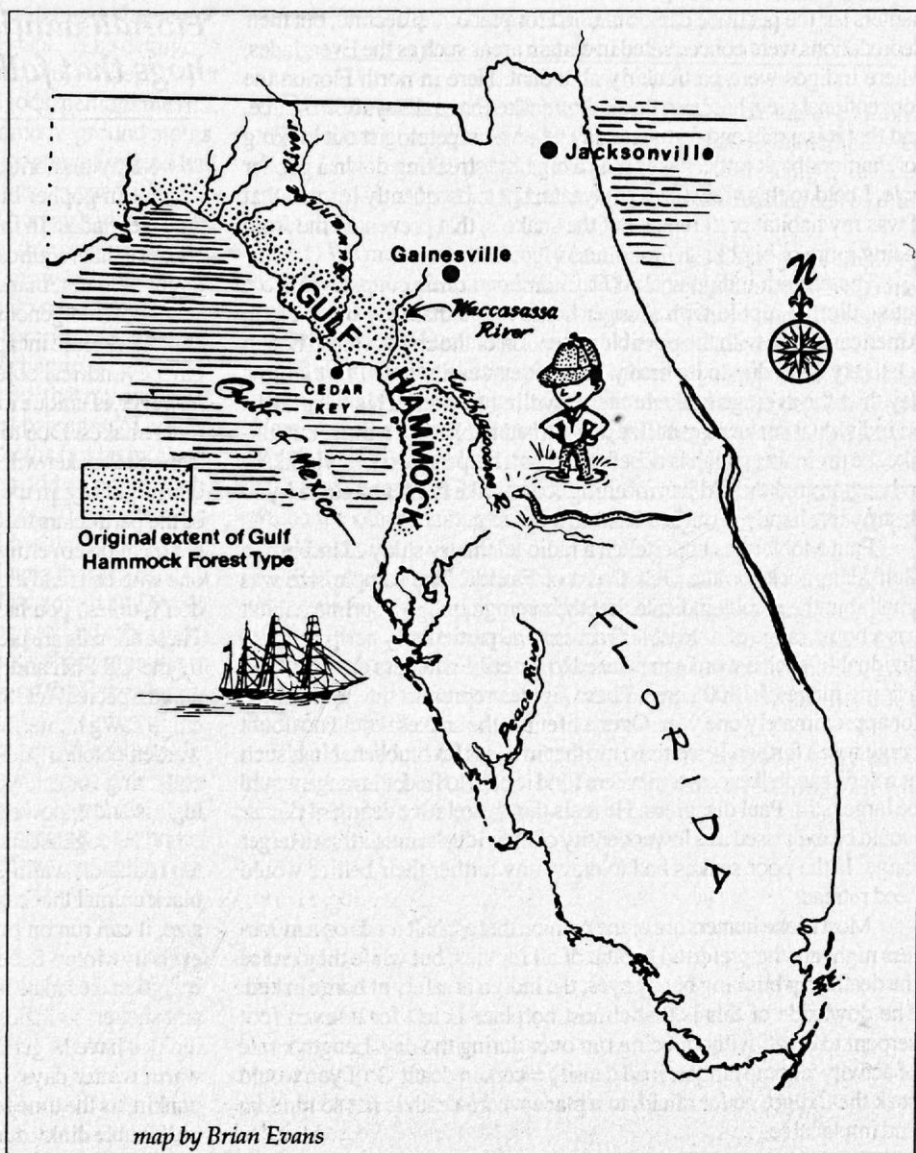
Most people suppose that any large tract without homes constitutes a wilderness. My friends from the cutover woodlands of suburban Maryland can be forgiven for their enthusiasm. "Look, over there, no convenience store!" Wherever I looked, I saw the shattered remnants of what was pristine ancient forest just a few years ago. As I was "in the cups," I began to glumly pontificate upon the sins of man. I was well into my bull when the discourse was rudely interrupted by a thunderous fart. Niki thought that this was meant to punctuate one of my points. I assured her that I would not so brutally assail her sensibilities, and that the sound had come from behind, that is to say, from far behind, in a brush pile. Summoning all of my dignity, I announced, "that, Madam, was the sound of an enormous serpent, perhaps a dinosaur, defecating." I am known and respected for my encyclopedic knowledge of woodcraft, but this bit of information was too arcane to be accepted. I felt much like Professor Drummond, whose pedagogic pronouncements are often considered merely droll by the benighted proles. To prove the point I strolled over to the thicket, and there by a stump was an enormous indigo snake disposing of a winters-worth of shit. The beast was over seven feet long, a relic from the virgin forest, and as close to a dinosaur as one is likely to get.

Three years earlier that stump had been part of a virgin forest growing on a rocky hammock alongside a crystal clear spring fed run. Venerable magnolias and gnarled oaks thirty feet in circumference grew around the rock rims of sinkholes similar to but smaller than the cenotes of the Yucatan peninsula where the Mayans used to throw what few virgins they could find. Ancient cabbage palms with swollen bases and moss-covered columnar trunks eighty or more feet tall occasionally broke through the main forest canopy. Maple ridges with hickory and ash revealed the limestone of ancient reefs. Below, in the deep shade, the forest floor was clear and open, easy to walk through, with little vegetation other than young palms and rare ferns and moss growing on the exposed limestone. Closer to the coast, cedar and palm gave way to spartina and other marsh grasses which mingled with the horizon at the Gulf of Mexico.

Gulf Hammock was once the heart of an unbroken expanse of hydric hardwood hammock that stretched along the Gulf Coast of Florida from Chassahowitzka, just above Tampa, north and

west to St. Marks, just below Tallahassee. Gulf Hammock proper is the land west of the highway, between Cedar Key and the mouth of the Withlacoochee River.

The Hammock was once America's only real jungle, a forest of forbidding aspect, deep and dark, home to Florida black bears, Florida panthers, and the famous "wild" hogs that folk singers still sing about. Homesteading came and went. The Hammock was spared from settlement by the early pioneers due to a fortuitous combination of environmentally adverse conditions. The place was a real hellhole. The soil is perhaps the richest in the whole state, but only an Indian could farm there, for the ground is strewn with limestone and chert boulders that would destroy any plow. These rocklands are dissected by innumerable effectively impassable swamps. The entire area is nowhere more than a few feet above sea level, so heavy rains completely flood the Hammock every summer. Along the coast, the Hammock is broken up into hundreds of islands separated by tidal creeks and marshes. It is a classic example of a submerging coastline. Here the Mississippi



embayment is causing the west coast of Florida to sink. So much sludge is being dumped on the alluvial fan at the mouth of the Mississippi that the weight is causing the Earth's crust to deform, at the same time that sea level is slowly rising. Dead palm trees standing in salt water are mute testament to the rate of change.

The greatest impediments to settlement in Gulf Hammock are the bugs, billions and billions of sand gnats, yellow flies, deer flies, gigantic pleistocene relic horseflies, and mosquitos in infinite variety (including giant mosquitos that can stand flat footed and fuck a turkey). Before the age of screens and Off, the naked ape didn't stand a chance. There were a few leather skinned semiaquatic settlers who hunted hogs and cut cedar for a living. Today, their descendants mostly live in the villages of Gulf Hammock, Otter Creek and Crackertown.

The first economic boom (to use a loud word for a small event) came as a result of the Civil War. The Southern patriots needed salt, and most supplies were cut off by the yankee blockades. The yanks could see the smoke from the cooking cauldrons, but the countless miles of tidal creeks, shallow water, and mud flats provided a refuge for the saltmakers. The remains of this primitive enterprise can still be seen today on one of the most remote islands in the marsh.

Cedar Key was a small fishing village until the schoolmarms of the late nineteenth century rose as one to demand an endless supply of cedar pencils with which to inculcate the principles of modernity into their grubby little wards. No mere wilderness could withstand such an imperative, so the cedars of the Gulf Coast fell under the axe. Cedar Key became one of the principal pencil producing ports in the nation. Another industry was based upon the harvesting of palms for fiber to make brushes. For no better reasons than these, the captains of industry chose to build a railroad from Fernandina Beach on the east coast through the swamps to Cedar Key on the west coast. Today Cedar Key is a quaint tourist attraction, people have forgotten how to read and write so pencils aren't necessary, and the railroad is gone.

From the railroad, spur lines were built which facilitated logging in the vast swamps. Lumber cutters harvested cypress along the few navigable creeks, giant loblolly pines off the high ground, and cut the cedar for which Cedar Key is named. In the good old days the lumber supply seemed endless, so they only took the best. Furthermore, the technology did not exist to completely ravage the land; they were selective just to avoid unnecessary work. Their methods were primitive and relatively gentle. One old timer told me about using oxen and carts with giant wheels to haul the lumber through the swamps when he was a boy. It was said that in the old days you could see a quarter of a mile through the forest, and could drive an ox cart anywhere without obstruction. There were no real roads, just rough trails and the old mainline railroad grade. People came and went, and in time the jungle swallowed most of their traces. By the 1920s most of the easily available cedar, cypress, and pine had been cut, but the forest was still alive, and the interior was still wild.

During the mid twentieth century the Hammock slumbered in bug infested oblivion under the benign ownership of the old Pat and Mac lumber company. Catastrophe came in 1966. Pat and Mac had selectively harvested most of the best trees, and it seemed like a good time to sell. They wanted to sell the land to the state so that it could be preserved, and offered it at the extraordinarily low price of \$75/acre. The standing timber was worth far more than that. The only thing more crooked than a real estate deal involving Florida swampland is the Florida politician who makes the deal. It is said that the reason the deal

fell through is that the governor, Ferris Bryant, did not get his kickback. May he burn in hell.

The biocidal conglomerate Georgia/Pacific chuckled with glee, wrote the check, and the fate of the forest was sealed. The blitzkrieg began when GP imported an 80 ton crusher and tested it out on 1000 acres of forest. It successfully eradicated all forms of life, but was ill-suited to the terrain, so they replaced it with a 60 ton crusher which was more maneuverable.

When I first explored Gulf Hammock in the early 70s the destruction was well under way. Most of the forest was still intact, but wide graded rock roads had been pushed into all corners of the wilderness. At 30,000 feet in a jumbo jet the grid of roads was more visible than the interstate highway system. White gashes crisscrossed the green expanse. Brown checkerboards of clearcut land could be seen spreading like the mange along the roads which were cheap and easy to build on the rock substrate. The roads were arteries with which to bleed away the life of the forest. Big trucks could run unimpeded across the swamps. It was a logging trucker's dream, no mountains, no potholes, no little old ladies in Toyotas to get in the way of progress. The big timber companies make much too much money, so GP's main problem was how to avoid capital gains taxes. The answer was to buy an enormous fleet of bulldozers and other heavy equipment with which to build roads, skid logs, and otherwise destroy the ecosystem. This equipment can be depreciated over many years; thus, the initial investment can be written off. As we all know, big corporations don't pay taxes. The most insidious reason for the elaborate road system is hard for the average decent citizen to comprehend. The environmental movement was beginning to notice and the GP schemers decided to head the problem off at the pass by making sure that no part of Gulf Hammock could ever again be called a wilderness. GP pushed roads into the nethermost swamps, then cut, poisoned, bulldozed, and burned the forest **without extracting the timber** as a tax write off.

If any of my readers should scoff at the idea that this amount of money and effort would be expended just for the sake of destruction, without even attempting to utilize the resource, I invite you to tour the area. Even today you will see the ghostly remnants of the giant oaks which were too thick to cut and too big to push over with a bulldozer. The smaller trees were cut, then pushed into piles. The ground was then bulldozed, in many cases down to bare rock. The precious soil was pushed into the piles and the whole mess, rocks, logs, soil, dead snakes, turtles, bugs, mycorrhizal fungi, etc., was burned into ash. Next came the herbicide to kill any seeds from the original forest that might be hiding in a pocket of soil that somehow escaped the bulldozers. After a time, to allow the herbicide to percolate down into the water table, the area was ready for replanting. This was the final death blow for the forest. Some seeds might escape site preparation, but when these seeds germinate into a monoculture of artificial pine trees, they have no chance; the forest is destroyed forever. The worst of the many lies told by the timber industry are those about replanting. It is far better to destroy the forest than do nothing, than it is to destroy the forest and replant it with pine trees or some other alien monoculture. In the twenty years or so during which the pines are grown to spindly poles before being clearcut for pulp, the wildlife dependent upon the original forest dies out almost completely. Oops, they made a mistake; the pine trees they planted turned out to be the wrong kind for the swampy soil. An uncontrollable growth of weeds twenty feet high has turned the place into an impenetrable thicket. The weeds have crowded out the mal-

adapted pines, so it was all for naught. The giant oak trees still standing were girdled with chainsaws or injected with poison. Go look if your stomach can stand it.

Paul Mohler's studies, reported in "Home Range and Seasonal Activity of the eastern indigo snake, *Drymarchon corais couperi*, in Northern Florida" (Gulf Hammock), seem to indicate that indigos, like many other snake species, prefer a disturbed, or early successional habitat. Most of his study animals spent most of their time in cutover areas. For this to be a meaningful observation, it would have to be correlated with the amount of area that was cutover; unfortunately, most areas have been. Indigos are an adaptable species that can no doubt profit from the temporary increase in biological productivity (explosive growth of weed, bug, and pest species) that comes with the ruination of the wilderness. This should not be taken as an indication of their actual demographic status. Most observers report seeing large individuals in Gulf Hammock. This, and the fact that they are a long-lived species, leads me to suppose that most encounters are with the remnants of a large population that existed in primeval abundance in the undisturbed forest, relict monsters. Any snake hunter who has cruised the roads at night, then examined the area by day, should conclude that snakes are where you find them. Snakes probably do not actively seek specific habitats, but rather crawl around until they accidentally find a suitable habitat, then spend a greater percentage of time there than elsewhere. To suppose that the relative abundance of indigos in Gulf Hammock is an indication of their prosperity, is to think like the Pleistocene hunter who followed the tracks of the last herd of mammoths on Earth, and supposed that there must be many more in the greener pastures somewhere to the north.

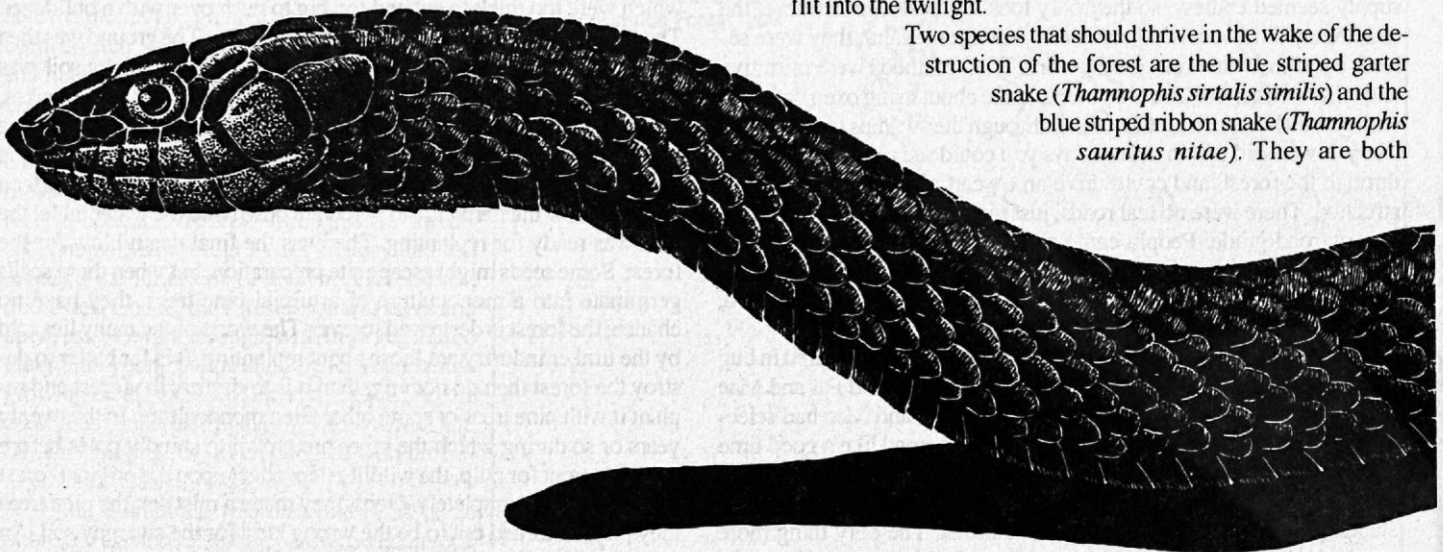
The mammals did not fare so well as the reptiles in Gulf Hammock. Most of the game was gone even before GP raped the hammock. Due to unregulated hunting the deer population crashed in the 1940s. In 1947 only 13 deer were legally killed during hunting season. The population has made a fitful comeback since the desecration because the clearcuts provide easy browsing for the first few years. The hogs, which are not native

to North America, go through boom and bust cycles because of disease and hunting pressure. When populations are high they do almost as much damage to the forest floor as a herd of hungry bulldozers. Reptiles and their eggs are devoured on the spot. Gulf Hammock was once a paradise for black bears, until the beekeepers got tired of their depredations and poisoned the whole bunch. The few survivors were relentlessly hunted down with dogs. The same thing happened to panthers. Nowadays the rednecks comb the woods with dogs every year but no bears or panthers ever turn up dead despite such comments as, "Why I saw a big panther just the other day in front of my mobile home, he was big and black and had blazing orange eyes! The woods are full of 'em!" Conventional redneck wisdom in respect to bears verges on ecological thinking, but it is wrong. They say that bears can't live here now because the habitat is gone; no oak trees, no acorns. Black bears are opportunistic feeders that can live well almost anywhere in proximity to humans provided they are not hounded with dogs and shot, or hit by vehicles (the largest source of mortality for Florida black bears). The possibility of reintroducing bears and panthers still exists, but only if we eradicate the rednecks and their dogs first, and close or modify roads.

[Science Editor's note: Black bears are opportunistic, but may depend on hard mast (e.g., acorns) for survival in some areas. They also may need large trees with cavities for denning.]

Gulf Hammock is home to several interesting endemic serpents. The Gulf Hammock rat snake (*Elaphe obsoleta williamsi*) was, until recently, considered by some to be a distinct subspecies. In reality it is an intergrade between the blotched grey rat snake of Georgia, more colorfully known as the white oak runner, and the striped yellow rat snake of the Florida peninsula. Rat snakes are safe wherever there are big oak trees to climb in search of squirrels and birds. The murdered, but still standing, live oaks may be the salvation of the Gulf Hammock rat snake. In the olden days, when trees were used for lumber instead of toilet paper, they built a giant lumber drying kiln in Gulf Hammock. When the big pines were gone, the kiln fell into disuse. Today it is a marvelous ruin, overgrown with vines and rife with rats. Bats roost in the ceiling, and lucky Gulf Hammock rat snakes snag the bats as they flit into the twilight.

Two species that should thrive in the wake of the destruction of the forest are the blue striped garter snake (*Thamnophis sirtalis similis*) and the blue striped ribbon snake (*Thamnophis sauritus nitae*). They are both



short-lived fast breeding animals that eat bugs, frogs, and minnows, all of which are in great supply. They should be common, but in my experience they are not. One might think predation, in part by indigo snakes, rather than food supply, is the controlling factor. However, this would imply that the woods were full of predators; as we know, predators are generally the first to go when the ecosystem is wrecked. Disease seems more likely to me.

I have long supposed that many, if not most, of the forms, patterns, and colors found in nature are the result of pure chance, not the result of active natural selection. While herpetologists may choose to distinguish between various subspecies of reptiles on the basis of color pattern, it is entirely possible that nature just doesn't give a damn. Coral snake mimics may be marvels of natural selection, and a bigger better dewlap may ultimately get the lizard laid, but who could argue that broad bands on a king snake are somehow better than narrow bands? Is an orange rat snake less well adapted than one with cryptic coloration? Logic would have it be so, but apparently the snakes have never heard the word. Nature is not perfect. Neutral or maladaptive traits abound, carried along by the overall fitness of the individual and the genetic linkage of adaptive and non-adaptive genes. Even I get laid occasionally, despite the fact that I have a nose that can hardly be distinguished in dim light from a drooping penis. All of this brings me back to an evolutionary conundrum. Why, in an effectively endless world of chance, would it be that in one particular swamp, there and nowhere else, two distantly related snakes should both develop blue stripes? The blue garter snake and the blue ribbon snake share similar but not identical habitats. Are they responding to some common environmental influence? Are the birds there blind to blue? Is the moon made of blue cheese? Is there any rhyme or reason to this chromatic convergence? I think not, but then, I am a cyano-cynic.

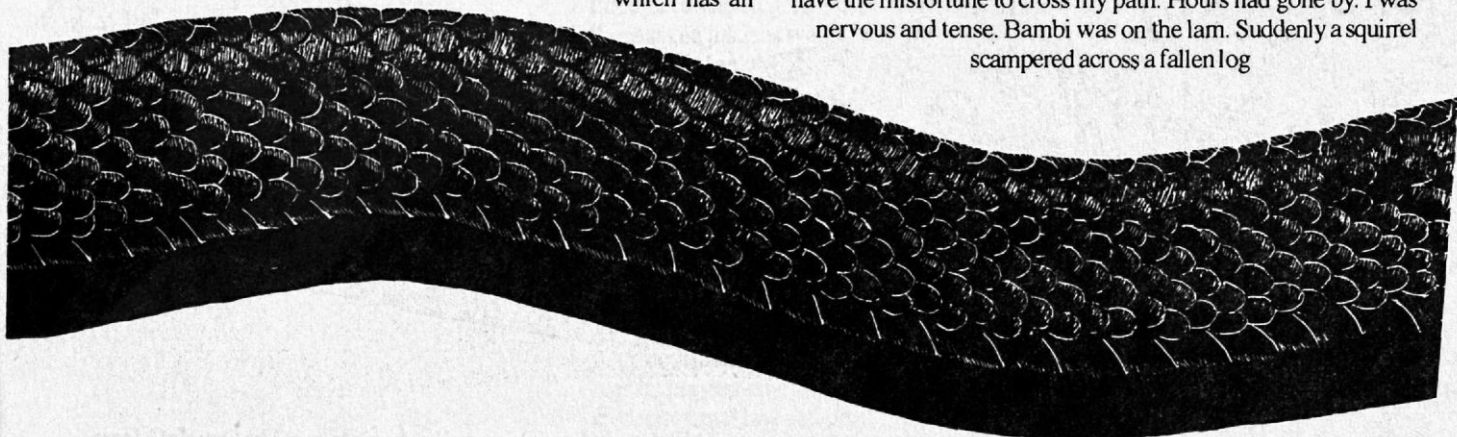
There are countless thousands of ponds, sinkholes, ditches, creeks and swamps in Gulf Hammock. All of these are replete with fish and frogs. On a recent trip to the Hammock (9/28/91) I found two giant indigos, a spectacular scarlet king snake (*Lampropeltis triangulum elpsoides*) climbing up a tree, a green snake, and ten billion frogs, give or take a few, but only one banded watersnake (*Nerodia f. fasciata*). Where are all the watersnakes? By all rights it should be possible to find hundreds on a good day. If Aristotle was correct in stating that Nature abhors a void, then something is wrong! Even more perplexing is the scarcity of the Gulf Coast Salt Marsh watersnake (*N. f. clarki*) which has an

endless world of tidal creeks to inhabit, but has always been rare. Twice a day, at various times of the day, an infinity of small fish become trapped in pools as the tide recedes. Why isn't the salt marsh watersnake utilizing this vast resource more successfully? Damn if I know. I can't blame this one on the timber industry.

The threatened Florida box turtle (*Terrapena carolina bauri*) should be common in Gulf Hammock, but the pigs, bulldozers, botflies and mosquitos have almost finished them off. The way to find box turtles is to look for a cloud of mosquitos. The particular species that eats turtles will not bite humans. You can sit right next to a swarm and not be bitten. Pity the poor turtle that cannot flee such a pest. Is it to spend its entire life withdrawn into its shell? It seems possible to me that mosquitos may be the vectors of some unknown disease finishing off the few survivors. I have frequently found young box turtles dead for no apparent reason.

Those who would trudge the swamp in Gulf Hammock in search of snakes should remember that in addition to the various aforementioned horrors, one can expect to get lost. Competent woodsmen always pay attention to such simple navigational aids as creeks and rivers. For example, suppose you park your car where a creek crosses the road, then walk upstream along the left bank some distance away from the creek. As long as you can find the creek again, no matter where you encounter it, it should be flowing from left to right. Follow it downstream, and presto, there is the car. If, at some point you should happen to cross the creek, then the creek should be flowing from right to left. Right? It is a reasonable supposition that a non-tidal creek will not suddenly start running backwards; furthermore, one of the cardinal hydrological rules is that under normal circumstances waters always join and never part. This is why the standard river has many tributaries but only one mouth. (Ignore the delta.) The Russians are fond of planning to make their rivers run backwards, and developed their nuclear industry for the purely peaceful purpose of instant excavation. (If you believe this, then I have great deal for you on submerged Florida home sites.) Other than in Chicago, if the river starts to run backwards you are in the twilight zone...or lost in Gulf Hammock.

There I was creeping through the forest along Spring Run, bow in hand, ready to deal swift and silent death should Bambi have the misfortune to cross my path. Hours had gone by. I was nervous and tense. Bambi was on the lam. Suddenly a squirrel scampered across a fallen log



about thirty yards away. No one in their right mind hunts squirrels with a bow and arrow. Arrows are very expensive, and you are certain to miss. Nonetheless, with an involuntary movement, I drew down on the poor hapless rodent. I had no intention of releasing the arrow, but before I knew it the shaft had passed directly through the squirrel's heart and was lodged in a tree behind. A perfect shot! The animal was not even knocked off the log, but merely stood there with a perplexed look and fell over dead. After this senseless murder, I decided to leave the woods before I involuntarily committed any other atrocities, so I pocketed the squirrel and headed back to the creek to find my way home. Much to my dismay I discovered that the creek was running backwards, upstream, and generally heading in the wrong direction. As usual, it was getting late, and I had neither bug spray nor light. By morning I would be a shriveled husk. The mosquitos would carry me off to their nest to feed me to their young. The Gods were angry. This was to be my punishment for senseless rodenticide. The only rational explanation was that I had somehow crossed the creek without knowing it. A land bridge? Possible in this karst terrain, but not likely. Thinking that I was merely confused, and knowing that the truck was surely downstream, I plunged through the undergrowth along the bank. The terrain changed, the creek disappeared into a swamp, and from the setting sun it was obvious that I was going in the wrong direction. I decided to backtrack with what little light remained. While trying to skirt a large swampy area I suddenly discovered the creek again, but this time it was flowing in the correct direction. Marvels and mysteries! What could cause such a thing? Simply this: the creek had bifurcated, or as one might say, distributed. Through a geological process known as stream piracy, half of Spring Run had been captured by the headwaters of Turtle Creek which is a much smaller stream. From my perspective downstream of the split it appeared that the creek was running in both directions at once. No wonder I was lost!

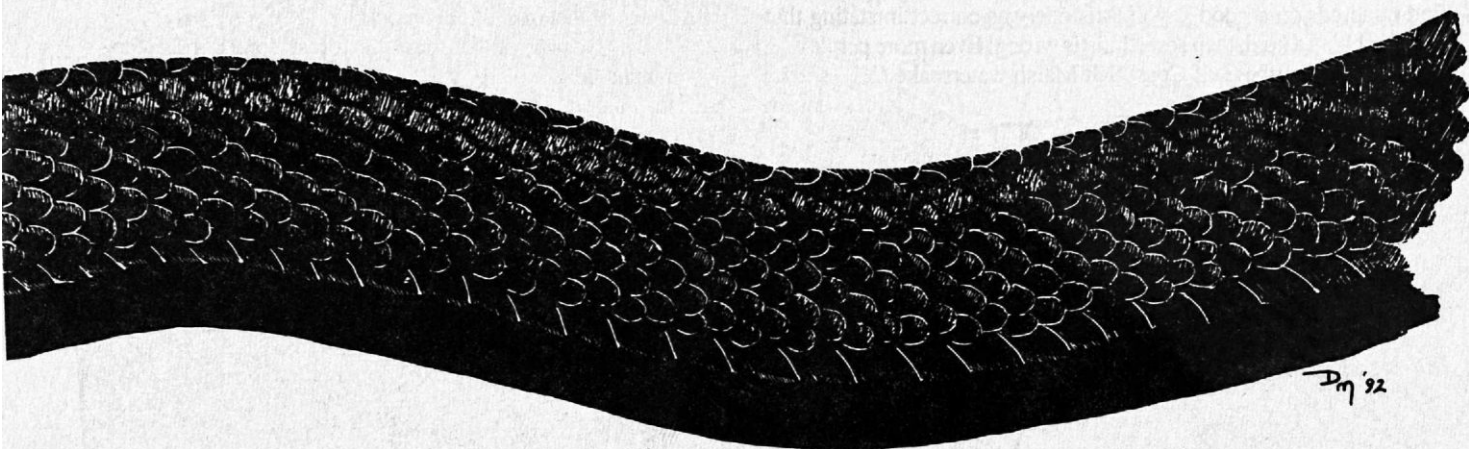
This story has a romantic sequel. The next morning as I wandered along a little path next to the swamp by my camp, there hidden by vegetation, were two huge water moccasins coiled up together and very

much in love. I was just wearing flip flops. If I had failed to notice them I would have stepped directly on top of them. Good thing I didn't have too much of a hangover. They weren't mating, just cuddling up and whispering sweet nothings into each other's thermoreceptors. Most snakes display a typically reptilian lack of ardor, but moccasins and copperheads are much given to romance. Stories about balls of moccasins are true. These are actual ophidian orgies. This couple was so enthralled that they completely ignored me. Breakfast in bed! That's what they needed, so I went back to my truck to get the squirrel. My new friends must have been sated with lust, for when I offered the squirrel, after much badgering, they merely crawled slowly away, one following the other. "Why won't he leave us alone? Has he no respect?"

How big does the indigo get? Bigger and bigger all the time according to the folks who live around Lake Tsala Apopka. It seems that once upon a time the famous Ross Allen allowed a giant anaconda to escape. The other version has it that a circus train derailed on its way to Gibsonton allowing anacondas (and presumably a few dwarfs, jugglers, and trained tigers) to escape into the wilds of Lake Tsala Apopka. We all know that it's bad to introduce exotic species, and here's why. The anacondas mated with the local indigo snakes to produce the indiconda, also known as the andigonda. These dread serpents grow to be at least twenty feet in length. Some say much bigger. I have spoken to three fishermen who have actually seen them swimming across the lake on dark and stormy nights. Nessie move over. One poor fellow was lost in the woods one night, struggling through the trees. He reached up to grab what he thought was a thick vine. You guessed it, an indiconda. The experience left him so shaken that he took up drinking, which is how I came to meet him down at the Biker bar in Hernando.

I could go on and on, for I have been blessed with many indigo snake encounters, but by this time you probably don't believe a word I've said.

Bruce J. (Sleazeweazel) Morgan (POB 6-A, Archer, FL 32618) is a naturalist, writer, and wilderness explorer. He plans soon to complete a book on his exploration of an uncharted river in Belize.



Eastern Indigo (Drymarchon corais couperi) by Douglas Moore

The Brethren Strike Back

The United States Supreme Court Undermined Environmental Laws In Its Latest Term

by Ray Vaughan

Springtime in Columbia. Ah, yes, April 1992, and the cherry blossoms and the clear sky touch our seat of government with pink and blue. The entire scene seems so tranquil. I stand on the steps of the Supreme Court building and look out over the busy people toward the Capitol, stately and solid in the afternoon light. The forces of American government are hard at work all around me.

In the building behind me, law clerks and support personnel are engaged in the routine work of BIG LAW; they scurry about researching cases, drafting memos and moving papers from one part of the building to another. Occasionally, a man steps from his office and bores several of the nation's brightest young legal minds with a long tirade on family values. Bound by a scholastic sense of honor toward one who holds a one-ninth vote in the future, the law clerks sit attentive in fake rapture at the words that come forth from the judge.

Farther down the hall the men gather—the ones deciding what the “America of the Future” will look like. One of the things over which they deliberate is that which is all things; the environment has the full attention of the new majority on the United States Supreme Court.

You have heard the names of this brave new majority: the infamous, Coca-Cola drinking Clarence Thomas; the ex-pro football player Byron White; the reserved, nerdy David Souter; the sometimes-thoughtful Anthony Kennedy; and their leader, Justice Antonin Scalia, the mastermind behind the tale that follows. Also usually allied with this conservative core, but not always, are Chief Justice William Rehnquist and Justice Sandra Day O'Connor, the non-brethren member of the Court. Together, these seven manifest the grand plan of the Reagan/Bush Administration to turn our country in a Republican direction for the next three decades. Regardless of who sits in the White House during the next thirty years, these seven justices will be the final arbiters of litigious things in America during that time. They serve for life; short of getting Congress to increase the Supreme Court to fifteen and packing it with Democrats, nothing can be done about the situation.

I was in DC to lobby for clean water and wetlands protection legislation, a futile gesture of faith in the system. The trip was a waste of time, and although I waited for quite a while near the back entrance to the Supreme Court building, I never saw any of the justices come out. I had a few things to say to several of them; my opportunity slipped away after I ran into Representative Kiker (D-Florida), who insisted that I go out drinking with him and his new environmental assistant. That new Coke joke I wanted to tell Clarence would have to wait.

Now that I have told of what I saw in the Supreme Court building, let me tell you just what our fine Court did this year regarding the environment. The 1991-92 term of the court was its biggest environmental year in history, and everything they did works to set back environmental law and protection at least twenty years.

The 1991-92 term of the court was its biggest environmental year in history, and everything they did works to set back environmental law and protection...

Environmental issues dealt with by the Court this past term included radioactive waste, hazardous waste, garbage, endangered species, the Clean Water Act and coastal protection regulations. However, more than anything else, these cases dealt with the conflict between state and federal control over the environment and with the extent to which states and citizens can enforce our environmental laws against those who violate them. Despite what you hear about this Supreme Court being in favor of states' rights, the Court has made it clear that it protects "corporate rights" only, and any state, federal, or citizen action that threatens the "right" of certain corporations to do what they want will lose.

Federalism, the idea that describes relations between the various states and the federal government, was involved in a number of cases. Regardless of the "states' rights" rhetoric, the Court crippled the states' right to protect their environments.

The Court issued one such ruling in *Arkansas v. Oklahoma*, Nos. 90-1262 & 90-1266, 60 USLW 4176 (Feb. 26, 1992) under the Clean Water Act. The EPA issued a water pollution discharge permit to the City of Fayetteville, Arkansas; the pollution would go downstream into Oklahoma where the additional pollution from Fayetteville would cause Oklahoma's more-stringent water quality standards to be violated. The Tenth Circuit Court of Appeals had ruled, in a beautiful opinion, that one state's (Oklahoma's) efforts to protect high-quality waters could not be compromised by another state (Arkansas) and EPA's allowance of excessive pollution in that other state. The Supreme Court reversed the lower court and held that Oklahoma could be forced to accept the federal regulatory scheme, even if that meant the degradation of its high-quality waterways.

The Court issued rulings in two cases regarding hazardous waste and garbage. In *Chemical Waste Management, Inc. v. Hunt*, No. 91-471, 60 USLW 4433 (June 1, 1992), the State of Alabama had placed a two-tiered tax on waste disposed of at ChemWaste's Emelle, Alabama landfill, the largest hazardous waste landfill in the country. Waste generated in Alabama was taxed at \$40 per ton, and waste generated outside Alabama and imported into the state for disposal was taxed at \$112 per ton. In a splendid opinion that spoke of the need to protect citizens from the dangers of hazardous waste transportation and disposal, the Supreme Court of Alabama had upheld the two-tiered tax as an environmental protection and public health measure and not as an economic measure.

The United States Constitution gives Congress the sole power to regulate interstate commerce; thus, states may not enact economic regulations that discriminate against interstate commerce. However, a state

may discriminate against interstate commerce if it has legitimate noneconomic reasons for doing so. The United States Supreme Court has long held that states may discriminate against, and even ban, noxious articles from being imported into their boundaries; contaminated fish, diseased rags and the like can be banned. However, big corporations now make billions of dollars transporting



and disposing of garbage and toxic waste; therefore, the Court has decided that such waste cannot be discriminated against. The Court struck down Alabama's higher tax on out-of-state waste, and the majority dismissed the environmental and public health issues with little more than a few condescending remarks toward lowly Alabama. The majority's rationale was that Alabama was trying to isolate itself from a national problem.

Using the same logic, the court struck down a Michigan law that allowed counties to ban the disposal of waste imported from outside the county. The decision was *Fort Gratiot Sanitary Landfill, Inc. v. Michigan Natural Resources Dept.*, No. 91-636, 60 USLW 4438 (June 1, 1992).

Dissenting from both opinions, Chief Justice Rehnquist stated that it was the states lacking disposal facilities and thus exporting their waste that were violating the commerce clause. Alabama was not trying to isolate itself from a national problem as Alabama was willing to dispose of its own wastes and to take other states' waste if those states paid for the additional environmental and public health protection measures needed. As he astutely noted, the states without disposal facilities had effectively isolated themselves from the national problem.

These two rulings bar local governments and states from preventing the importation of waste from other jurisdictions. Such rulings discourage reduction and recycling by mandating that places like Alabama be open as dumping grounds for the less-responsible states. The Court did allow Alabama to place a total cap on how much waste can be dumped each year, but as a practical matter this cap must be large enough to ensure the profits of the private landfill owner; and the court did not address the problem of what Alabama will do with its own waste if its landfill decides to take only out-of-state waste. In effect, these two waste rulings say the rich can dump their waste problems on the poor, and the poor have to shut up and take it.

Contrary to *Arkansas, Hunt* and *Fort Gratiot*, the Court upheld states' rights in *New York v. United States*, Nos. 91-543, 91-558 & 91-563, 60 USLW 4603 (June 19, 1992). The Court dealt with provisions of the federal law over low-level radioactive waste; that law provided financial incentives to states to build facilities for waste disposal or to agree with neighboring states to form a compact to collectively dispose of their wastes. But the law also included a stick; any state that had not arranged for disposal of its waste by 1996 would automatically take title to all waste in the state and become liable for it. Most states made arrangements under the law, but New York decided to challenge it instead.

The Court upheld the financial incentives, but it struck down the "take title" provision as unconstitutional under the Tenth Amendment, which reserves to the states all powers not explicitly delegated to the

federal government under the Constitution or prohibited to the states by the Constitution. The Court basically ruled that states could not be compelled to take part in the federal regulatory scheme.

The Court further weakened the power of states over their own environments in *United States Dept. of Energy v. Ohio*, Nos. 90-1341 & 90-1517, 60 USLW 4163 (Apr. 21, 1992). There, the Court



held that states could not fine federal agencies for environmental damage caused by those agencies. Under various environmental statutes, a state can sue for damages a polluter that violates the statute. For example, a state can sue and fine a company that violates its water pollution discharge permit. But, under this ruling, the state is powerless if the violator is a federal agency. Sovereign immunity prevents states from making the federal government protect the environment. In effect, this ruling means federal agencies, particularly one dealing with nuclear energy, can do whatever they want.

These five cases demonstrate that the Court was not bothered with any notions of consistency regarding federalism and states' rights. Powerful states like New York can do whatever they want, when it suits the Court, whereas weaker states can do nothing to protect themselves against the federal government and big corporations. From a reading of the various opinions, it is clear that the Court was entirely result-oriented.

Nailing states to the wall to suit Republicans and big business was just the beginning of the Court's Big Brown Year. After making states virtually powerless to protect the environment under federal laws, the Court took away the right of most citizens to protect the environment in *Lujan v. Defenders of Wildlife*, No. 90-1424, 60 USLW 4495 (June 12, 1992). This case will have the most impact on guardians of the wild. Defenders of Wildlife thought they had brought a suit about whether the Endangered Species Act (ESA) limited what the federal government could do in other countries. Under the Reagan Administration, the Interior Department had issued a rule exempting federal agencies from abiding by ESA rules for actions taken outside the country. Defenders contended that this ruling was illegal. The Court, led by Scalia, took this case as an opportunity to limit environmental groups' standing to bring suits under the ESA and under all environmental statutes.

"Standing" is a legal concept that essentially means the one bringing a lawsuit must have a sufficient stake in the controversy to obtain judicial resolution of that controversy. Basically, you cannot sue over something that does not concern you. If your neighbor is hit by a car, you cannot sue the driver of the car because you like your neighbor a lot. Since 1972, because of the landmark ruling of *Sierra Club v. Morton*, 405 US 727 (1972), the rule for standing in citizen suits under our environmental laws had been fairly lenient; if the groups had members with even a merely aesthetic interest in what the government was about to destroy, then the group had standing to sue to stop the destruction.

As good Republicans, Scalia and friends decided to limit access to court for environmental groups and held that standing *now* means a group's members must prove that the government action to which they object will produce imminent, actual harm unique to those members. Although he did not spell out the complete parameters of this new, narrower rule of standing, Justice Scalia made it clear that one must pretty much own the land next door to the action in order to be sure to have standing to sue to stop it. However, he did leave the door open, just a little, for those who have unique personal and professional interests in a species or habitat such that the person benefits



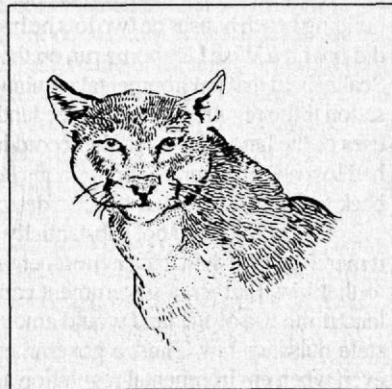
more than the public at large. "It is clear that the person who observes or works with a particular animal threatened by a federal decision is facing perceptible harm, since the very subject of his interest will no longer exist." When Scalia says "particular animal," he does not mean a particular species; he makes it clear elsewhere that someone who works with spotted owls in Oregon will not have standing to stop a clearcut that threatens owls in Washington. He means the individual animal. You cannot sue to stop harm to spotted owls unless you have worked with or observed (and will do so again in the very near future) owls that will actually be killed. Thus, you must prove your unique relationship to the animal; you must prove that the individual animal is indeed in imminent threat of death, and you must prove that you will be uniquely and immediately harmed by the death of that particular animal. All this proof is just so you can get into court; much more will be needed to win your case.

This decision flies in the face of the clear language of the ESA which says that "any person" may sue the government for violating the act. Scalia says that Congress did not mean what it said, and that the words "any person" do not necessarily mean you. As the dissent by Justices Blackmun and O'Connor stated, this opinion amounted to "a slash-and-burn expedition through the law of environmental standing."

Although the case involved the application of the ESA overseas, Scalia wrote the opinion so that it clearly limited citizen suit standing under all environmental laws. This could mean that if the government proposes to clearcut a Wilderness Area in clear violation of the law, you cannot sue them to stop it if you have never been to that area or if you do not have concrete plans to go there again in the future. Being an advocate for wilderness, even for that particular Wilderness, will no longer do. You must prove some unique professional or personal relationship with the actual Wilderness in order to get into court. If you make your living as a guide in that area, you may get standing. Being a pantheist and getting spiritual and religious fulfillment from that Wilderness *should* give you standing. Remember, though, the Court just this year limited standing, and what will make it must be worked out in future litigation. One thing is sure: whereas before a group could sue in its name and leave its members protected and relatively uninvolved, now individuals must come forward with unique and personal relationships with the wild thing in peril in order to file a lawsuit to protect it. As most people are fearful of sticking their necks out in litigation, plaintiffs will be more difficult to find.

Thus, what is needed now is for people to get out into the wilds and establish personal standing. If you care about a particular area or endangered species, go out and get directly involved with it. Arm-chair environmentalists have now been officially taken out of the litigation game.

In another endangered species matter, *Robertson v. Seattle Audubon Society*, No. 90-1596, 60 USLW 4273 (Mar. 25, 1992), the Court held that a 1990 Department of Interior appropriations bill rider, known as the "Northwest Timber Compromise," effectively exempted certain National Forest timber sales in



Oregon and Washington from the Endangered Species Act. The Supreme Court upheld the legislation even though it preempted pending litigation over protecting the northern spotted owl. This legislation stated that the government was to be deemed in compliance with the ESA as long as timber harvesting met the directives in the Northwest Timber Compromise. This opinion was written by Justice Clarence Thomas for the unanimous Court.

Now that the Court had taken away most of the power of states and of citizens to protect the environment under our federal environmental laws, only one thing was left to make this last term a clean sweep for the Far Right. The grandest dream of the Republican hard-core is to have the Court rule that environmental laws and regulations represent "takings" of private property without just compensation. As almost everyone knows, the Constitution protects your right to property, and the government cannot take that property from you without giving you just compensation for it. In rulings on criminal cases, the Court had been hinting that the constitutional rights to life and liberty were not all that important: only criminals need assert such rights. But PROPERTY, every big corporation has property. So, that must be the most sacred constitutional right.

Therefore, if the Republican Right could get the Court to say that environmental laws and regulations were "takings," then developers and other industry people could act at will without permits or government interference. Example: you own marshes along the coast that are the Critical Habitat for an Endangered species. To develop that land into a mall now, you need a wetlands fill permit, a coastal zone permit and an incidental take permit for the Endangered species. However, if the denial of those permits amounted to a "taking" of your property, then the government would either have to let you build the mall without regard to the environmental damage or else buy the land from you at its fair market value as a mall. Thus, any ruling from the Court setting such a precedent would mean that the sole remaining way for federal, state and local governments to protect the environment would be to buy it at full value. And in these times of budget deficits and proration, what government can afford to do that? It would be a developers' field day; all sensitive lands would be wide open. That is the grandest dream of the Wise Use Movement, miners, oil companies, and other fractions of the Far Right.

With this grand property dream in mind, the forces of Brown brought three cases before the Supreme Court last term involving the issue of whether environmental regulation of property is an unconstitutional "taking." The lead case was *Lucas v. South Carolina Coastal Council*, No. 91-453, 60 USLW 4842 (June 30, 1992), and it involved coastal zone protection measures that were keeping a developer from building beach houses on two lots he had bought. Fortunately, the Court did not hit a Wise Use home run on this issue. The Court, again led by Scalia, held that environmental regulations might require just compensation if the regulations denied the landowner *all* economically viable uses of the land. However, the record in *Lucas* did not reveal if Lucas had lost all economic viability in his land, and the Court sent the case back to South Carolina for such a determination.

This opinion did not substantially change existing "takings" law; it merely established that environmental regulations are indeed subject to that law. Further, a government can take all economic viability in land if the use of the land would amount to a nuisance under existing state nuisance law. Thus, a government would not have to buy land even when environmental regulation amounted to a "taking" if use of

the land would be a nuisance to surrounding lands. The Sierra Club declared it a "major victory" that the Court did not make significant changes to the law. However, Scalia made it clear that he wanted to go much farther, and the Court's members are divided in several directions on how they want to go on this issue. Some consolation can be found in Justice Kennedy's desire to make broader exceptions to "takings" law for environmental and public health regulations. Rest assured, though, this is the prime target area for the Wise Use Movement and other land abusers in environmental litigation for the foreseeable future. It is really their only target area in law, because, although this case on this one issue may have been a victory of sorts for the environmental protection side, the Court clearly took away almost every other federal legal tool available to the environmental movement in other rulings last term.

On environmental matters and in most other areas of law as well, the Brave New Court has proven to be very result-oriented. Essentially, they decide whom they want to win and then write an opinion accordingly. They construe the Constitution narrowly or broadly, depending on what achieves victory for the Right people. This, though they and Bush said they were not "activist judges." If a statute helps the Right People, it is upheld. If a similar statute hurts the Right People in a different case, it is struck down. While these are generalizations, they hold true in almost all cases. Chief Justice Rehnquist is the only strict constructionist of the Constitution and statutory language on the Court, and he does remain true to that ideology even if it means hurting Republican interests. He dissented in the commerce clause cases because the commerce clause does allow states to discriminate against interstate commerce to protect public health.

The 1991-92 term dealt a severe blow to the environmental movement and to environmental protection law. True, the Court did not gut environmental law as much as it could have or as much as the Wise Use people wanted, but environmental protection law lies in shambles today. Because the Court, under Scalia's skilled hand, based its opinions on constitutional grounds, there is very little Congress and a Democratic President can do to reverse what the Court has done. Congress does have the power to allow states to discriminate against out-of-state garbage and hazardous waste, and bills to allow that are pending; but Congress cannot fix the damage done to standing in environmental citizen suits.

The stunning setbacks this term underscore the need for environmentalists to advance state laws for environmental protection. State legislatures can adopt, and state supreme courts can make rulings under, state laws and even constitutions to protect the wild things that we can no longer protect under federal law. In many states, the prospect of getting the legislature and the courts to protect the environment is not good, but some states, such as Alabama, do have judges that favor people's health and environmental protection.

No major environmental cases have yet been accepted by the Supreme Court for their review in the 1992-93 term. Perhaps they will take a rest from their Big Brown Year, but the Wise Use nuts will be back soon with more attempts to limit environmental regulations through new "takings" law. For the rest of us, there are at least three more decades of the Brave New Court to look forward to; the ideals and morals of Reagan and Bush will live on for quite some time. Congratulations.

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Grassroots Resistance

The Emergence of Popular-Environmental Movements In Less Affluent Countries

by Bron Taylor, Heidi Hadsell, Loris Lorentzen, and Rik Scarce

The emergence and proliferation of grassroots environmental groups in the developing world has been a striking feature of the past two decades. Although the movements differ in many ways, it is possible to discern commonalities in the social contexts from which they have emerged, in the movements themselves, and in the resulting social conflicts. Our goal is to examine several grassroots environmental movements in less affluent countries and to articulate common patterns we have found. No claim is made that these generalizations apply to all grassroots, "popular environmental" movements. Indeed, most of them are relatively new and have received little or no scholarly attention.¹ Rather, we offer our analysis to encourage further research into the objectives, impacts, and future prospects of such movements.

TRENDS AND TENDENCIES IN POPULAR-ENVIRONMENTAL MOVEMENTS

Few environmental movements in less affluent countries have their primary origins in ecological concerns or focus exclusively on environmental issues. Most commonly, such groups have their genesis in the survival efforts of persons and communities living at the margins of existence, especially peasants and indigenous peoples in rural areas. Popular grassroots environmental movements often begin with efforts promoting community development, literacy, and political empowerment. But it is the battles over who owns and/or controls the use of land that are most characteristic of the emerging environmental movements. Such battles take one of two forms: struggles to overturn current ownership patterns and to reform current land uses, or efforts to preserve traditional land ownership and use patterns against the encroachment of the industrialized world. The crucial issue is land reform or land defense. Struggles over land shape popular movements into environmental movements, because generally speaking, the land use plans of poor people are more ecologically sustainable than the more centralized ownership and mechanized land use patterns they are trying to overturn or prevent. In rural areas, the (usually accurate) perception within popular-environmental movements is that the land is being exploited for and by outsiders—either multinational commercial interests or, more commonly, commercial elites within the nation in question.

Much of the commercial enterprise carried out or planned in rural areas displaces long-term inhabitants. Thus, fear of displacement is a major source of popular-environmental resistance. Just as pernicious as forced displacement, is the division of families when fathers and sons leave to seek employment in urban centers (or other countries) after their traditional livelihoods are destroyed by changing land-use patterns.

Whether or not local people are displaced, commercial development threatens traditional ways of life. The process usually begins with road building, followed by logging, mining, and industrialized agriculture (ranching and farming), all of which are usually accompanied by increasingly centralized ownership of land by outsiders. Such threats contribute to the proliferation of grassroots popular movements stressing self-reliance, resistance to outside commercial interests, and ecologically sustainable practices.

Popular-environmental groups in less affluent nations tend to be radical in their genesis, or to become so through experiences gained in social struggle. By radical we mean one or more of three things. First, these movements often threaten private ownership of commonly used lands, seeking to overturn current, private land ownership patterns. Some are self-consciously socialist in orientation. Second, these movements critique industrial development and mechanized agriculture, thereby placing themselves in opposition to elites who usually hope to emulate the more technologically "advanced" societies. Movements influenced by such a critique seek to prevent or overturn western-style, mechanized forms of development.² Third, many of these groups employ increasingly militant tactics, including illegal direct action, from civil disobedience to sabotage (sometimes called "ecotage" or "monkeywrenching"—when the purpose of the sabotage is to protect the natural world). Such militancy has even, occasionally, involved homicide, justified as self-defense.

Not surprisingly, this radicalism is often met by violence, sometimes governmental, often private, and seldom prosecuted. Such reactionary violence far outpaces in scope and brutality the more occasional,

Editor's note: A longer version of this paper will be published in *Environmental Politics in the International Arena: Movements, Parties, Organizations, and Policy*, ed. Sheldon Kamieniecki; SUNY Press, 1993.

poorly armed, and usually defensive violence of those involved in popular-environmental movements.

Obviously, the above patterns suggest that popular environmental movements operate under difficult circumstances. It is important to note, therefore, two key forces driving and buttressing these movements. First, women play important and often decisive roles. Indeed, some of these movements are essentially women's movements. This is remarkable given the traditional subjugation of women in most of these countries. Second, religion is frequently central for those involved. These movements articulate moral rationales beyond self interest for their activism, and such rationales are often based on religious sentiments. These movements usually rely exclusively on nonviolent tactics, for pragmatic and/or moral and spiritual reasons.

Survival, on the one hand, and the prospects for the success of these movements, on the other, are greatly enhanced through the strategic building of coalitions. Often, previously antagonistic local groups are brought together in a common cause against the outside interests. Just as important, solidarity is sought from international environmental groups who help apply political pressure on national governments.

These movements have had successes, usually small-scale but sometimes shaking the corridors of power in the international business, finance and political sectors. Some groups, for example, have formed coalitions with environmental activists in more affluent countries and have secured changes in the lending practices of certain international lending agencies.

Yet despite the proliferation of such groups and their notable successes, the ecological and social context that gave rise to them remains so grave, the economic interests so intransigent, and the need for a comprehensive restructuring of political, social, and economic relations so fundamental, that it appears naive to anticipate enduring successes. Even the long-term survival of the peoples and places in these struggles is at risk.

The following analysis of popular-environmental movements will illustrate the preceding characterizations. Among the best known and globally influential movements are those originating in India.

SARVODAYA MOVEMENTS IN INDIA AND SRI LANKA

With empty water pots, women gathered in Tehri, India, on World Environment Day in 1979, protesting water scarcity and the failure of water supply projects. "We have come to tell you that nature is the primary source of water, and we are the providers for our families. Unless the mountains are clothed with forests, the springs will not come alive," they declared (Shiva 1988:211). In the 1980s, peasants gather to protest the damming of the Ganga and Narmada, sacred rivers whose valleys are home to thousands. If completed as currently planned, the dams will displace more than one million people, mostly peasants and tribals (Kendell and Buivids 1987:153-54). Also in the 80s, peasant women in the hills of Garhwal refuse to sell milk from their cows, protesting social conditions that have made milk a market commodity while local children go hungry. In 1987 rural women, with some men and their children, blockade mining operations destroying forests and streams in the Doon Valley. The blockade continues even after they are beaten by 200 men hired by the quarry contractor (Shiva 1988:209). All these are manifestations of a movement known as Chipko Andolan—literally the "hugging-the-trees-movement." Chipko is based, Vandana Shiva writes, on the realization that "the right to food today is inextricably linked to the right of nature to conserve her ability to produce food

sustainably" (1988:178).

This movement is often and properly described as a self-help and survival-oriented environmentally conscious movement. But such a description oversimplifies the motivations of its people. Understanding this movement first requires some understanding of Mahatma Gandhi's philosophy of conflict; and second, an understanding of how the major religions originating in India—Hinduism, Jainism, and Buddhism—can promote intra-species compassion. These religions provide fertile ground for viewing all life as intrinsically valuable, having worth regardless of its usefulness to human beings. Such moral sentiments are shared by the philosophy now called "deep ecology" (especially in the West). The term was coined by the Norwegian eco-philosopher Arne Naess, and is juxtaposed with "shallow" environmental ethics that ground ecological concern exclusively on human needs and desires.

We cannot here describe in detail the mythic, religious resources for environmental ethics embedded in these traditions³. A couple of examples must suffice to provide a "feeling" for the Indian worldview and the deep ecological ethics that can be derived from it. Beginning with the Jataka Tales, which are later re-cast by Buddhism into more philosophical form in *The Diamond Sutra* (Schelling 1991:10-12), we can find a basis for a "deep ecological" concern for the natural world. These tales register what one Buddhist scholar calls "the first written literature [promoting] cross-species compassion" and a sense of "kinship that sweeps across animal species" (Schelling 1991:11). For example, in one well known tale, the Buddha, in an early incarnation, compassionately sacrifices himself as food for a hungry tigress about to eat one of her cubs (Schelling 1991:10-11).

The image in the "Jewel Net of Indra" myth expresses a cosmology generally shared by the religions originating in India: a cosmology that informs the more spiritually inclined Chipko activists. Francis Cook aptly describes this myth-metaphor:

Far away in the heavenly abode of the great god Indra, there is a wonderful net which has been hung by some cunning artificer in such a manner that it stretches out infinitely in all directions. In accordance with the extravagant tastes of the deities, the artificer has hung a single glittering jewel in each "eye" of the net, and since the net itself is infinite in dimension, the jewels are infinite in number. There hang the jewels, glittering like stars... If we now arbitrarily select one of these jewels for inspection and look closely at it, we will discover that in its polished surface there are reflected all the other jewels in the net.... Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels, so that there is an infinite reflecting process occurring. [This image] symbolizes a cosmos in which there is an infinitely repeated interrelationship among all the members of the cosmos. This relationship is said to be one of simultaneous mutual identity and mutual intercausality (in Callicott 1989:214).

Such cosmology, along with the Jataka tales, tends to enhance feelings of kinship with everything else in the universe, and thus provides a basis for deep ecological moral sentiments and activism. Such myths provide moral rationales beyond self-interest for Chipko-style activism, and thereby buttress the determination of Chipko activists. To the extent that people believe they are acting in harmony with the structure of a divine universe, they will be strengthened in struggle⁴.

Mahatma Gandhi (1869-1948), best known for pioneering non-violent tactics eventually successful in overturning British colonial rule

in India, combined such Indian religious sentiments (often expressed in the ideal of *ahimsa*—meaning no-harm or no wanton killing) with the conviction that through social struggle truth will eventually emerge, as long as at least one party to the struggle remains committed to the truth as such and seeks to align herself with it (Bondurant 1965). Gandhi and the independence struggle inspired many of the “Sarvodaya” self-help workers who, after independence, established cooperative, self-help groups in rural communities. From such Gandhian workers and the cooperatives they established, the Chipko movement emerged (Shiva 1988:68-77).

“Sarvodaya” can be defined in different ways. Berreman renders it “building a just society” (1989:246). A.T. Ariyaratne, who in the late 1950s founded the Sarvodaya Shramadana Movement (a self-help movement in Sri Lanka), writes that Sarvodaya “signifies the awakening or liberation of *one and all*”, and then adds the common Sarvodayan slogan, “may all beings be well and happy (in Macy 1983:13, cf. 12; cf. Ingram 1990:123-139). As with Chipko, this movement, “in formulating its philosophy and goals...., took inspiration from the Gandhians” (Macy 1983:29). As with Chipko, the liberation goal is inclusive of non-human life.

Finally, the people of India, with their ancient religious roots and diverse tribal religions, often view specific creatures or places as sacred. Thus, when peasants and tribals protest the damming of the sacred rivers Ganga and Narmada, they believe they are defending sacred values. Some Chipko activists hug trees to protect Aranyani, goddess of the forest. Western observers of non-Western environmental movements often fail to appreciate the site specific nature of the spirituality of many groups, and thus miss altogether how the defense of such places is a religious-moral duty⁵.

With these impressions in mind regarding religious sentiments common in India, and the inspirational role of Gandhi in these movements, we can now sketch the development of the Chipko movement itself. Anthropologist Gerald Berreman recounts how the movement:

began in 1972 among the people of the central Himalayas in India, as an effort utilizing nonviolent direct action to prevent the destruction of their forests and thereby save their environment, their livelihood, their ways of life, and ultimately life itself in their homeland. The characteristic method employed by those participating in the movement...is to interpose themselves bodily between tree cutters and the trees—a tactic in the Gandhian tradition (Berreman 1989:240, 246).⁶

After its initial campaigns, its methodology and philosophy quickly spread to Himachal Pradesh in the north, Karnataka in the south, Rajasthan in the west, Orissa in the east and to the Central Indian Highlands (Shiva 1988:67).

In the early stages of the Chipko movement, the exploitation of forest resources by outside contractors was the primary concern of local villages (Pearce 1991:267). Such villages are often populated primarily by women, as able-bodied men seek work in urban areas (Berreman 1989:243, 253; cf. Harrison 1987:61, 332). By 1975, 300 villages in the hill districts of Uttar Pradesh faced severe erosion and landslides due to deforestation by non-local commercial interests (Shiva 1988:74; Berreman 244-245). Widespread protests against the commercial exploitation of forests by outside contractors eventually led the government to a new strategy: using local labor and forest contractor cooperatives (Shiva 1988:76).

This strategy contributed to a schism in the Chipko movement,

one faction more pragmatic and development oriented, supporting local sawmill cooperatives, the other less compromising and more explicitly environmentalist, feminist, anti-market and thus, more radical. The more radical faction resists market-driven forest exploitation regardless of who profits, even if it is local men (Shiva 1988:76, cf. 71-72). Pearce sees the schism as a battle between deep ecologists and anthropocentric environmentalists.

All observers agree that women have been very important in the Chipko movement, but differ on how to characterize their contributions. Berreman credits two men, Chandi Prasad Bhatt (a Sarvodaya worker who organized a self-help cooperative in the 1960s) and Sunderlal Bahuguna, with helping found the movement (1989:246-47). He implies that it is inaccurate to label it a “women’s movement”—as Shiva comes close to doing—since men are involved “in similar ways and to a similar extent” (1989:252). Shiva and Pearce, on the other hand, note that women inspired both Bahuguna and Bhatt (Pearce 1991:266-267; Shiva 1988:70). These two men eventually became the highest profile Chipko spokespersons, Bhatt of the more anthropocentric faction, Bahuguna of the more deeply ecological one. But Shiva well argues her view by quoting Bahuguna himself: “We are the runners and messengers—the real leaders are the women” (1988:70).

The focus of the Chipko movement broadened in the 1980s, and now expresses concern over mining, the damming of India’s rivers (Pearce 1991: 205-206), and women’s control over dairy production. In 1983 it spawned “Appiko Chaluvali,” an anti-logging movement in the Western Ghats, and there have been Chipko-style campaigns in defense of urban parks in India. Chipko’s spiritual politics and direct action tactics have become a permanent feature of many popular-environmental struggles around the world (Berreman 1989:251). There are now at least 3000 formally structured groups and a similar number of informally organized social movements in India, many promoting ecological agendas (Berreman 1989:239).

THE PACIFIC RIM

Just before the Winter Solstice of 1991, ninety Nobel Prize winners debated the proposition that “mankind [sic] is, on balance, harnessing its intelligence to build a better world” (Anonymous 1991a). Only half of these renowned figures agreed, with ecological anxieties prompting much of the pessimism. Henry Kendall, who won the physics prize in 1990, “warned of an ‘environmental disaster’ if mismanagement of resources and overpopulation persist” (Anonymous 1991a).

Nowhere are the twin specters that haunted the pessimists among the Nobel laureates—population growth and natural resource depletion—more pressing than along the western edge of the Pacific Rim. Here, survival and environmental conflicts often become manichean struggles between industrial and tribal lifeways. Those resisting industrial and commercial incursions often turn to mass civil disobedience, but in the absence of the deep Gandhian influences found in India, tactics have sometimes become more militant. Ecotage is increasingly common, sometimes carried out by large riotous crowds, and resistance has even been expressed in armed rebellion. The results of these struggles have been mixed, but the tenacious ties between peoples and their lands, often grounded in spiritual beliefs about the sacredness of certain places, are exhibited again.

One of the most tragic campaigns by an indigenous people for its place has occurred in the Malaysian state of Sarawak. There, the Penan,



the last nomadic gatherer-hunters in Southeast Asia, have peacefully fought since 1987 to end the destruction of the tropical hardwood forests on which their physical and spiritual existence depends (Anonymous 1990). Other Sarawak tribes have managed to keep their land free of loggers, in part through ecotage. For example, the Iban tribe blew up twenty-five bulldozers and logging trucks in 1982, repeating such tactics four years later (Scarce 1990:151). The Malaysian government refuses to halt the destruction of the Sarawak forest. After being presented with a petition signed by 7000 persons and 14 organizations in 1986, reported anthropologist Bruno Manser, "the destruction of the land went on even faster" (Anonymous 1990).

Meanwhile, environmental groups such as the grassroots, Australia based Rainforest Information Centre and the US based spinoff, the Rainforest Action Network (RAN), have tried to reduce the demand for tropical hardwoods through an international boycott. The boycott has slowed the cutting and road building, which have decimated one-third of the Penan's historical food-gathering grounds and opened two-thirds for further exploitation (Anonymous 1990). Nevertheless, the deforestation continues.

SOUTHEAST ASIA

Rainforest dwellers are not always as committed as the Penan to nonviolence. In Burma (recently renamed Myanmar), along the Salween River border with Thailand, three tribal peoples have launched a guerrilla war against those invading their forest. Since Burma gained its independence from British colonial rule in 1948, the Karen National Union has struggled alongside their blood relatives the Karenni and another neighboring tribal group, the Moi, for their traditional lifeways in their ancestral territories. They have been fighting a brutal government, led by autocrat Ne Win, that came to power in 1962 through a coup overthrowing Burma's first democratic government. The rebels are defending the forests and their more sustainable lifeways, so they can be considered both a cultural survival and a popular-environmental movement.

Spectacular teak forests hide the rebels, while revenue from rebel logging is used to purchase arms and ammunition. Eric Ransdell claims that the rebels log carefully, viewing the forest as "their heritage, the only home they had ever known. Parents...plant teak trees as a kind of living inheritance for newborn children..." (Ransdell 1991:90).

Maintaining this faith was made more difficult in 1988, however, when the Burmese government sold the rebel forest to Thailand. "In less than two years, an estimated four million acres fell to the chainsaw. The world's last great teak forest was disappearing" (Ransdell 1991:90).

Ironically, this sale made possible an environmental victory in Thailand: the Thai government's 1989 banning of all commercial logging. This ban was precipitated by ecological disasters such as flooding and mudslides, and the grass-roots activism of a coalition of "poor peasant hill-farmers...and the students and intellectuals of Bangkok" (Pearce 1991:190-192).

Today the Karen's war has become desperate—and the fate of 600 forest dependent endangered species is linked to the outcome. Previously the Karen sold their trees to the Thais, but only mature ones were cut and only Karen workers could do the felling. But in 1988 the Burmese began to attack the Karen from Thai territory, and "now, the...Burmese military... protect[s] loggers who are clear-cutting forests" (Ransdell 1991:94). Little concern from the international community has been forthcoming. The U.S. Congress voted in 1990 to prohibit the importation of Burmese teak but with little impact (Ransdell 1991:146).

The government of Thailand has also faced environmental direct action within its borders, on Phuket, a small offshore island. On 1 June 1986, 50,000 of the island's 200,000 inhabitants demonstrated to halt the construction of a tantalum refinery. Anxiety about the safety of the plant had been fueled by grassroots environmental activists showing a videotape of the Bhopal disaster. Two weeks later 70,000 went to a meeting with the Thai industry minister. The minister arrived to find the crowd enraged, however, and he quickly fled. Receiving no assur-

ances from the government, the crowd torched the plant. Damage was estimated at \$25 million—the most expensive act of ecotage in history. Afterward, the Thai government began to review its environmental planning laws with an eye toward more public input (Sachs 1988; Scarce 1990:154).

AFRICA

By 1989, Africa had two-thirds of all refugees (Matthews 1991:24). Most of these are environmental refugees, victims of soil erosion, desertification and devegetation. Often environmental decline displaces only part of the family, as able-bodied men seek work in urban areas (Harrison 1987:61, 332). Africa, self-sufficient in food as late as 1970, now fails to feed many of its people.

Given the enormity of African environmental decline and its consequences for survival, one might expect a proliferation of grassroots environmental groups in Africa. Most of the evidence, however, seems to confirm Harrison's claim that "Africa is weaker than any other continent in popular grassroots organizations of every kind." (1987:278). Pearce agrees that "Africa is a desert for environmental groups," and attributes this to "the unhealthy domination of governments over every aspect of the lives of their peoples" (1991:258). Eco-philosopher Baird Callicott suggests there is a deeper cultural reason for the dearth of environmental activism in Africa: its indigenous spiritualities rarely view animals as kindred peoples and non-human life as intrinsically valuable⁷.

Kenya is at least a "partial exception" in that it does have many grass-roots self-help groups (Pearce 1991:258). Kenya's "green belt movement," moreover, is an *explicitly environmental* self-help group that has gained international recognition (Pearce 1991:258-262). Started in 1977 by Kenya's National Council of Women, the movement enlists rural peoples as tree-planters in the fight against desertification and soil erosion. Local communities establish tree plantations on open spaces, school grounds, and roadways. Pearce notes that by 1990 over ten million native trees had been planted, very possibly doing more to stall desertification than the UN Environmental Program (1991:259). The project is headed by a woman, Wangari Maathai, a former anatomy professor. Harrison notes that women continue to be the backbone of Kenya's popular-environmental movements, and suggests that this tradition of women's self-help efforts can be traced to the time when men were away fighting British rule (1987:279).

The green belt movement worked well with the government for many years, but became more militant in 1989 over the government's plans to chop down trees in Uhuru Park in the capital city, Nairobi. The repression that followed included the eviction of the green belt movement from its offices and accusations that it was trying to destabilize the government (Pearce 1991:261-262). Maathai's rising international status (in 1989 she was named "Woman of the World" by the Princess of Wales) may have helped insulate the movement from more serious repression.

A similar movement exists in Senegal, and is labeled, literally, "women's gardening groups"—even though men participate. These groups have become a major force for reforestation. They plant gardens and trees and engage in projects that protect the environment while reducing the work of rural women involved in subsistence agriculture (Timberlake 1986:212).

Zimbabwe's Organization of Rural Association for Peasants

(ORAP) is yet another movement that grew out of women's groups. ORAP groups engage in "service projects" promoting environmental restoration, especially related to water and sanitation. Their "self-help" and decentralized nature is evident in group names such as Siyazenzela, "We're doing it for ourselves," and Vusanani, "Support each other to get up" (Timberlake 1986:212).

Despite the efforts of Africa's popular-environmental movements, it is hard to be optimistic. Not only is grassroots activism exceptional, but Africa has "the harshest of habitats" which makes sustaining large numbers of people more difficult than on any other densely populated continent (Harrison 1987:27-46). Just as problematic is the prevalence of development policies modeled after and promoted by Western countries. These policies exacerbate environmental decline in many ways, especially by encouraging the expansion of multinational rather than locally based firms and through the planting of monoculture cash crops (Pearce 1991: 104-106). Despite the various cultural obstacles to the emergence of popular-environmental movements in Africa, however, it is reasonable to speculate that Africa's fragile ecosystems, droughts, and survival struggles will precipitate increasing environmental activism, and possibly militant action.

SOUTH AMERICA—THE BRAZILIAN AMAZON

In February 1989, 1000 warriors from twenty previously warring Indian groups, in traditional tribal regalia and warpaint, met with Brazilian government officials to protest plans to dam and flood 7000 square kilometers of land adjacent to the Xingu River. The project would displace 70,000 forest inhabitants near the Amazon boom town of Altamura (Pearce 1991:133). Many environmentalists and foreign celebrities were present in solidarity with the Indians. The meeting nearly turned violent after a Kayapo woman ritually threatened a government official with her machete, threatening to kill any dam builders entering the forest (Hecht and Cockburn 1989:212; Pearce 1991:134).

Indians have been fighting invaders for nearly 500 years. Many tribes have been decimated or exterminated by the invaders' diseases and violence. The occupation of the Indians' lands accelerated in the 1960s following intensified road building into the forest. This led to increasing collaboration among Indian tribes, culminating in the founding of the Indigenous Peoples Union in 1980. Supported by international solidarity groups such as Survival International (in England) and Cultural Survival (in the United States), the Indians have recently become skilled at coalition building and lobbying, even succeeding in overturning their status under Brazil's constitution as "wards of the state" in 1987 (Hecht and Cockburn 1989:175, cf. 193). During the 1980s, they increased their use of direct action resistance to the invasions. In several incidents, tribal warriors killed loggers and miners found in their traditional forest areas (Hecht and Cockburn 1989:140, 143; Anonymous 1991b).⁸ Perhaps better known are the efforts of members of the rubber tappers union to preserve their traditional forest livelihoods. Beginning in 1976, the tappers began resisting rancher and miner incursions into their areas by occupying disputed areas. Murders of rubber tappers and their union leaders went largely unreported until the assassination of Chico Mendes in late 1988 (Pearce 1991:140-41; cf. Hecht and Cockburn 1989:171-173). With international concern about Amazonian deforestation mounting, Mendes had become well known within international environmental circles as a forest defender and promoter of "extractive reserves".

Extractive reserves set aside the forests for gathering, hunting, and sustainable, rotating small-plot planting, while precluding mining or large-scale ranching or farming (Hecht and Cockburn 1989:181). Most observers miss the "profoundly radical" nature of the extractive reserve proposals, which favor "some form of communal land ownership, [attacking]...private property and hence capitalism" (Hecht and Cockburn 1991:182).⁹ This certainly explains some of the violence against those promoting extractive reserves, including, perhaps, the suspicious 1987 bombing of an aircraft carrying the Brazilian agrarian reform minister who had just signed the enabling legislation for the reserves (Hecht and Cockburn 1989:182).

By the late 1980s, a scientific consensus had emerged that the traditional lifeways of many forest peoples—especially Indians and other long-term inhabitants such as rubber tappers and river dwellers—provide models for sustainable ways of life in the forest (Hecht and Cockburn 1989:155; Pearce 1991:138). Thus it makes sense to view these particular groups as popular-environmental movements, even though in the heat of survival struggles they have not always viewed themselves as such. There are, however, many obstacles to understanding grassroots popular-environmental movements in the Amazon. The best way to proceed is to analyze the complex social life in the region. Such analysis can overturn misperceptions about the causes of the ecological destruction, and misunderstandings regarding the best prospects for ecological protection.

Since, to most people, the word "Amazon" evokes images of dense and unpopulated rainforests, some outsiders are surprised to learn that 13 million people live in the legal jurisdiction of the Brazilian Amazon, which is 57% of the Brazilian national territory.¹⁰ Indigenous peoples in the Amazon today number between 140,000 and 190,000. In addition to the rubber tappers and river dwellers, there are hundreds of thousands of small farmers, some of whom own the land they work, most of whom do not. The more destructive elements in the Amazon are large cattle ranchers, land speculators, miners, private national and international business concerns, Brazilian government owned businesses, and the Brazilian military.

Often obscured by the trees are the conflicts over use of land among these groups, and between these groups and the Brazilian government. In such conflicts, particularly noteworthy (especially when contrasted with Africa) is the degree of organization among many of the groups. Indians, rubber tappers, and peasant farmers have organized themselves, but so have rich landowners and ranchers. In Brazil in the 1970s and 80s urban and rural popular organizations multiplied and formed innumerable networks and coalitions. Many rural workers unions, for example, support peasants' self-defense against the landowners and their gunmen, and fight the ensuing legal and media campaigns, often with the support of regional and national unions. In addition, local unions are usually involved with other local organizations, such as Catholic churches, that do social service and political solidarity work.

As with many popular-environmental groups on other continents, religion plays an important role in Amazonia's social conflicts. Radicalized sectors of the Catholic Church inspired "liberation theology"—a powerful grassroots movement in Latin America promoting the interests of the poor as the central practice of Christian faith—and began in the early 1970s to help Amazonian peasants organize "base communities." Stressing self-help and popular resistance against oppressors, these communities have provided a social base for many

Amazonian resistance movements. One important organization allied with the liberation theology movement is the Catholic Land Commission (CPT). It facilitates the organizing efforts of rural peasants in the Amazon and elsewhere in Brazil. The importance of radical Catholicism is commonly recognized throughout the region. Indeed, "many forest dwellers got their start in active organizing under the Church's auspices," and priests are often targets of reactionary violence, as illustrated by the remark of one rancher, "For every land invasion, a dead priest" (Hecht and Cockburn 1990:171).

While the liberation Church supports the popular movements, violence against these movements is sometimes justified by traditional conservative Catholics who believe the base community movement threatens the Church's mission as well as "sacred" private property rights. Religion further complicates the social landscape as Pentecostal ministers, with their otherworldly form of conservative religion, promote migration to the Amazon as a promised land; while indigenous leaders who resist these migrations base their vision of the forest on primal spirituality and lifeways (see, e.g., Hecht and Cockburn 1991:213). Social conflicts, and the passions of social actors, are often intensified through ideologies grounding social objectives in some vision of the sacred. This is one way contending religious ethics play a role in Amazonian social-environmental conflicts.

A final characteristic of the Amazonian social drama worth emphasizing is that most members of the popular classes exist at a bare subsistence level. Thus their organizations and conflicts are related directly to survival efforts. But the survival strategies of most Amazon groups do not involve sustainable practices. The slash and burn methods peasants use, for example, are not even sustainable in the short term. Three or four years after beginning such methods the land is exhausted and will no longer produce. The peasants know this and recognize the irony of risking their lives for land that will soon be unproductive, but they continue both their slash and burn farming and their battles for land as matters of short-term survival.

Peasants in Brazil have few options. Many have been forced to the Amazon by structural changes in Brazil, such as the displacement of small farmers due to "the expansion of mechanized agriculture and the flooding of enormous areas of agricultural land" (Hecht and Cockburn 1989:97, cf. 116). Other peasants, in the wake of the military government's brutal repression of peasant leagues, have seen the Amazon as the only place to run (Hecht and Cockburn 1989:104). It is difficult for relatively recent migrants to practice sustainable lifeways when they do not have the specialized knowledge of such practices or the necessary tools, as do long-term forest dwellers such as Indians and rubber tappers.¹¹

The complex social reality is that sometimes, but not always, Amazonian conflicts are between those whose objectives include ecologically sustainable practices and those who do not. And although the Amazon's peoples are directly affected by the consequences of non-sustainable logging, farming, and mining, ecological concerns and sustainability are not the central issues for most popular organizations in the Amazon except the rubber tappers and Indians, whose concerns are simultaneously productive of forest and group survival.¹² The reasons why are clear. People in popular organizations are immersed in a context of conflict and their first concern is the acquisition of the bare necessities for survival. Nevertheless, ecological concerns are not ignored altogether. Rather, the ecological issues tend to be viewed as part of

the larger political and economic context.

Many rural workers in the Amazon know that they are exploited by powerful individuals and hurt by the economic and political policies of Brazil. It is therefore logical that they are suspicious of ecological policies, fearing that such policies are just another way to exploit the poor; and in fact, they often are.¹³ Rural workers are also generally perceptive in their understanding of the political dimensions of ecological questions, realizing that the Amazon cannot be "saved" without addressing the question of land ownership, promoting land reform and, more broadly still, the redistributing of wealth in the country. When peasants own their land and can remain on it, they will be more easily persuaded to adopt sustainable agricultural methods.

Such an integrated view of the ecological questions of the Amazon challenges much thought among social scientists, who divide issues into discrete parcels in order to devise technological solutions.¹⁴ The combined insights of current forest dwellers—including rural peasants, rubber tappers and indigenous peoples—regarding the ecological and political problems confronting their region better express the complexity and interrelatedness of the questions at hand. In the Amazon and the other cases we have been examining, observers interested in promoting ecological sustainability would do well to consider the voices from the various popular movements.

CONCLUSION

Environmental movements in less affluent countries have proliferated in recent years. Conflicts result from their efforts to prevent peasant displacement and to gain control over land use and property. Many participants in these movements cling precariously to life and thus survival is often their chief objective. These movements have become increasingly sophisticated about building coalitions both locally and internationally, with a supporting role often played by environmental organizations based in affluent countries (Pearce 1991:48-67). Although usually nonviolent, some grassroots groups grow militant as they face increasing reactionary violence. These movements tend to promote or strive to protect land uses that are more sustainable than those of their more powerful and wealthy enemies. Women play decisive roles in the movements. Finally, religion is often a critical factor, providing inspiration and buttressing courage within these movements.

Industrialism—with consequent deforestation, hydroelectric projects, and mechanized agriculture, all exacerbated by ever increasing human numbers—is causing global environmental crises such as atmospheric warming, ozone depletion, acid rain, and decline of biodiversity. Some conservation biologists now assert that the process of evolution itself has been arrested. Such findings make it clear that the importance of these movements goes far beyond specific, contested landscapes. A scientific consensus is emerging that no political, environmental, and moral task is more important than the rediscovery and development of ecologically sustainable lifeways. Much of what little hope there may be for the development of such lifeways resides in the emerging popular-environmental movements of less affluent countries.

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NOTES

(1): The term "popular" refers to diverse, non-middle-class groups, including workers, peasants, indigenous peoples and participants in the so called "informal" economy.

(2): A.T. Ariyaratne, founder of Sri Lanka's Sarvodaya self-help movement, for example, recommends that his people "totally de-link from the international economic system" and stop worrying about GNP measures (Ingram 1989:135). Indigenous Malaysian rainforest activist Martin Chor advocates complete deindustrialization (Pearce 1991:31i). Factionalism among environmental groups often results from disagreements about the merits of industrialism.

(3): For a start here, see Callicott and Ames 1989, especially the articles by the editors, LaFleur, Cook, Weiming, and Ames.

(4): Chidester (1987:part one) shows that religious ethics begins with a human sense of obligation and leads to an attempt to harmonize one's actions with the sacred, and that such obligations do not depend on a divine lawgiver.

(5): The case of the sacred cow in India shows how the line can be blurred between sacred and secular, between ecological and economic needs, when part or all of the natural world is seen as sacred. The sacred cow, as mother of prosperity, on the one hand, performs a critical function in the food chain: enriching the soil, providing power for the village, and so forth (Shiva, 165). When Chipko women protest the selling of milk they are denouncing the defilement of the sacred cow through its commodification into a mere milk machine, as well as the economic and social consequences of this commodification.

Similarly, when peasants and tribals protest the damming of sacred rivers they are protesting the desecration of sacred sites, as well as the submersion of fertile soils and the displacement of peasants. The lines between the "sacred," the "economic," and the "ecological" cannot be clearly drawn when the forest is Aranyanik, goddess of life and fertility, as well as a resource for survival. See Linenthal (1991) and Sears (1989) on the process of sacred place veneration and defilement.

(6): Some observers trace the origin of the Chipko movement to the founding of the Bishnoi sect "in 1485 by the son of a village headman who had a vision in which he saw a period of terrific hardship caused by callous regard for nature." He forbade cutting of green wood and killing wild animals. But in 1731, a Maharaja demanded Bishnoi trees for a palace, and a woman named Amrita Devi hugged a tree in resistance. She was then killed by an axeman. Three of her daughters immediately took her place and were killed, and before long 294 men and 69 women died. The Maharaja relented and banned logging in Bishnoi areas upon seeing the carnage (Schelling 1991:17).

(7): One exception may be the pygmies, who consider the rainforest to be sacred. Callicott's reflections on such matters will soon be found in his forthcoming book, *The World's Great Ecological Insights*.

(8): Although Kayapo resistance has been especially fierce (Hecht and Cockburn 1989:143), some of them also are compromised, seeking to profit from and not overturn mining in their areas (Pearce 1991:135-36).

(9): Mendes, for example, was a participant in the Acre region's long tradition of leftist agitation before social forces shifted his priority to ecologically important land-use battles (Hecht and Cockburn 1989:161-69).

(10): This figure is from *Debate*, a Church related magazine published in Rio De Janeiro, a supplement of *Contexto Pastoral*, No.3.

(11): Wealthy landowners and cattle ranchers also knowingly engage

in non-sustainable agriculture in the Amazon, burning forest into pastures in far greater amounts than the peasants. Unlike the peasants, large landowners destroy the bush and forest not for survival but for profit.

(12): This statement is based on contributor Hadsell's field research, and is not meant to be categorical. There may be popular organizations whose concerns are primarily ecological, but if so they are not typical of organizations in the region (BT).

(13): The control of burning implemented by the Collar government in the last several years is seen by the peasant farmers as one more way to remove them from the land. The new policy requires farmers to have permits to burn their land before planting; but in order to receive a permit, one must own the land, and few peasants do. Thus they burn at great risk, as one fine can exceed a season's earnings. Large landowners, of course, can get permits or afford the fines (Hadsell and Evans, 1991).

(14): Daly and Cobb (1989) well critique such compartmentalized analysis.

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POEM

Sockeye
you were one of four of your people
who made the 900 river mile journey—
You, who scaled eight dams
to birth your progeny
as the moon told you.
Of my people,
twelve thousand began
the cavalry march from Echota.
My dark-eyed Nancy ancestor
transplanted us here
where she could
but the moon did not speak to her about it.
—kathy carter-white ©

More Precious than Money

Ancient Forest Rescue Ad Campaign

It is not common to open a Sunday newspaper and be confronted with a full page ad asking: "DID YOU KNOW...OVER 400 TIMBER SALES ARE PLANNED IN COLORADO IN THE NEXT FIVE YEARS?" A series of ads with forestry information, supported by local businesses, has appeared in Boulder's "Daily Camera" this fall. The ads state the problem and then ask "GUESS WHO'S DOING SOMETHING ABOUT IT?": the list of businesses grows with each ad.

Sandy Shea, of Ancient Forest Rescue, has contacted about 500 businesses to talk about the ads. It all started after Ancient Forest Rescue (AFR) asked the Boulder County Commissioners to support Colorado's original forests by not buying paper products from Stone Container, the Chicago based multi-national logging National Forests throughout the Southwest. Once the County resolution was passed, Sandy sought support in the business community. To be listed in the ad, a business pays \$25 and avoids using Stone Container products. The goal of these ads, and this participation with the business community, is to cause Stone to lose money on its logging in Colorado.

Apart from the end goal, the educational aspect is important. "People know more about logging in the Northwest than they do in their own state," Sandy has noted. He has been pleased and surprised to find the business community willing to work with a group best known for direct action and civil disobedience. At the same time the ads began appearing, AFR activists were confronting logging operations in the San Juan Ecosystem, in addition to funding other more radical ads urging "VOTE REPUBLICANS OUT OF OFFICE."

A campaign such as this takes a great deal of determination and a cauliflower ear. Sandy admits that he enjoys talking on the phone and his background in education (working with reluctant learners in outdoor programs) has helped. Mostly the campaign is about participation. When a

business switches paper products and commits to the ad, they are being pro-active on the old-growth issue.

Several of the ads have included cut out coupons. The large supermarket chain, King Soopers, has always claimed to be an environmental leader but they have refused to stop using Stone bags. One ad, in bold type asks, "DID YOU KNOW THAT DON GALLEGOS CAN HELP?" Don Gallegos is the president of King Soopers, and at the bottom of the ad is a coupon asking him to stop buying bags from Stone Container. Hundreds of readers sent off the coupons — another form of participation. Future ads will have coupons for Roger Stone, Stone Container CEO.

The ads pay for themselves, since Sandy volunteers many hours every day to keep the campaign happening. He'd like to be able to have weekly ads, but one man can only do so much. Every three weeks, readers of the "Daily Camera" are reminded that the last ancient forests are threatened, that Ancient Forest Rescue is still kicking, and that there are local businesses worth supporting. Even if Roger remains a Stone and Don Gallegos is revealed as yet another green washer, the ads (with borders listing the timber sales) will help citizens realize that "Colorado's Old Growth Forests Are More Precious Than Money."

POSTSCRIPT

At this time, Sandbench, an ancient forest in the San Juan National Forest, is being logged. The new Region Two Forester, Elizabeth Estill, claims to care about ecological management, but business continues as usual and the last of Colorado's unprotected original forests and roadless areas are designated for destruction. Write and call Forester Estill and demand a moratorium on all ancient forest timber sales. Elizabeth Estill, 11177 West 8th Ave., Lakewood, CO 80225, (303) 236-9427.

—Naomi Rachel, AFR, Box 1309. Lyons. CO 80540

MARTINEZ CREEK SANDBENCH CORRAL MT. VISTA
HORSE PARK MONUMENT SUGARLOAF QUAKER TORSO DRY FORK SPRUCE MT. TEN MILE

**DID YOU KNOW...
OVER 400 TIMBER SALES ARE
PLANNED IN COLORADO?
...IN THE NEXT FIVE YEARS?**

It's true! These sales will push over 1000 miles of roads into the few remaining old-growth and roadless forests in our state, destroying habitat for many forest creatures, from butterflies to lynx, who can live nowhere else. Over 150,000 acres (234 sq. miles) of Colorado's forests will be affected. All in the next five years...

**GUESS WHO'S DOING
SOMETHING ABOUT IT?**

ALFALFA'S MARKET	IDEAL MARKET
BIBLER TENTS	JIM MORRIS T-SHIRTS
BOULDER COUNTY	JRAT PERFORMANCE
THE BREWING MARKET	LIQUOR MART
BUSINESS EXPRESS	MADDEN MOUNTAINEERING
COOL 4 CATS	MANUFACTURERS SPORTS OUTLET
CRYSTAL GALLERIES	MOUNTAIN MEND
EIGHT DAYS A WEEK	NATURE'S OWN IMAGINATION
EL LORO JEWELRY	NEPTUNE MOUNTAINEERING
ESTEY PRINTING	RUDI'S RESTAURANT
EVERYBODY, LTD.	TERRA-TEK COMPUTERS
THE HIGH WHEELER	WILD OATS MARKET

How? They don't purchase paper products manufactured from Colorado's Old Growth Forests, in accordance with Boulder County Commission Resolution 91-151. By doing so, they're actively helping to save the last of Colorado's ancient trees. But they can't do it alone. If your company uses paper bags or cardboard boxes, find out where the paper comes from. If the source is Stone Container Corporation, use of these products directly contributes to the destruction of Old Growth Forests. If you'd like to know about alternatives, call us at 444-7510, and we'll be happy to direct you to a new paper source. We'd like to add your name to this list and let everyone know of your support and commitment for Colorado's Ancient Forests.

COLORADO'S
OLD-GROWTH
FORESTS ARE
MORE PRECIOUS
THAN MONEY.

**ANCIENT
FOREST
RESCUE**

SUPPORT
BUSINESSES THAT
SUPPORT
COLORADO'S
ANCIENT FORESTS.

*TO SEE THESE SALES AND MORE, ASK TO SEE THE NEW AFR POSTER AT THE BOULDER BOOKSTORE

FLOATING LAKE STEVENS GULCH GROVE CREEK

TRUBY CREEK ILLINOIS CREEK TROUT MT. JAROSA SHEEP FLATS SOUTH QUARTZITE

Broadened Horizons Riverkeepers

ROUTE 2, BOX 242, WHITWELL, TN 37397

This past summer Parker Towing/Canal Chip attempted to quietly obtain from the port authority at Eddyville, Kentucky, a lease to establish a chipping mill. The night before the port authority was due to sign, Broadened Horizons arrived in Eddyville with a slide show. Eddyville is a resort and retirement community with financial means. Residents took the information and acted fast. For the present that mill has been halted.

Eddyville was just one of many stops along the Tennessee River and its tributaries in recent boating seasons for the staff of Broadened Horizons, Leaf and Cielo Myczack. The organization takes its name from a 30-foot wooden sailing ketch, "Broadened Horizons," home and campaign headquarters for the Myczacks. Inspired by the "Clearwater," which sails the Hudson to educate New Yorkers about the river, they built the ketch in 1989 in Saltillo, Tennessee, largely from recycled materials. As they voyage from port to port, they speak out for the Rights of the River and work with local residents to try to achieve them.

Broadened Horizons is focusing its opposition to chipping mills on the US Army Corps of Engineers. The Corps makes the final decisions on all permits pertaining to navigable waters. The Myczacks are encouraging citizens to pressure the Corps, through letters and a petition, to reevaluate every existing permit for each site where a chip mill attempts to locate. The Code of Federal Regulations, 33CFR 325.7, states that if there is significant public opposition to an activity, or new information on the activity, a reevaluation can be called by a third party or by the district engineer.

Lumbering in the Tennessee's watershed is only one of the problems the Myczacks confront. They believe that the river "is near ecological death." Mussels are prime indicators. "At one time the river bed was covered with mussels; now they're almost gone," Leaf says. To help call attention to the plight of the mussels, the Myczacks dedicated a recent issue of the Broadened Horizons newsletter "to John Bates [a specialist in mollusks whom TVA, Tennessee Valley Authority, fired] and the voiceless bottom dwellers he sought to save." (In the process, they beat *Wild Earth* to picturing a pearly mussel on a front cover.) Harvesting of mussels is proceeding apace in Kentucky, 80% of it illegally, since diving for mussels is against state law. Most of the shells go to Japan to be used in the production of pearls and cosmetics. Left where they belong, mussels cleanse rivers by collecting pollutants in their tissues and shells.

Among the causes of the mussels' death is TVA's use of herbicide to kill Eurasian watermilfoil, a non-native aquatic plant that flourishes in Tennessee River reservoirs rich in nutrients from sewage. Eliminating the sewage is not on TVA's agenda. Again Broadened Horizons tries to raise awareness of the problem and the need for a change in approach.

In 1992 the Myczacks published *A Citizens' Guide to Pollution in the Tennessee River*. The documented guide includes a history of TVA (a history replete with dams and nuclear ventures), descriptions of the river's reservoirs, and recommendations. Among the recommendations are the "establishment of a green 'treeway' to a minimum depth of 1,500 feet along the entire River"; "denying cattle and other livestock access to river bank areas"; and "establishing a hunting free zone along the entire mainstem River that would include all adjacent wetlands." The report has received good press coverage, and is getting into school libraries.



The Myczacks say TVA "has to go." As they write in their guide, "The agency has helped institutionalize the efforts of humans to drastically bend the natural systems to their will." TVA's primary goal, Leaf says, is "to make money from generating power."

Broadened Horizons was the starting point for and is now a part of the Foundation for Global Sustainability's Clean Water Project. (See *Wild Earth*, vol. 1, #10, p.50) The Myczacks encourage others to participate in the project as keepers of waterways.

Copies of *A Citizen's Guide* are available for \$2.50 from the address above.

—Mary Byrd Davis

Dr. Dioxin on the Toxic Trail

As The World Burns

BLASTING THROUGH dazzling fall colors, deep in the cradle of the old Confederacy, the CRIMSON TIDE turns the VOLUNTEERS OF TENNESSEE INTO SOUR MASH. HARD TO BELIEVE ANOTHER YEAR HAS GONE FULL CIRCLE. BUT TIME IS MEANINGLESS OUT HERE WITH THE SPANISH MOSS, GOLDEN LEAVES OF HICKORY, SWEET GUMS. A BUZZARD CIRCLES TO MY RIGHT; DARK CLOUDS OF A COLD FRONT CAPITULATE TO AN ICE BLUE SKY.

THE DOCTOR PUSHES THE ROAD WITH A VENGEANCE, ONE STEP AHEAD OF THE EPA, FDA, CIA AND THE TATTERED REMNANTS OF THE BUSH LEAGUE. IT IS AN ODD, SORDID PATH, THIS TRAIL OF TOXICITY. IT IS LITTERED WITH DECEIT, LIES AND CORPORATE DEMENTIA. TRAVELING THIS TRAIL IS NOT FOR THOSE ROMANTIC, CRYSTAL HUGGING, DREAMERS OF THE POST-HIPPIE-HOME-BOY AGE.

MINE IS A DEPRAVED JOB. SOMEBODY HAS TO DO IT. THEY CHOSE ME. I AM DR. DIOXIN AND THIS IS THE TOXIC TRAIL.

YOUR ENVIRONMENTAL PROTECTION AGENCY WORKS FOR YOU. IT ALSO WORKS FOR THE CEOs OF AMERICA'S BIGGEST PAPER MANUFACTURERS, WHO—BY HOOK OR CROOK—HAVE PERSUADED THE EPA TO REEVALUATE THE CARCINOGENICITY OF 2,3,7,8-TCDD. THE DRAFT OF EPA'S NEW RISK ASSESSMENT IS ON THE STREETS, COMING SOON TO A NEIGHBORHOOD NEAR YOU.

IN KEEPING WITH THE AGENCY'S LONG-STANDING plan to delay serious regulatory action regarding our most toxic brew, EPA IS KNEE DEEP IN THOUSANDS OF PAGES OF VOODOO SCIENTIFIC SEMI-CONCLUSIONS AND FANCY GUESS WORK. AN EPA-AUTHORIZED panel of "INDEPENDENT SCIENTISTS" IS SPRINKLED WITH INDUSTRY HACKS. WIRE SERVICES ARE CARRYING SNIPPETS OF SAID PANEL'S PRELIMINARY ESTIMATES CONCERNING DIOXIN'S EFFECTS. CANCER SUDDENLY TAKES A BACK SEAT TO A TEAM OF EVEN SNEAKIER DISTEMPERS. CHECK YOUR IMMUNE SYSTEM.

BEHIND THE INDUSTRY MOSAIC OF FEAR AND GREED, DANFORTH QUAYLE SLITHERS BY, OFFERING CORPORATIONS WHAT HELP HIS COUNCIL CAN RENDER. IF THERE IS ANYTHING REPUBLICANS DISDAIN, IT IS A RISK-FREE AMERICA. BILL REILEY, ONCE TOUTED AS THE ADMINISTRATION'S ECO-STAR, HAS CAVED IN ON THE DIOXIN THING, TACITLY ACCEPTING HIS ROLE AS THE PILATE OF THE ENVIRONMENTAL MOVEMENT.

MEANWHILE, THE NATION AWAITS THE NEWEST VERDICT ON DIOXIN'S PROPENSITY TO WREAK HAVOC ON OUR DNA. BILLIONS OF DOLLARS ARE RIDING ON THE "REASSESSMENT."

INDUSTRY HAS READ AL CORE'S BOOK. AS LONG AS HE REMAINS IN ARKANSAS, SLICK WILLIE CAN BE CONTROLLED; BUT HIS POSITION BEHIND THE MASSIVE OAK PANELS OF THE WHITE HOUSE APPEARS BEYOND INDUSTRY'S GREEDY COMPREHENSION.

THOUSANDS OF MILES SOUTH OF EPA HEADQUARTERS, MISSISSIPPI LAWYERS IN PIN-STRIPED SUITS MOVE THE HONORABLE BILLY JOE LANDRUM TO CERTIFY A CLASS ACTION AGAINST GEORGIA-PACIFIC, PUTTING ALL RELATED G-P CASES UNDER ONE ROOF. AN APPEAL GOES OUT TO THE MISSISSIPPI SUPREME COURT.

IN GREENVILLE, TENNESSEE, FEDERAL JUDGE THOMAS HULL DECLARES A MISTRIAL AFTER WEEKS OF TEDIOUS TESTIMONY CONCERNING CHAMPION PAPER'S DISCHARGE OF TOXIC SOUP INTO THE PIGEON RIVER. THE JURY SIMPLY CAN'T COME TO GRIPS WITH THE FACTS. WHILE THE CASE IS RESET FOR TRIAL, THE PIGEON RIVER CONTINUES TO RUN ITS DARK COURSE.

ALLEGATIONS FLY THAT AT LEAST ONE JUROR REFUSED TO PARTICIPATE IN DELIBERATIONS CONCERNING GUILT, PREFERRING INSTEAD TO READ A NOVEL. THE KNOXVILLE NEWS-SENTINEL REPORTED ANOTHER JUROR AS SAYING: "THE PLAINTIFFS...PROVED THEIR CASE BEYOND A SHADOW OF A DOUBT IN MY MIND." (20 OCTOBER 1992) SO WHAT HAPPENED?

THE GOVERNOR OF MAINE WANTS TO EASE HIS STATE'S DIOXIN REGULATIONS. THE STATE HELD PUBLIC HEARINGS IN EARLY NOVEMBER, SEEKING SCIENTIFIC DEFENSIBILITY FOR THEIR ACTIONS. Op-

ponents remind the Governor that administratively-mandated increased cancer rates are not in keeping with our inalienable rights to life, liberty and the pursuit of happiness. (CONTACT THE NATURAL RESOURCES COUNCIL OF MAINE FOR INFORMATION ON HOW YOU CAN HELP: 207-622-3101.)

PROCTOR AND GAMBLE Cellulose wakes up to find itself looking down the barrel of a possible class action suit against their operations in Perry, Florida.

THE BIC QUESTION FACING INDUSTRY IS NOT WHETHER DIOXIN CAUSES ADVERSE HUMAN HEALTH EFFECTS (NOT TO MENTION ITS EFFECTS ON WILD CRITTERS), BUT IN WHAT AMOUNTS. IF ONE MOLECULE CAN DISRUPT THE IMMUNE SYSTEM THEN DIOXIN COULD, IN THEORY, TURN A SIMPLE BOUT OF INFLUENZA INTO A POTENTIAL FATAL ATTRACTION.

DR. GEORGE LUCIER'S STUDIES BODE POORLY FOR DIOXIN FANS. HUNKERED DOWN AT THE NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES AT NORTH CAROLINA'S RESEARCH TRIANGLE, LUCIER HAS BROKEN THE SPELL SO CLEVERLY WOVEN BY INDUSTRY WONKS. AS HE TOLD SCIENCE NEWS, "MY DATA MIGHT NOT PROVE THAT A THRESHOLD DOESN'T EXIST, BUT THERE'S NO EVIDENCE OF ANY THRESHOLDS." (SEE RACHEL'S HAZARDOUS WASTE NEWS #270.) THE OLD THRESHOLD THEORY HAS IT THAT A CERTAIN DOSE IS REQUIRED BEFORE ANY HARMFUL EFFECTS ARE RECOGNIZED.

THE DOCTOR REPORTS THESE THINGS WITH A JAUNDICED EYE. AS LONG AS AMERICANS PERCEIVE THEMSELVES IN THE ICY GRIPS OF A RECALCITRANT RECESSION, THERE APPEARS TO BE LITTLE SYMPATHY FOR THOSE WHO STRUGGLE TO FREE AMERICA'S WATERS OF TOXIC CHLORINATED COMPOUNDS.

PRESIDENTIAL DEBATES AND SLICK COMMERCIALS NOTWITHSTANDING, THE DOCTOR HAS LITTLE TO HOPE FOR IN THE BORN-AGAIN POLITICAL RHETORIC OF OUR COUNTRY'S 42ND PRESIDENT. IT WILL REQUIRE MORE THAN A COVEY OF NEWLY ANOINTED BUREAUCRATS TO CLEANSE THIS TRAIL OF ITS MANY LAYERS OF TOXIC SLIME.

"CHLORINE FREE BY 93" PROCLAIMS GREENPEACE. THE HOUR IS NEAR, THE GOAL IS NOT.

DIOXIN IS NOW UBIQUITOUS IN THE ENVIRONMENT. SOURCES INCLUDE MUNICIPAL INCINERATORS, PETROLEUM REFINERIES, AUTO EXHAUST, AND PULP MILL EFFLUENT. YOU ARE WALKING AROUND WITH A PERSONALIZED BODY BURDEN OF BENZENE RINGS AND CHLORINE ATOMS. 2,3,7,8-TCDD.

DIOXIN HAS A SEVEN YEAR HALF LIFE. IN SEVEN YEARS, HALF OF THE DIOXIN IN YOUR BODY WILL STILL BE THERE. THAT DOES NOT INCLUDE FUTURE UPTAKES. NOW, IMAGINE THAT BOUT OF INFLUENZA MENTIONED ABOVE. OR, BETTER YET, IMAGINE A GIANT SWAMP, FULL OF GATORS, OSPREY, PERCH, MUSSELS, AND A PLETHORA OF AQUATIC INSECTS. WITH NO STANDING TO DEFEND THEMSELVES AGAINST THE ONGOING DEMISE OF THEIR ECOSYSTEM, THEY QUIETLY SUFFER THE CONSEQUENCES OF HUMANITY'S DEPENDENCE ON CHLORINE. A SILENT SPRING, A HUSHED DECAY OF THE WILD.

THE ELECTION RETURNS BOUNCE FROM THIS HOTEL TV LIKE THE MINUTE ELECTRONS THAT THEY ARE. EARLY REPORTS SHOW SLICKIE AHEAD. FOLKS WAVE LITTLE FLAGS AT THE CAMERA.

NURSING A BOTTLE OF JIM BEAM, THE DOCTOR LETS THE IMAGES OF AMERICA'S FIXATION WITH FRESH FACES GLIDE IN ONE EYE AND OUT THE OTHER. THERE IS NO EXCITEMENT IN THIS HEART, NO GLEE. CORPORATE AMERICA WILL ONLY TOLERATE SO MUCH FROM ANY ADMINISTRATION. EVEN FROM A SMOOTH OZARK BILLY LIKE SLICKIE.

DIOXIN HAS BEEN DISCOVERED IN THE ARCTIC ICE, THE HIMALAYAS, ON THE ROOF OF THE KREMLIN. TRUST THE DOCTOR, THE SHIT STICKS TO THE RIBS. YOUR RIBS! IT HAS A TOE HOLD IN THE BOB MARSHALL WILDERNESS, THE BRIGHT ANGEL TRAIL, DEEP IN THE OKEFENOKEE SWAMP. IT HAS NO PURPOSE, OTHER THAN TO REARRANGE GENETIC TENDENCIES. IT IS HERE WITHOUT OUR CONSENT. IT MUST GO.

WHAT YOU CAN DO:

DON'T PURCHASE PAPER BLEACHED WITH CHLORINE. THAT INCLUDES YOU WILD EARTH. * SPEND THE EXTRA FEW SHILLINGS FOR UNBLEACHED. OR, PERHAPS A CREAMY CHLORINE-FREE SHEET.

HELP TURN THE MARKET AROUND, FROM THE GRASSROOTS UP. THE TRICKLE-UP THEORY. GET A SEVENTH GENERATION CATALOG. START WIPING WITH OFF-WHITE TP. YOUR SEPTIC TANK WON'T MIND AND NEITHER WILL THE NEIGHBORS.

INVEST IN "GREEN COTTON," BLEACHED WITHOUT CHLORINE OR UNBLEACHED. YOUR WARDROBE WILL SUDDENLY BE SO HIP YOU'LL BE POPULAR.

JOIN (EGAD!) GREENPEACE AND EARMARK YOUR TWENTY BUCKS FOR THEIR PULP AND PAPER CAMPAIGN. (DR. DIOXIN IN NO WAY ENDORSES ANY BUREAUCRATIC, TOP HEAVY, ECO-WOO-WOO ORGANIZATIONS! PERIOD.)

ON THE TOXIC TRAIL,

Dr. Dioxin

*Yes Doc, we are eco-scum. However, with our Wildlands Project Special Issue (and continuing with subsequent regular 1993 issues) we'll be printing *Wild Earth* on Patriot's non-chlorine bleached 100% recycled offset.

A Greater Desert Wildlands Ecosystem Proposal

by George Wuerthner

Southern Nevada is roughly outlined by the Mohave Desert. The region includes everything south of a line from the White Mountains on the California border, east through Tonopah, south of the Quinn Canyon Range to Caliente near the Utah border. Las Vegas is the major population center. Lower than central and northern Nevada, this region is hotter, drier, and to many people exceedingly bleak. But southern Nevada is surprisingly diverse, with 43% of all species recorded for the state. This is, in part, due to its mountains which rise above the desert heat as island outposts of northern forests.

Southern Nevada is also one of the fastest growing parts of the country, with Clark County, which includes Las Vegas, growing by thousands of new human residents a month. Yet southern Nevada remains one of the least developed regions of the country, and could be one of the major protected desert wildlands in the United States if a Greater Desert Wildlands Ecosystem were established.

At the heart of the proposal area lies the 1.5 million acre Desert Wildlife Refuge, largest refuge in the lower 48 states. Though split into a number of units by a few dirt roads and paved highways, the Desert Wildlife Refuge and adjacent Forest Service and BLM lands comprise the largest area of nearly contiguous roadless lands in Nevada.

Starting in the west and moving east, there is the 200,000 acre Mt. Charleston roadless area composed of both BLM and Forest Service lands centered on the Spring Mountains. Cross one dirt road and you enter the 180,000 acre Mount Stirling BLM roadless area, the northern extension of the Spring Mountains.

Go a little north and east and cross paved highway 95 and enter the 354,000 acre Spotted Range roadless area, mostly in the Desert Refuge. One dirt road separates this area from the 467,000 acre Desert-Pintwater Range, also in the Desert Refuge. The 277,000 acre Hole in the Rock roadless area, split about equally between the Wildlife Refuge and BLM land, lies immediately east, across another dirt road. Just south is the 468,000 acre Sheep Range roadless area, mostly in the Refuge.

Then, crossing paved highway 93, you enter the 127,000 acre Delamar Mountains BLM roadless area, which is separated from the 186,000 acre Meadow Valley Mountains BLM roadless area by a dirt road in Kane Spring Valley. Also east of highway 93 and the Desert Refuge is 32,000 acre Arrow Canyon roadless area. Finally, one more dirt road and railroad tracks in Meadow Valley Wash separate this area

from the 163,000 Mormon Mountains BLM roadless area.

In total this is at least 2,617,000 acres — one of the largest roadless land complexes in the lower 48 states, and virtually uninhabited. If roadless lands in Nellis Air Force Range and Nevada Test Site were added, the total complex could exceed 5 million acres.

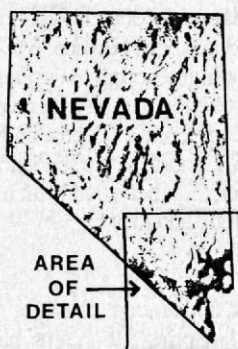
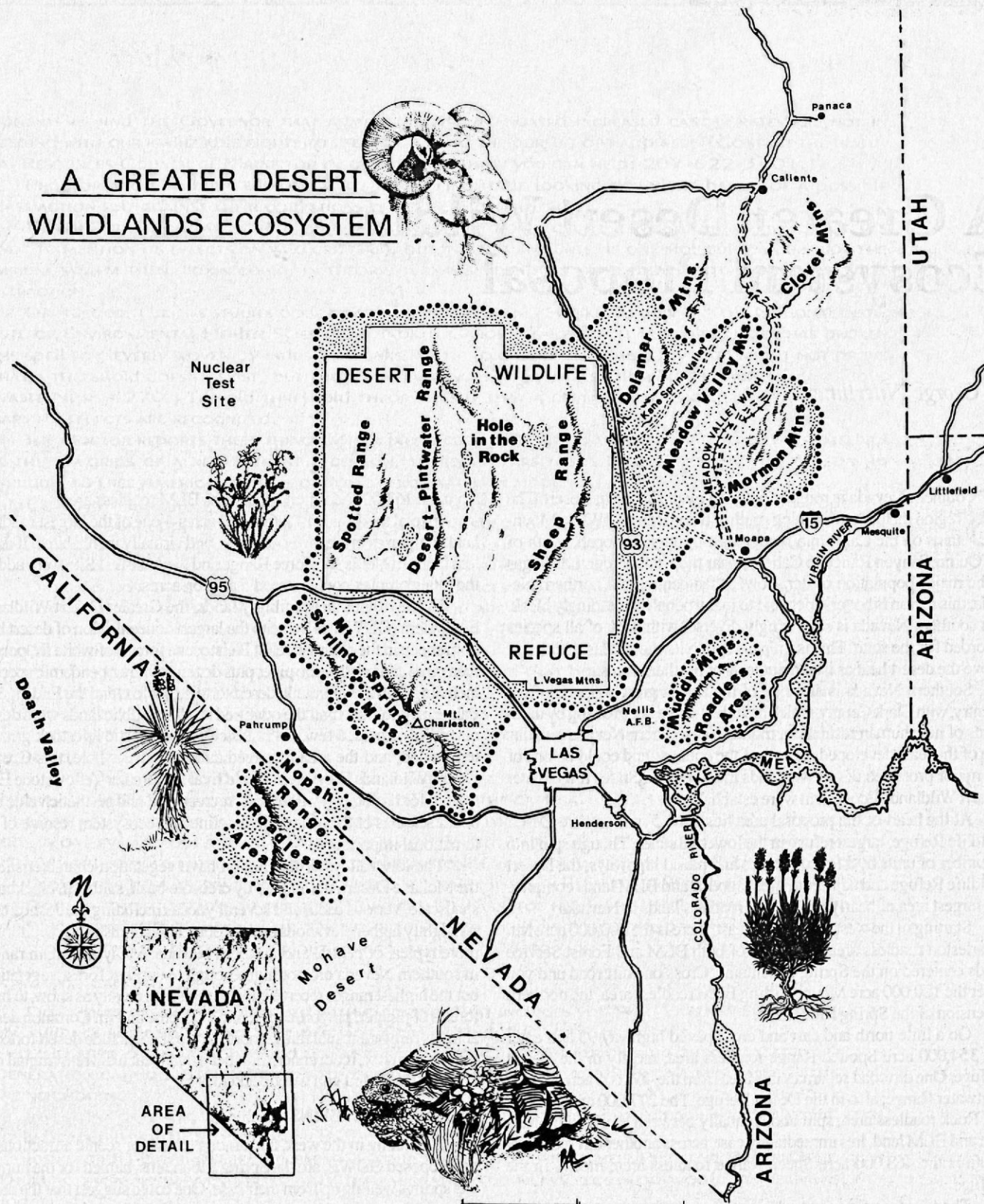
Even without these military lands, the Greater Desert Wildlands Ecosystem (GDWE) is home to the largest concentration of desert big-horn sheep in the country; relict Pleistocene forests of white fir, ponderosa pine, and bristlecone pine; plus dozens of rare or endemic species, including Palmer chipmunk, desert tortoise, kit fox, and the Endangered Pahrump poolfish. If all the qualified roadless public lands were designated Wilderness, a few dirt roads closed, domestic livestock grazing terminated, and the area managed as a cohesive whole, this Greater Desert Wildlands Ecosystem would rival the Greater Yellowstone Ecosystem for biological, wilderness, recreational and aesthetic value and could serve as both a scientific baseline and ecosystem reserve of international importance.

The low valleys of this region have vegetation characteristic of the Mohave Desert, dominated by creosote bush, saltbush, blackbush, shadscale, various cacti, and several yuccas including the Joshua tree. At slightly higher elevations one encounters sagebrush and rabbitbrush, more typical of central and northern Nevada. Many mountain ranges in southern Nevada are not high enough to support forest vegetation; but the highest ranges receive enough moisture, mostly as snow, to have forests of juniper, pinyon, aspen, and even pine and fir. Common desert animals rare or unusual farther north in the state include desert tortoise, gray fox, kit fox, roadrunner, Gambel's quail, cactus wren, ringtail cat, collared lizard and gila woodpecker.

SPRING MOUNTAINS

Beginning in the west, and among the major scenic attractions of the proposed GDWE, are the Spring Mountains, named for the numerous springs welling up from their base. One could suggest that the name also applies to how this mountain range springs from the surrounding lowlands. Rising more than two miles above the valley floor, the Springs possess the greatest relief of any mountain area in Nevada. Charleston Peak, 11,912 feet in elevation, is the highest peak in this range and the third highest in Nevada. On a clear day from the summit, it's possible to see more than 200 miles over to the Sierra Nevada in California.

A GREATER DESERT WILDLANDS ECOSYSTEM



map by Brian Evans

Other high peaks include Mummy Mountain, (11,530 feet), Griffith Peak, (11,072), and McFarland Peak (10,772).

This 80 mile long range begins near the California border and trends north and then northwest. It is bounded on the east by the Las Vegas Valley and on the west by the Pahump Valley. The Spring Mountains are well known for the Keystone Thrust, a major fault which drove gray older Paleozoic limestones and dolomites up and over younger Mesozoic beds of red Aztec sandstone. This layering sequence is evident in Red Rock Canyon National Conservation Area. To anyone familiar with the sandstone canyons of southern Utah, the red Aztec sandstones of Red Rock Canyon will look familiar. It is the same rock. The Aztec sandstones are fossilized sand dunes.

As you ascend the range, you pass from typical Mohave Desert vegetation, like Joshua tree and barrel cactus, up through the pinyon-juniper belt, then into Pleistocene relict forests with ponderosa pine, white fir, aspen and the most extensive stand of bristlecone pine in Nevada—18,000 acres in size. Disjunct occurrences of species found in other regions include Gambel's oak, which is common in the Rockies and much of the Southwest, and sword fern, typically associated with Pacific Northwest rainforests. Isolated as they are, the Spring Mountains have at least 30 endemic species including Charleston Mountain prickly pear cactus, Charleston angelica, Keck's penstemon, Clokey's thistle, Palmer chipmunk (Nevada's only endemic mammal), and the Spring Mountain blue butterfly.

Elk, never native to the area, were introduced in the 1930s. However, one early witness remembers that both deer and bighorn sheep were abundant in the Spring Mountains and recalls seeing a migration of over 1000 bighorns across the Las Vegas Valley between the Spring Mountains and Sheep Mountains to the east. Today, approximately 160 desert bighorn are thought to roam the central and southern portion of the Spring Mountains.

Reclassifying the Spring Mountains and other parts of southern Nevada would not be without precedent; the Springs, in particular, have been parts of various land designations. In 1906, the Charleston Forest Reserve was established. In 1908, this area was combined with the Vegas National Forest which encompassed the higher mountains in what is today the Desert Wildlife Refuge, to form the Moapa National Forest. In 1915, the Moapa was combined with the Toiyabe National Forest. Several other administrative changes occurred, and at various times, the Spring Mountains were part of Dixie National Forest and Nevada National Forest. Today, the range is again a part of the Toiyabe National Forest.

Some 43,000 acres of the highest ridges and peaks of the Spring Mountains are currently protected by the Toiyabe NF. Three major BLM roadless areas straddle the range, including the 69,000 acre Mount Stirling Wilderness Study Area (WSA) on the northern end of the range, the 56,000 acre La Madre Mountains WSA, and the 24,000 acre Pine Creek WSA which dominates the central portion of the range within the BLM's Red Rock Canyon National Conservation Area. The combined Forest Service and BLM roadless areas make up a unit of nearly 230,000 acres.

DESERT WILDLIFE REFUGE

Just north of Las Vegas and directly across the Las Vegas Valley from the Spring Mountains lies the Desert Wildlife Refuge, managed by the U.S. Fish and Wildlife Service. The western half of the Refuge is used as a gunnery and bombing range by Nellis Air Force Base and is not open to the public.

The highest mountains in the Refuge are in the Sheep Range. This once was part of the National Forest System, but the Forest Service lost control of the area when the Refuge was established in 1936. The Desert Wildlife Refuge was created to protect desert bighorn sheep, and indeed, more desert bighorn are found here than anywhere else in the world—at least 1500 sheep are thought to wander in the Refuge's six mountain ranges. The Refuge's mountains, including the Sheep, Las Vegas, Pintwater, and Desert Ranges, are all fault block uplifted masses of limestone.

The largest and longest of these, the Sheep Range, sprawls northward some 50 miles and is up to 12 miles wide. Rising nearly 6000 feet in precipitous, tiered cliffs and rugged, turreted canyons above surrounding lowlands, the highest peak is 9912 foot Hayford Peak. Sheep Peak, the second highest in the range, is 9750 feet. The other ranges are considerably lower. The high point in the Las Vegas Range is on 7133 foot Quartzite Mountain. The Desert Range and Pintwater Range reach similar elevations.

Corn Creek Springs at the Refuge headquarters is a genuine oasis in the desert, with reedy ponds, cottonwood trees, and an abundance of birds—more than 200 avian species have been recorded here. The ponds are also home to the Pahump poolfish, a minnow-sized species which was transplanted here after its native home in the Pahump Valley was by ground-water pumping to grow food for domestic livestock—yet another casualty of the cow!

Beyond the area influenced by the springs, typical Mohave Desert vegetation cloaks the valleys and lower slopes, primarily creosote bush, white bursage, Mohave yucca, and various species of cactus. Between 4000 and 6000 feet, blackbrush and Joshua tree "forests" take over; pinyon-juniper forests and sagebrush predominate between 6000 and 7000 feet. Peaks in the Sheep Range above 7000 feet have coniferous forests of white fir and ponderosa pine. Bristlecone pine crowns the summits just under 10,000 feet.

MORMONS AND KIN

North of Interstate 15 and the town of Moapa, and east of highway 93, lies a group of mountains all under BLM management—the Mormon, Meadow Valley, Delamar and Clover mountains. Most of them are roadless, forming a huge area of wild country directly east of the Desert Wildlife Refuge. The highest of them is under 8000 feet, but their crags and canyons are rugged.

Farthest south of the group and about 75 miles northeast of Las Vegas, are the Mormon Mountains. Unlike most ranges in the Basin and Range province, the Mormons are more circular than linear, and approximately 18 miles across. The highest point, Mormon Peak, rises

to 7414 feet, for a vertical relief of more than 5000 feet above Meadow Valley Wash which borders it on the east.

Like the Spring Mountains, the Mormon Mountains consist of older limestone formations overlying younger sandstones. The Mormons have deep, remote canyons, cliffs over 800 feet high, and knife-edge ridges. The central portion of the range has numerous caves, several with stalactites, stalagmites and columnar formations.

Most of the range is covered by Mohave Desert vegetation including bursage, blackbrush, and yuccas. Pinyon-juniper covers some of the higher peaks, along with a small relict stand of ponderosa pine near the top of Mormon Peak. Desert tortoise and desert bighorn sheep both inhabit the range. It has numerous pictograph and petroglyph sites. A 162,000 acre roadless area is under study by the BLM for potential Wilderness designation.

Slightly north and west of the Mormon Mountains is the long, linear crest of the Meadow Valley Mountains, in places less than a mile wide. The western slope is steep, the eastern side more gradual. The range contains numerous jagged peaks and hidden canyons, although the highest point is only 5700 feet in elevation. Most of the range is made up of sedimentary limestones and dolomites, some volcanic rocks, plus quartzite (which is metamorphosed sandstone). Lower elevations are mostly shrubs, while pinyon-juniper grows at the highest elevations. Desert bighorn sheep, desert tortoise and spotted bat are among the species found here. Hackberry and Vigo Canyons are popular hiking destinations. A BLM WSA encompasses 186,000 roadless acres.

Northwest across the Kane Springs Valley from the Meadow Valley Mountains, and east of highway 93, are the 50 mile long Delamar Mountains whose greatest elevation is 8035 foot Chokecherry Mountain. These mountains are mesa-like, dissected by ridges and canyons. One special feature of the range is the most northern occurrence of Joshua tree, which grows on the slopes mixed with sagebrush and juniper. A 126,000 acre WSA covers part of the range.

Gold and silver were discovered in 1889 along the eastern edge, and the town of Delamar sprang up. Water had to be hauled 12 miles from Meadow Valley Wash, hence dry milling was the norm. The resultant fine dust caused the death of many residents, giving rise to the town's nickname—"widow maker". Nearly 15,000,000 ounces in gold were taken from the Delamar mines, making it the leading producer for the decade. Today Delamar is abandoned, though ruins remain.

Southeast of Caliente are the Clover Mountains. The roughly circular range is bounded on the south by the Tule Desert and on the east by Meadow Valley Wash. The highest ridges rise to 7400 feet. The range is composed of limestone, quartzite, and brightly colored volcanic tuffs and other material from the Caliente caldera, the sides of which are the cliffs along Meadow Valley Wash. Cottonwood Creek, which dissects the range on the southwest, is a perennial stream with cottonwood, ponderosa pine, willow, and ash. Elsewhere in the range are Gambel's oak stands and aspen stands, although pinyon-juniper is the dominant forest cover. An 84,000 acre BLM WSA centered on Cottonwood Creek covers part of the range.

WORKING FOR GREATER DESERT WILDLANDS ECOSYSTEM

Managing this entire region as a whole, instead of keeping fragmented wild areas under varying federal and state jurisdiction, could go a long way toward ensuring the long-term biological recovery of this region. To this end, Nevada wilderness proponents may wish to become active in The Wildlands Project, a continental wilderness recovery effort, and to draft comprehensive Wilderness legislation of the sort proposed by the Alliance for the Wild Rockies to protect the Northern Rocky Mountains.

The Nevada state office of the BLM just released its state-wide wilderness recommendations. Conservationists can use the state-wide BLM process to begin lobbying for a more visionary proposal based on maintaining biological corridors and large wildland reserves for BLM areas both east and west of the Desert Wildlife Refuge.

Quite a few of the roadless areas in the Greater Desert Wildlands Ecosystem proposal were endorsed by the BLM in their final recommendations. For instance, the BLM recommended Wilderness for the Mt. Stirling, La Madre Mountain, and Pine Creek Wilderness Study Areas, which surround the Mount Charleston Wilderness in the Spring Mountains. Areas to the east of the Desert Refuge, like the Mormon Mountains and Meadow Valley Mountains, were also recommended for Wilderness, but the Delamar Mountains were dropped. So the first step would be to take the BLM to task and ask that they consider all these areas as part of a larger unit. Roadless areas like the Delamar Mountains and Arrow Canyon Range, both dropped by the BLM as lacking significant wilderness qualities, are critical as corridors to link the other roadless areas together. By presenting a unified Greater Wildlands complex package, it may be easier to gain protection for all these areas.

Wilderness supporters in Las Vegas should seize the opportunity for a Greater Desert Wildlands Ecosystem and begin to lobby for its preservation as a single wildland unit. Closure of non-essential vehicle corridors could combine now-separate roadless areas into one unit.

The next step is to get the Nevada congressional delegation to sponsor a wilderness package for the entire proposed wildlands complex. Given its outstanding scenic, geologic and biologic characteristics, Nevada Congresspersons should eagerly embrace this proposal.

A proposal to make a National Recreation Area in the Spring Mountains of Nevada has been introduced into Congress by Nevada Representative James Bilbray. This would include the area from Mt. Potosi on the south to Mount Stirling on the north, taking in the Mount Charleston Wilderness and adjacent roadless areas. So far no action on this proposal has been taken, but should it go forward, it would be one step toward unified management of the region.

George Wuerthner (Box 273, Livingston, MT 59047) is a freelance writer, naturalist, and member of The Wildlands Project board. His most recent book is on Nevada's Basin and Range country.

Bad Science Lacks The Visceral Connection

by Howie Wolke

Several weeks ago in rain, sleet, and swirling mist, I approached the Continental Divide high in the wilds of the Northern Rocky Mountains. Moist Pacific air was overriding cool Canadian air that was spilling over the Great Divide from the northeast. I've long had an interest in meteorology, and I knew that such conditions can lead to severe storms. It was mid-September, and we'd already endured one snowstorm on our nine day jaunt. Here in the exposed alpine expanse atop the great moisture barrier, caution was necessary. A careless hiker could quickly become wet, cold, disoriented, hypothermic, frozen, dead. Dead like honest government, like culture in Utah. As a professional guide, I could afford a calculated risk, but I was paid to avoid a careless one.

The chill wind blew sleet into my sweaty face. We reached a high pass on the divide; it was decision time. Unless we chose to descend from the pass to safe sheltered forest and a final camp several easy miles from the trailhead at the trip's terminus, we'd spend the next couple hours along an exposed stretch of rock and tundra. If the clouds lifted, the views would be superb. Steve, my client, asked if I thought we should take the high route.

All of my meteorological knowledge said "no." Air masses were colliding; a severe storm seemed imminent. My brain, my textbooks, and my experience said retreat, down to the enduring safety of the trees. Down to stinging teary eyes in the smoke of a warm fire in gentle rain. Down to the womb-like security of a warm sleeping bag in a tent under a spruce. In the swirling clouds and sleet and snow, there would be no views anyway.

"Let's go for it," I said to Steve.

I was betraying my intellect and obeying my guts. Something—I don't know what—told me that the severe storm wouldn't materialize. I was fairly certain of it, despite the signs to the contrary. Steve and I cautiously continued along the open ridge in dense fog. After a mile or so, the clouds suddenly lifted, and we enjoyed some unforgettable views of mountain wilderness: glacier, rock, tundra, lake, forest, avalanche path and an endless sea of peaks rising from valley mist into the clouds. The storm had faltered. Our camp that evening was of damp smoky fire down in the spruces, but we got there the adventuresome way, by instinct, not intellect.

We upright primates are a funny bunch, prisoners of our fluctuating infatuations. We learn a new group of facts and quickly they're dogma. We're so quick to embrace, to swallow, to be taken in by the sanguine simplicity of singular solutions, that we forget to trust something far older, far more proven than intellect and the alleged rational solutions derived thereof. There's a lot we can learn from the four-leggeds, like following our instincts.

When storms approach, Mountain Goats descend from the highest peaks to the lower cliff faces. When they're atop the crags, though, fair weather usually follows, even when skies appear to threaten. I've seen this often. Who knows how they know.

I'm not certain what, exactly, instinct is. A biologist might describe it as knowledge genetically encoded in the species, enabling individuals to forgo the time-consuming learning process. For instance, many millennia of associating with large mammals have created within our species a reluctance to harass big animals, like 2000 pound Yellowstone Bison . . . with horns. The survival instinct of our species is enhanced whenever some idiot is removed from the gene pool via a lacerated liver, compliments of the big bovine that he or she approached too closely. I call such incidents natural selection, honing the survival instinct of humanity. Those with the proper caution survive to reproduce.

Scientists can lead us down a better path, one of intellect and instinct; one that allows us to rejoice in our connection—visceral and physical—with the natural world.

"Instinct" also has a more general connotation, describing various kinds of gut-level feelings. I like to think of it as a sixth sense, something that goes beyond what's traditionally thought to be "rational." In this broad sense of the term, a precise definition of instinct disappears.

I suspect that we clothed apes have forgotten how to utilize many of our basic animal instincts. The western technological mindset demands quantification. Yet it's tough to quantify and categorize feelings and visceral reactions. Instinct and visceral feelings have survival value; otherwise, they wouldn't have evolved. In the era of global eco-catastrophe, or, as writer Christopher Manes puts it, the "End of the Cenozoic," basic survival instinct says slow down, stop and reverse human population growth; protect and restore wild nature. By contrast, the alleged rational mind says push on; trust Technology to produce new fixes. But the purely rational mind in the dying Cenozoic is the insane mind. Basic survival instinct says that the upward spiral of frivolous consumption, expanding human population, and economic growth—be it free market or centrally controlled—is a death spiral.

Back in 1980 when Dave Foreman and I began to fantasize the ecological wilderness system upon which early Earth First! was based, we knew little of conservation biology. Though our travels in southern Utah had familiarized us with the problem of inbreeding depression in isolated populations, terms like island biogeography, biological corridors, and viable populations represented uncharted territory. It was instinct, our visceral feel for wilderness, that told us there was too little wilderness remaining. It was our gut level love of wild country that convinced us to decry the destruction of any more wilderness. It wasn't because we knew of the potential for environmental or demographic stochasticity* to wipe out small isolated populations that we began to promote wilderness recovery areas. We were angry at the senseless destruction of wilderness, and we wanted our lost wilderness back. Those "radical" yearnings of over a decade ago have today become the standard themes of conservation biology. Conservation biologists have completed studies, collected data, and articulated the scientific basis for protecting, connecting, and restoring big ecologically healthy wilderness.

In general terms, the new science of conservation biology asserts that populations of wide-ranging megafauna—particularly big predators and some big ungulates—need very large chunks of wild habitat for long-term population viability. Wolves, Grizzlies, Wolverine, and Bison are large mammals vulnerable to genetic deterioration and environmental and demographic stochasticity in small isolated populations. Big chunks of habitat (big wilderness) should be connected, wherever possible, by wide wild corridors that would allow individuals to migrate between the major populations. In addition, we now know that in areas characterized by periodic catastrophic disturbances, like wildfire in the Rockies, nature reserves must be very large—at least 2.5 million acres—to adequately encompass nature's shifting mosaic of habitats: recent burns, young post-fire forest and range communities, and mature ecosystems, including old-growth forest. Conservation biologists now warn that the American wilderness is already too small and fragmented by roads, clearcuts, mines, fences, ranches, subdivisions, and ski resorts to protect complete ecosystems with thriving populations of

...we knew little of conservation biology—though our travels in southern Utah had familiarized us with the problem of inbreeding depression in isolated populations...

all surviving native species. Some conservation biologists also assert that habitat fragmentation is already blocking the evolution of new species, particularly for large terrestrial vertebrates.

Unfortunately, conservation biology is no less vulnerable to subversion than are other branches of science. Like others before them, men and women who claim to be conservation biologists will fudge data, temper principles, and moderate, in order to gain acceptance from the powers that be—in academia, government, and industry.

To avert subversion, science must be accompanied by natural gut-level instinct. Feeling must complement analysis. In an ethical vacuum, science is worthless, even dangerous. Lacking an ethical matrix in which to function, science and technology unite in an unholy promotion of the status quo. And it happens easily, because the potential applications of science are so varied, and because so much science is inexact and open to such varying interpretations. Bad science has helped create today's mess of dissolving ozone, greenhouse warming, dying oceans, and the biological meltdown. The ethical matrix that science so desperately needs is a matrix borne in instinct, in the visceral knowledge that the natural world has intrinsic value. Lacking the matrix, even good science goes bad.

"New Forestry" is an example. Here's a quick fix, a new buzzword, a simple solution to a complex problem. New Forestry is attractive because it's based upon some important ecological parameters. For instance, biologists have long known that standing and fallen dead trees (snags and deadfall) provide habitat for a diversity of wildlife: woodpeckers, owls, hawks, flying squirrels, Marten, Fisher, Black Bear, and various rodents, to name just a few. Dead trees are also important for nutrient cycling and for providing shade after a fire or insect infestation has opened up a forest. This shade reduces moisture loss and protects various soil microbes from the direct sun. Dead trees also check erosion when they fall across a slope, and they create fish habitat when they fall into streams.

Traditional forestry in the US fails to recognize the value of death to a living forest. The typical scenario is to clearcut a complex native forest, pile and burn the slash (all the recently living woody organic matter that doesn't go to the mill), and plant a tree farm—neat rows of genetically uniform individuals of the economically preferred species. Often, toxic herbicides are applied to prevent deciduous species from competing with the little conifers.

New Forestry is merely a variation of the old. Thanks to good science, it recognizes the importance of dead trees to the ecosystem. But New Forestry is still tree farming. Its advocates pretend that it emulates nature's cataclysms, but it does not. Ironically, many of its advocates, especially in the US Forest Service, use New Forestry as an excuse to oppose wilderness protection, even though conservation biologists have graphically shown the need for big wilderness as the fundamen-

* Environmental Stochasticity is chance catastrophic events, like wildfire, flood, and landslide, which can obliterate small and isolated populations lacking nearby individuals to re-colonize an area. Demographic Stochasticity is events within a small isolated population, like too few births of one sex, that can lead to extirpation.

tal basis for an enduring wildland conservation strategy.

New Forestry works like this: Instead of stripping entire mountainsides, or instead of creating big ugly square clearcuts in a checkerboard pattern that covers the entire landscape, the clearcuts become smaller and irregularly shaped. Some trees (live and dead) are left standing or lying on the ground for wildlife habitat and ecosystem maintenance. That's better than the old strip, burn and plant scenario, but it's no substitute for big wilderness. It's a kinder gentler rape.

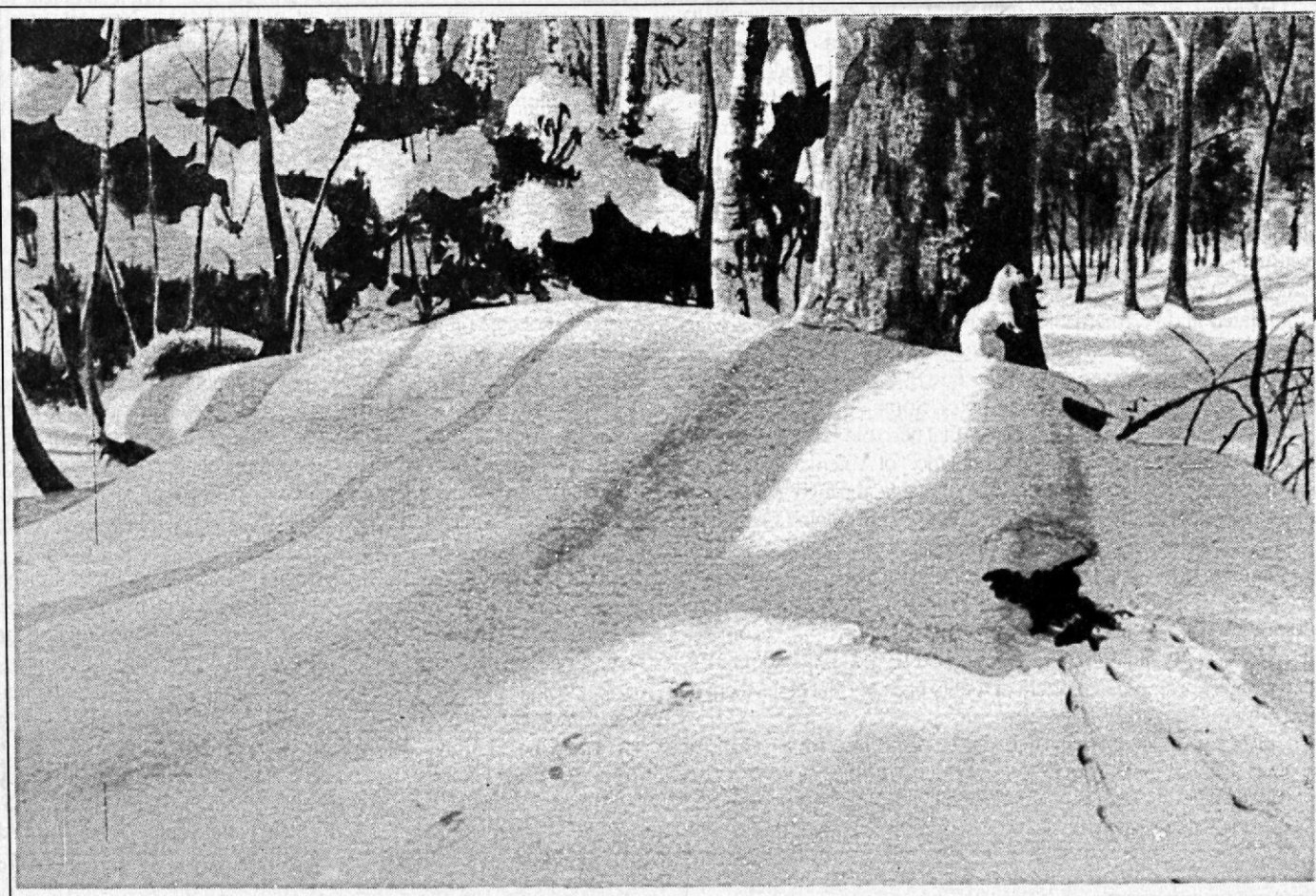
Under New Forestry, the massive road-building program continues (nearly 10,000 miles per year in the National Forests), noxious weeds continue to use roadsides as avenues for the invasion of previously remote wild country, and slob road hunters and poachers gain more access to the shrinking backcountry. Forest interior species, like Red-backed Vole, Fisher, Northern Goshawk, and various songbirds continue to dwindle; being replaced by weedy invaders that thrive in disturbed habitats. Wilderness-dependent species like Grizzly Bear, Wolverine, and Gray Wolf also dwindle. Moreover, in terms of the amount of snags, deadfall, and live trees that it allows to remain in the system, New Forestry pales when compared to a natural cataclysm, like wildfire. Unlike nature's cataclysmic events, modern logging usually removes most of the biomass from the system, even in New Forestry. And erosion—from road-building, log skidding, and subsequent bare ground exposure to torrential rains—ruins the soil and smothers spawn-

ing beds for trout and salmon, just like in the old forestry. The New Forestry landscape still becomes tame, a managed, damaged land; a glorified tree farm instead of a complex evolving native forest.

Unfortunately, some "conservation biologists" now advocate New Forestry. They argue that a wilderness system that adequately protects native biodiversity is politically unattainable. So they promote New Forestry as a second choice. That's defeatist, and it's bad science. The ethical matrix is missing. That's intellect with no guts. Bad science says embrace the New Forestry fix. Work with, not against the agencies. Avoid controversy. Accept the mediocrity of a totally managed landscape that supports some life, because that's better than total devastation.

Scientists can lead us down a better path, one of intellect and instinct; one that allows us to rejoice in our connection—visceral and physical—with the natural world. Within this ethical matrix good science can play an important role in halting the growth juggernaut and restoring some of the Earth's damaged wildlands to health. Good science, in the matrix, says protect, restore, and connect. It describes wildland habitat restoration as a key to enlarging and connecting damaged, fragmented wildland ecosystems. It does not modify its ideas based upon political considerations, however bleak the politics might be.

In one of the most telling and oft repeated incidents of modern conservation, Aldo Leopold eloquently describes an episode of personal enlightenment. He portrays his youth as "full of trigger itch," embrac-



detail from a watercolor by Bob Ellis

ing the idea that fewer Gray Wolves, Grizzlies, Puma, and other predators would mean more deer, Elk, and other prey—a hunter's paradise. That was the typical thinking of the day. But, right after mortally wounding a she-wolf in the highlands of New Mexico, the young biologist watched the "green fire" in the wolf's eyes slowly die; at that moment he realized that neither the wolf nor the mountain agreed with his viewpoint. Though the story has been told often, one of its major lessons is sometimes lost. Leopold was a scientist, trained and certified by official academia. Until he shot the wolf, his outlook was shaped by the prejudices of the times in which he lived. Predators were bad, Bambi was good. That was simple and expedient, particularly for slob hunters, stockgrowers, and developers. After watching the green fire die, though, Leopold was transformed. As a scientist, his biocentric theme of promoting a land ethic (described in *Sand County Almanac*) has inspired many to defend nature and to promote good conservation based both upon science and a profound respect for life and land. Respect is the matrix. Leopold the scientist became a giant in conservation history because of something visceral, something he felt in his guts when he saw the wolf die. That visceral connection not only changed Leopold's life; it profoundly altered conservation history.

Good science such as modern conservation biology within the context (the matrix) of a profound respect for life and natural processes is a powerful force for wilderness. When transformed into activism it wins converts and puts exploiters on the defensive. It's tough to oppose good science.

Unfortunately, bad science still thrives. Government and industry foresters, for example, often claim that logging increases biodiversity due to increased edge effects, where logged lands abut standing forest. The idea is that there are more species where two distinct habitats (forest and clearing) meet than where there is just one. Conservation biologists and enlightened land managers, however, reject the creation of artificial edges because edge effects create habitat for White-tailed Deer, Brown-headed Cowbirds, various exotic weeds, and other species common elsewhere in human-dominated landscapes. The creation of artificial edges reduces or eliminates populations of forest interior and old-growth species (Pileated and Red-cockaded Woodpeckers, Flammulated and Northern Spotted Owls, Northern Goshawk, Marten, Fisher, and many others), and critters that can't cope with much human use (Grizzly, Gray Wolf, Wolverine, Puma, Lynx, Elk, Mountain Goat, and wild salmon, for example). Some of these species are called "wilderness dependents." Species that need old growth, deep forest, or wilderness are in trouble throughout most of America. We needn't manage for more White-tails; we should manage, through habitat protection and restoration, for Grizzlies, Lynx, Flammulated Owls, and Goshawks. Again, the big wide-ranging predators, in particular, need big areas of wild habitat. The absolute number of species in an ecosystem (species diversity) is less important than which species are there. Wildland conservation based upon good science therefore promotes native biodiversity rather than maximum diversity. Using bad science, land managers promote maximum diversity because that helps them to justify logging.

One of my earliest lessons in bad science occurred at a hearing in Meeteetse, Wyoming back in 1976. As a Friends of the Earth representative, I was working with Bart Koehler of The Wilderness Society and a bunch of Meeteetse area locals to stop a proposed copper mine in the

nearby Absaroka Mountains, near the southeast corner of Yellowstone National Park. In my testimony, I asserted that Amax's proposed mine was within and would damage the Yellowstone Ecosystem. An Amax witness, Dr. Ken Diem of the University of Wyoming, refuted my testimony, claiming the ecosystem boundary was where the rock strata changed, between the proposed mine and the Park. That was bad science. Ecosystem boundaries can be defined in many ways; wildlife movements, vegetation changes, and complexes of roadless wildlands are often primary considerations. I don't know if Diem, a biologist, had been paid off by Amax or not, but he had a PhD. I was a 24 year old with a mere BS. Because his credentials were Piled Higher and Deeper than mine, Dr. Diem won the hearing exchange.

Nonetheless, I was right; he was wrong. Virtually every expert today recognizes the old proposed Kirwin mine site,** within the Shoshone National Forest, as part of the Yellowstone Ecosystem. Elk, Bighorn, Grizzly, and many other species wander with impunity across Diem's change in rock strata. The proposed mine site was within a big roadless area that extends well into the Park proper: not just the same ecosystem, but the same wilderness.

Diem's testimony was not unusual. University programs are particularly vulnerable to the corrupting influence of big money. For example, forestry schools often get grants from big timber companies. (I discuss this problem in *Wilderness on the Rocks*.) Likewise, medical schools get grants from big drug companies. . . . Therefore, it should be no surprise that most forestry schools—and the professors within them—promote timber management, not wilderness. Nor is it surprising that medical schools are extremely traditional in their approach to medicine. Is it realistic to expect many nuclear physicists to oppose splitting atoms, or a certified range manager to oppose grazing livestock on public lands? Too often, research and professional biases reflect the sources of funding. Few will bite the hand that puts the bread on the table (or the loot in the vault). More to the point, society as a whole lacks not just Leopold's land ethic, but the entire ethical code essential to good science. There's no moral matrix. Corruption comes easily in an ethical vacuum. We're often told to let the "experts" decide, but like Leopold before he shot the wolf, the "experts" are prisoners of society's prejudices, myths, and ethical shortcomings.

It's no wonder that some young activists feel alienated from science. Bad science is reductionist and mechanistic; furthermore, it reflects the quest for society's lowest common denominator: money. When my "Thoughtful Radicalism" essay was published in *Earth First! Journal* in 1989, a number of young radical activists opposed my suggestion that radical activists utilize biologists as spokespersons for wilderness. "Reductionist!," they screamed. I can sympathize with their feelings.

Nonetheless, it would be disastrous to abandon scientific arguments for big wilderness. Pure emotion without facts would be rejected. Fortunately, increasing numbers of conservation activists are utilizing the recent findings of conservation biology. My suggestion in "Thoughtful Radicalism" was to deploy biologists who operate within the matrix: competent scientists who love wild country and wild life. David Brown, John Craighead, Paul Ehrlich, Charles Jonkel, Maurice Hornocker, Reed Noss, and Michael Soule are among them. It's easy to differentiate them from typical agency and industry *BIOSTITUTES*.

These scientists and others like them have graphically articulated

** Amax eventually withdrew its proposal, largely because the ore was very low grade and copper prices fell.

the need for a wildland conservation strategy based upon big multi-million acre areas of wilderness, biological corridors connecting them, and wildland habitat restoration on many now-developed lands. Within buffer zones around the wildlands framework, good scientists would allow some resource extraction—particularly on private lands—but extraction must be small scale, carefully conducted, and subservient to the dominant surrounding wildlands. In essence, conservation biology has given us powerful arguments for saving and restoring real wilderness, but they are only valuable if wildland conservation activists translate them into effective action.

A word of caution is needed. As I said earlier, we hairless hominids tend to embrace singularity, to jump onto a particular bandwagon and damn the consequences. Conservation biology is a very attractive bandwagon, and it's easy to forget many other good arguments and strategies for wilderness. As we've seen, any branch of science is likely to be subverted by monied influences. That's why science needs an ethical matrix. In the wildland struggle, biological arguments are strengthened by economic and social arguments. Good biology does stand on its own. But the more forces that stand opposed to habitat destruction, the better. That's why I'm an eclectic. I fear the consequences of singularity as I fear the consequences of replacing native forests with simplified tree farms. Simplified systems are vulnerable to both natural and anthropogenic disturbances, just like simplified strategies are vulnerable to corruption and cooptation. Conservation biology is the bedrock upon which to base wildland conservation strategies. Nonetheless, economic and social arguments are essential, too. For instance, below-cost logging and subsidized public land grazing are robbing both the land and the taxpayer. Excessive road-building in the National Forests is decimating Elk herds; hunting therefore declines and local revenue is lost. In addition, healthy wildlands promote economic and social diversity. Dr. Tom Powers of the University of Montana has demonstrated that wild country attracts a diverse array of small businesses and cottage industries to nearby communities, whereas mining and logging promote social uniformity and economic upheaval associated with the inevitable boom and bust cycles. As in an ecosystem, a diversity of arguments and tactics for wilderness means strength and resilience.

While the various intellectual arguments are essential if we are to develop broad support for good wildland conservation strategies, ultimately feelings provoke the action. A visceral love for wild land and wild life strengthens and validates intellectual arguments, be they scientific, social, or economic. The matrix reminds us that we're animals, alive with the joy of evolving life, and outraged at its destruction. It's not just ok, it's essential that we express outrage at the destruction of the biosphere. For what could be more outrageous? The Federal deficit? AIDS? Unemployment? These things are troubling, even tragic, but they are not in a league with the destruction of life on Earth (today's unprecedented extinction event), and indeed, the destruction of the Earth's very ability to sustain life (ozone depletion, greenhouse emissions, dying oceans). To a great extent, the environmental movement's traditional lack of outrage (trying to appear "reasonable") has allowed society to consider the environmental crisis to be merely one of many pressing social issues.

Yes, it would be a mistake to eschew science; similarly, it would be a mistake to canonize science and neglect the visceral connection. Ultimately, guts are the bedrock foundation for effective action.

Howie Wolke is the author of Wilderness on the Rocks and co-author of The Big Outside. He operates his Wild Horizons Expeditions out of the Bitterroot Valley in Montana.

Note to "Going-home song for a wildlife biologist"
In the spring of his last year, an estimated three in one hundred original prairie potholes held water. Various Native American tribal groups sing Promising Songs (praying to the spirits of creatures to be harvested), Honor Songs (commemorating some notable deed or change in life), and Going-Home Songs. This poem is all three.

Going-home song for a wildlife biologist
Robert Oetting—May 7, 1934; June 9, 1990

Let the lost waters rise.
Let the great flocks cry again
Over the greening land.
Goldeneye, bufflehead, teal,
Snow goose, Canada, swan,
In their primordial numbers
Shout back to us lost songs.

Let them chorus that wild sound
Over concrete and plastic,
Over lead and nuke-dumps and steel.
Let the right folks in offices smile,
Old Fish-and-Game men, like Bob Oetting,
Look at the charts and grin,
Watching the numbers rise.

Under the wheat and freeways
Whisper ghost sloughs and potholes.
Water rises like darkness
In the parched glare of our souls.
Who fears the dark will suffer.
Who cannot swim will strangle.
But some will dive as the loon dives,
And fly as the swan flies.

Earth and air and water,
In darkness it is finished.
In beauty it is finished,
Work that is never over.

—Edith Rylander, from *Where the Good Stuff Comes From: Bush Poems*, 1991, by Edith Rylander (Grey Eagle, MN: Big Swan Press, 1991)

Zoos and the Psychology of Extinction

"The reactions of zoo visitors to zoo animals have little to do with zoology. They are thoroughly irrational and express obscure impulses the study of which has just begun."

—Henri F. Ellenberger, *"The Mental Hospital and the Zoological Garden"*¹

by Mike Seidman

HISTORY OF A DISILLUSIONMENT

I used to believe in zoos: in my mind zoos stood for expertise about animals and concern for their plight. When, many years ago, I began to work for one, I thought I had, at long last, found a job of which I could be proud. After a few years, although I was still a believer, I was becoming disturbed by practices that had little to do with conservation or education and that often seemed unnecessarily stressful to the animals. I listened to zoo visitors and heard nothing I could interpret as genuine interest in the living beings set out for them. And my zoo seemed less concerned with promoting appreciation and respect than it did with bringing more bodies through the entrance gates.

But I continued to believe in the educational potential of zoos—if they would focus on sending a message of humility toward the natural world. Zoos could do this, I thought, by minimizing signs of human presence and immersing their visitors, through appropriate landscaping, in simulations of the habitats of the animals they were watching. This "landscape immersion" idea originated among zoo people, a fact that encouraged me in my hope.

Zoos, however, seemed more intent on indulging their visitors than enlightening them. Gradually it dawned on me that zoos were not about education at all, that the elements of zoos I deplored—the promotional gimmicks and humanizing of animals to bring people in, the gaudy media events using animals as backdrops, the exhibits that were more showy than realistic, the carnival atmosphere—were not mere frivolities that might someday be pruned away in the interest of promoting conservation but were indispensable elements, the very essence of zoos.

This paper is an attempt to flesh out that insight, to make sense of the mismatch I perceive between what zoos claim to be doing and what really goes on there.

CLAIMS AND ACCUSATIONS

Being in the presence of captive wild animals is one of our cultural obsessions; hence zoos. Until recently we thought nothing of removing animals from their homes so that far-away people might gaze at them for entertainment.

Most contemporary critics of zoos focus on what they perceive to be the suffering of animals there. But even if we assume that keeping animals captive may be done humanely, it is still necessary to ask what purpose is being served. Zoos claim to "save" endangered species through captive breeding programs and to promote knowledge and respect that will lead to protection of animals in the wild. My own view is that such claims claim too much (by far) and are intended to deflect attention from the central activity of zoos—the public display of captive wild animals.

The urge to dominate animals (or to "manage" them, as we say today) is...tied to the repression of our own animal nature. Thus our war on organic life...our envy of machines. It's not only the habitats of animals that we covet, we want their souls; we want to inhibit them as we inhibit ourselves.

Zoo people are perplexed by the accusations of animal welfare critics. They concede that zoo animals in the past may have suffered; they will gladly pass the accusation on to today's roadside zoos; but the accredited zoos, those that meet the standards of the AAZPA (American Association of Zoological Parks and Aquariums) consider themselves paragons of humane animal keeping.

To those who accuse zoos of being prisons, zoo people point to spacious naturalistic exhibits, high quality food and the devoted care of experts. They emphasize that most zoo animals today are born in zoos and have never known the wild. Some zoo defenders even hint that animals may be better off in zoos where they are provided with approximations of their habitats without the multiple threats of predation, starvation, disease and adverse climatic conditions.

I have no wish to disparage the very real improvements zoos have made in the living conditions of the animals they keep. But all these improvements have only made zoos more humane prisons. Disengaged from the sole context in which their appearance and behavior makes sense, animals in zoos might as well be on another planet. Without the proper environmental cues, complex behavior patterns wither; energy that is no longer required for the satisfaction of basic needs gets burned up in exaggerated responses to inappropriate stimuli.

Some zoo animals become semi-catatonic automatons, numb from unrelieved confinement and an overload of bewildering sensory input. All face the unrelenting presence of human beings: staring, intruding, coercing. From birth to death their lives are choreographed for

optimum visibility on exhibit and human safety and convenience during servicing.

Surely only the most arrogant (or the most incredibly naive) of us could believe that animals might prefer such lives. (Has anybody ever asked them?) And I am not convinced by the argument that animals born in zoos will not miss the wild: to the extent that captive-born animals retain the genes of their wild counterparts, they are adapted to a set of conditions that no amount of human ingenuity can replicate.

Whether the keeping of wild animals in captivity can really be humane depends on how the word "humane" is defined. Zoos define it in terms of space, food, health, social interactions and stress. But their standard of comparison is not the wild so much as the old zoos.

Despite the assertions of some zoo critics, it is unlikely that animals in zoos agonize over the loss of their freedom as we would. But if sensory deprivation is considered a form of suffering, then suffering is intrinsic to animals in zoos—no matter how much their living conditions are improved. Animals in zoos live impoverished lives in incomprehensible surroundings; the numbing emptiness of their lives is relieved only by periodic bouts of terror (during transfers, for example).

To the extent that zoo animals suffer, the responsibility for it rests on our presumed "right" to remove them from their worlds for trivial human purposes. Neither zoo people nor their customers ever question this "right"—because all agree that nature is our property.

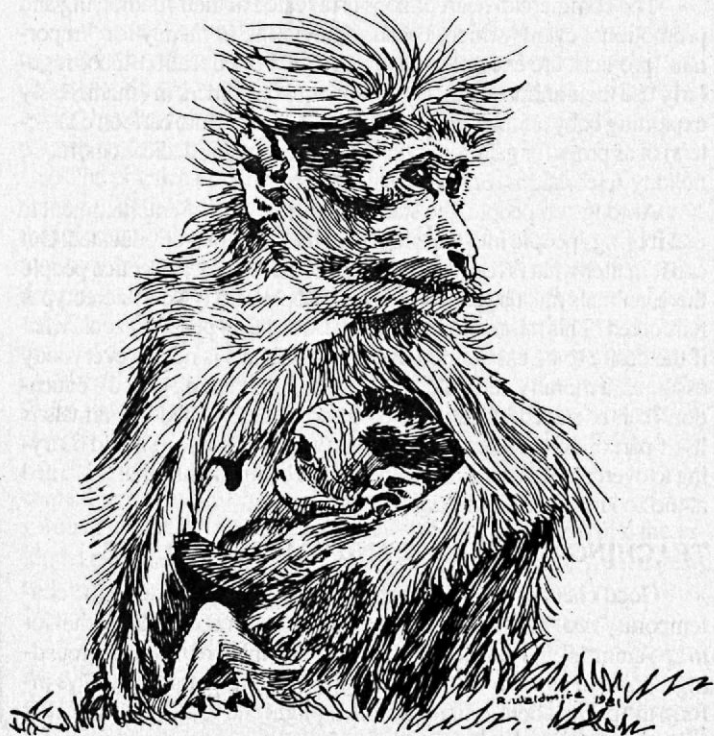
PROPAGATING MOTHER NATURE

More than anything else, the breeding of endangered species has legitimized zoos in the public mind. Zoos, however, did not undertake the task of captive propagation wholly by choice; they became conservationists only when procuring animals from the wild became difficult. At that point (15-20 years ago), zoos realized that future exhibit animals would have to be recruited from within the existing captive population, which would have to become self-sustaining.

A 1983 study by zoo researchers, however, revealed that years of mating among closely related animals was resulting in genetic problems which might lead to a decline and population crash, putting zoos out of business.² Out of necessity zoos began to cooperate with each other, treating the animals they collectively owned as one population, shifting animals among themselves in accordance with the calculations of geneticists. By manipulating which individuals bred, and with whom, zoos could preserve genetic diversity among their limited number of animals, compensating in this way for the absence of incoming genes. What zoos learned about maintaining genetic variation in small populations of animals, in the interest of their own survival, they could then use in the service of endangered species.

Zoos, at least the largest of them, now devote considerable time and effort to solving the problems—behavioral, physiological and genetic—of captive propagation. This, as well as their increasing involvement in all facets of endangered species protection, has brought zoos some respectability. The expertise of zoo biologists is of particular interest to conservation biologists, partly because they too are interested in the breeding of endangered species, but also because the genetics of small populations in zoos has increasing relevance for conservation of animals in the wild, whose populations are becoming isolated from each other as a result of human expansion.

It is not my intention to pass judgement on the ethics or effectiveness of captive propagation. It has succeeded in restoring wild popula-



Bonnet Macaques by R. Waldmire

tions of Arabian oryx and may do the same for California condors, red wolves, and black-footed ferrets. But captive propagation is subject to one decisive limitation: it can help relatively few species, only those whose imminent extinction does not stem from destruction of their habitat. Most endangered species bred in zoos will never return to the wild, partly because reintroduction is an extremely complicated procedure, technically, financially, politically and socially, but primarily because there is no wild to which they may be returned. (This prospect no doubt seems less tragic to those who *really* believe in Captive Propagation, the ones who believe in the notion of zoos as arks, according to whom zoos will collectively hold a multitude of species of animals, over many generations, releasing them hundreds of years hence, when human population growth has subsided and habitat is once again available. Sounds like cheap science fiction to me.)

The greatest danger of captive propagation is the temptation to call an animal "saved" if it is thriving in zoos, thus rationalizing destruction of its remaining habitat. In their defense it should be said that most zoo people, especially those directly involved in captive propagation, clearly recognize its limited value as a conservation tool. They know that what these animals need is habitat.

For the purpose of this essay, the important point about captive propagation is that the breeding of endangered species is a marginal activity of zoos, practically restricted to specialists and wholly peripheral to their real business, the public display of animals, which alone accounts for the existence and popularity of zoos. Even if it is conceded that breeding endangered species sanctions the removal of animals from the wild, it can hardly be said to justify their removal for the purposes of public display. That must be justified on its own account.

EXTINCTION AND FUN

To zoo people, the public display of wild animals is a valuable educational tool; zoo animals are "ambassadors to the wild," teaching people facts about animals and creating incentives for their protection.³ Since, in the U.S., over 112 million people visit zoos each year, more than attend all sporting events combined, zoos have a grand opportunity to spread the word of conservation, proponents say.⁴

Only one obstacle would seem to thwart this sunny plan: people do not come to zoos to learn about animals but to be entertained by them. This is so obvious that even zoo educators acknowledge it.⁵ Zoos were invented so that people could regularly experience the pleasure they derive from staring at and socializing among captive animals, from watching (or making) animals perform, from riding animals.

Zoo people assert that entertainment at the zoo is completely compatible with education. In their quest for a rationale to justify entertainment, zoos have latched on to the notion that information is more likely to be absorbed and retained if the experience of acquiring it is enjoyable. This was clearly stated at an AAZPA meeting in 1988:

*Most of us will agree educating the public is important. And we constantly strive for more effective tools to enlighten the visitor. One common problem is the public does not always want to read the graphics or participate in the programs we develop. But the public does like to be entertained. A live animal show not only provides a close encounter with wildlife, but also holds the attention of the audience, thus creating a natural atmosphere for learning.*⁶

Armed with the new logic, zoos can continue providing the old diversions. Animal shows, which used to be considered "just plain fun," turn out to be educational if they are accompanied by a smattering of

facts. Having opened the door to fun, the temptation to fling the door wide open is irresistible:

Our objective becomes to create learning experiences so fascinating, enjoyable and fun that the visitor will not differentiate between learning and entertainment. Hence our plan to create the illusion that the visitor is truly on safari in Africa.⁷

This is transparently self-serving; whether or not learning is enhanced by mixing facts and fun, business most assuredly is. The motivations of zoos aside, however (and I do not mean to suggest that these motivations involve any conscious deceit), the problem with linking education to pleasure is that what needs to be learned about animals, namely the true extent of our complicity in their demise, cannot be taught in this way.

Making it fun no doubt works well for teaching elementary facts about the world—alphabets or numbers (*a la* Sesame St.) for instance—or bits of natural history about animals; but knowledge about animals is irrelevant as long as we continue to act as if the planet is ours to consume. The extinction crisis stems not from ignorance but from a life-negating value system.

Turning conservation education into fun—teaching only what is easily absorbed and painless—mocks the seriousness of extinction, reduces it to a game, without existential consequences; it trivializes both the true meaning of conservation—sharing the world with other species—and the hard work it will entail, weaning ourselves of our addiction to possession and consumption. Since zoos themselves are committed to the cycle of never-ending growth and development, they cannot, without obvious hypocrisy, enjoin their customers to give up these pursuits. The gulf between conservation education and what passes for education at the zoo is the difference between challenging a world view and indulging it.

The commercial heart of zoos is revealed in their fundraising and promotional events which, because they bring in money for "important" projects, are exempt from any pretense of education. Zoos regularly use their animals either as bait to lure customers in (shamelessly exploiting baby animals and turning adult animals into cartoon characters) or as props for gala community events: contests, dedications, races, holiday celebrations, Easter egg hunts, etc.⁸

Among zoo people, the standard justification of entertainment is that it brings people into the zoo where they can then be educated. But can it matter what is learned inside the zoo if, in order to entice people there, animals must be caricatured and people's hollywood stereotypes reinforced? This raises another hard question never posed by zoos: what if the desire to be entertained by captive animals is not, as everybody assumes, a morally neutral desire, to which something called "education" can be added; what if the desire to be entertained by animals is itself part of the problem of extinction, which education should be trying to overcome? If that is so, then, besides being trivial, what is learned at the zoo may actually be dangerous.

TEACHING DOMINANCE AND CALLING IT LOVE

Good cheer and wholesome learning seem to permeate the contemporary zoo. "Naturalistic" exhibits help promote natural behavior in zoo animals; and people, by seeing animals in more natural surroundings, respond to them with greater appreciation. Creative displays inform the public about animals and their plight and visitors are exhorted to become involved in "saving the earth." Is this not conservation education in action?

Alas, every surface has an underside. This is a problem of moral education everywhere: what is explicitly taught may be contradicted by what people actually experience. The context of our experience, what we see and hear around us and what we associate in our minds, either supports what we are asked to believe or contradicts it. Education at the zoo is a mirage. While claiming to teach respect and concern for wild animals, zoos exude the smug presumption of human mastery. Whatever facts about animals zoo visitors may learn, they absorb a world view along with it, one in which animals are merely resources for people.

Naturalistic exhibits may hide the barriers these days but nobody doubts their presence. That awareness defines the zoo: a place where animals are confined and people are free to come and go. A day at the zoo encodes a rite of dominance: we are the experiencing subjects, they the objects of our experience; we the ones being entertained, they the source of our entertainment; we are the rulers, they are the ruled.

The history of animals in captivity in the West is the history of animals demeaned for human entertainment. It begins with animals in pits and cages being taunted and jabbed or animals being forced into combat with each other. The first large-scale recreational use of animals was the Roman gladiatorial games which pitted men against animals and animals against each other. This form of entertainment persisted for over 1000 years.

Public humbling of animals, whether to test manliness or increase social status, continues to this day in bullfights, rodeos, rattlesnake round-ups, circus animal acts—and the keeping of pets. Overcoming big powerful animals, subjecting their wills to ours (by taming and training) provides an illusion of power in an unpredictable world. When we applaud the actions of trained elephants or big cats, it is not so much the animals and their abilities that impress us as the control of the trainer, with whom we are identifying. The rush of power we call "entertainment."

So-called "animal people," seeming to possess some mysterious rapport with and control over animals, have always been accorded special status. In the modern world this charismatic aura still adheres to animal handlers and trainers, even to zookeepers. It is part of the allure of such professions.

The practice of collecting and keeping exotic animals originated among the aristocracy of the late Middle Ages, people very aware of the tenuous nature of their power. Although they were not usually "animal people" in the sense above, the mere possession and display of dangerous beasts served to symbolize royal power in the eyes of their subjects and fellow aristocrats—in the same way perhaps as the capture and display of an especially strong and fearless enemy warrior.

In a democracy everyone, not merely aristocrats, can share in the feeling of mastery. Pumped up by sheer numbers, their comforts assured, visitors do not come to pay their respects to animals or to learn any truths about them; they visit zoos as a novelty, a diversion; they come to gawk at the biggest, the cutest, the ugliest and the most dangerous creatures that nature has to offer. Stripped of all frills, the essential pleasure of a zoo visit is the satisfaction of strolling from exhibit to exhibit like lords, surveying the wildness at the mercy of our whims. Inducing this smug intoxication is the unstated function of zoos.

This is not self-evident though. People are not prone to analyze what entertains them and collecting and displaying wild animals in order to demonstrate mastery is so old and so overlaid by habit and rationalization that we have lost consciousness of its original, and still underlying, cultural function. I am not suggesting that people come to

zoos consciously intending disrespect, but beneath the pleasure of being at a zoo lies the assurance, however unconscious, that we humans are in control.

Contemporary zoos are undeniably different from those of the past; but the differences are only on the surface. Zoos are still places of human self-congratulation, but today this purpose is concealed beneath a veneer of prettiness and gentility and a pretense of concern.

Zoos mirror the progress of our control over nature. Up until fairly recently, animals were perceived as adversaries, and zoos displayed them in cramped, featureless cells, surrounding them and smothering them with people. Inevitably under these circumstances, zoo animals became sullen, morose and easily enraged, which confirmed the dogma of the time that animals were crazed embodiments of a fallen world, that nature was a chaos of conflicting wills and unrestrained appetites. Thus we justified our "rational" intervention (i.e., our lust for plunder).

Today the war against nature seems all but won (at least for the moment) and zoos are mellower places. Driven from the world and deprived of power, no longer either competitors or threats, beaten and completely at our mercy, animals have suddenly become—of all things—precious. Whereas in the past people experienced animals as ravaging beasts, today, firmly in control, we are inclined to see only those aspects of animals that we like, their grace, agility, beauty, playfulness and their vulnerability. Today's distortion of animals is sentimental; animals are perceived as helpless.

"Stewardship" we like to call it. Not for a moment doubting the rightness of our domination of the planet, we nonetheless accept, as befits any benevolent dictator, a certain responsibility for those beneath our yoke. This concern may result in better treatment of animals in captivity, but our generosity does not extend so far as to include sharing the Earth's bounty with them.

It is frequently asserted (by zoo people at least) that because urbanites flock to zoos they must be harboring a deep and frustrated need for contact with nature. But it seems obvious that people prefer seeing animals in zoos or circuses, animal shows, TV, anywhere other than their natural habitats. It is not interest in the wild lives of animals that brings people to the zoo, but animals under our control, easily seen, without risk. As long as the behavior they witness is entertaining, it is irrelevant to them whether that behavior is a natural part of the animal's repertoire or a neurotic response to living in hell.

Because people walk freely among confined animals, a visit to the zoo does not function to connect people with nature, as the propaganda would have it, but to enhance the sense of separation from nature which is our cultural fantasy. This is the dark truth about zoos. So hopelessly alienated are we that we think a visit to the local zoo is "getting in touch with nature." Instead of acknowledging nature as a living throbbing force in our lives, we see nature as, at best, an aesthetic phenomenon, something Other to ogle.

ZOO AS PSYCHODRAMA

Today's mass extinction of animal life is no accident. Underlying the causes usually adduced to account for it—human population growth, economic expansion and technological imperialism—is a psychology of extinction. It is the wish to control that—the Earth—of which we are but a part. Rather than accommodate our desires to the world, to limit ourselves in the interest of the whole (the mature thing to do) we seek instead (like adolescents) to fit the world to our desires. And our desires are of the quantitative kind: we want more of everything. The

result is mass extinction, as we eliminate the competitors.

But the wellsprings of extinction run deeper still. The extinction of animals is an outward manifestation of our wish to extinguish "the animal" in ourselves.

From the Greek and Christian sources of our culture, nature has traditionally been perceived as an obstacle both to the spread of "civilization" (i.e., the overcoming of human suffering, poverty, disease, etc.) and to the attainment of moral or spiritual perfection. Just as we are unwilling to integrate ourselves into nature but seek instead to impose our will on it, we also attempt to beat into submission our own appetites, feelings and spiritual longings (nature inside us). Animals in our culture have always symbolized the stubborn resistance of our own bodies.

What bothers us about animals is that we are animals; the fact seems to deflate our pretensions to autonomy and free will. Animals remind us of our physicality, our bodily connection to the natural processes of decay and death which we seem powerless to stop. We are terrified of the Unspeakable. We fear that deep inside us a dark greedy animal is crouching, ready to burst into an orgy of unbridled sensuality if we dare relax our vigilance. When we call people "animals" we mean they have lapsed from rational control, become slaves of their desires.

The urge to dominate animals (or to "manage" them, as we say today) is thus tied to the repression of our own animal nature. Repression turned outward becomes Oppression. Projecting outward from ourselves, everything "animal" must be eliminated or rigidly controlled. Thus our war on organic life; thus our envy of machines. It's not only the habitats of animals that we covet, *we want their souls*; we want to inhibit them as we inhibit ourselves.

So we put them in prison, punishing them for their "lack of restraint." This allows us respectable citizens to survey not only representatives of the awesome power of nature that we have conquered, but incarnations of our own wildness behind bars.

Because we are ambivalent about being animals, the confrontation may be tense. Obsessed with rational control, we are forever anxious about slipping back into wildness. Watching animals at the zoo, we may question the extent of our own self-control: their honest, unrestrained behavior resonates within us, arousing long-stifled natural impulses, luring us with the promise of simple deep satisfactions. But the Great Temptation animals represent—spontaneous immersion in the flow of life—is unacceptable in a culture fearful of its own depths. We thus respond to zoo animals as we do to our own repressed impulses, ambivalently, with both fear and a secret desire for release.

Teasing, taunting and laughing at confined animals, throwing objects, or merely words, we act out and momentarily relieve inner discord. Dramatic interactions among animals externalize inner conflicts; because the experience is without consequences in the real world, we find it entertaining. Zoos are successful as commercial institutions because people will pay to see what excitement, by way of their own fears and fantasies, can be derived from captive wild animals. Much of the fun can be reduced to the simple pleasure of projecting on to others, and then belittling, what we fear in ourselves.

We "civilized" folk are drawn to zoos to gawk at animals pawing and sniffing, devouring, excreting, playing, fighting and mating (all of which may be exaggerated in captivity). People like to gather in large groups to glare at these behaviors, to shudder at them with exuberant disgust, to be alternately riveted and repelled, disgusted, amused, embarrassed and amazed by the unabashed display of those raw instincts whose presence in ourselves is still a constant source of anxiety.

One occasionally catches a zoo educator declaring that fact-teaching is not enough, that *attitudes* toward animals must be changed. I rush to listen, thinking that at last someone within the profession has recognized the depth of the problem; but it always turns out that by "attitudes" they mean superstitions or misconceptions about animals (that snakes are slimy, for instance, or that hawks are pests). They are still only skimming the surface of the problem of extinction.

To seriously pursue the question of "attitudes" toward animals would mean descending beneath the placid waters of cultural ideology, where people believe they are separate from and superior to nature, into the murkiness of the real world where everything is interconnected; it is to risk the revelation that we and nature (the so-called "environment") are not two separate entities and that the goal of conservation is not "liking" animals better (or endowing them with "rights") but accepting our own animal nature and taking our place within the natural community. The mass extinction of animals—and their public display in zoos—follows inevitably from our denial of kinship with them. Extinction is ultimately a problem of human consciousness: to save animals we need to save (i.e., acknowledge) ourselves.

THE TEMPTATIONS OF IRRELEVANCE

As long as we fail to recognize the deep cause of the extinction crisis—the belief that we are not part of nature—our idea of conservation education will be shallow and contradictory, our "solutions" part of the problem. Out of touch with the tangled emotions in us that are driving extinction, we mistake the grim purpose of zoos—the subservience of animals to our will, the denial of our animal nature—for harmless entertainment or, worse yet, for education.

Whatever its worth, captive propagation reinforces the idea that only more manipulation (i.e., more of the problem) will fix the problem of extinction. Instead of working on our inner lives to fit reality, to stop the problem at its source, we prefer to manipulate the world outside us, to juggle some "inputs" and "outputs," to do just enough to put off the confrontation with ourselves. Captive propagation seems to give us an "out"; it allows us to "save" a few animals in zoos while we continue to think and live in a way that prevents those animals from ever being reintroduced.

I have implied that the best zoos can do for animals is to induce people to like them—in zoos. True conservation education must surely aim at instilling in people the sort of love for animals that cannot abide animals in captivity, that can be fulfilled only when animals are living wild in healthy ecosystems. Naturalistic exhibits may actually thwart this admirable goal. If zoo visitors prefer the sanitized, emasculated version of nature they encounter in zoos to the wild and messy reality, then, as naturalistic exhibits are perfected over time, people will have even less incentive to protect the habitats upon which those exhibits are modeled.

Rather than serving the cause of wild nature, these slick and polished facades, on which millions of dollars are casually spent, are really monuments to ourselves. Our real joy in them is in the creation of miniature worlds that we can contemplate and manipulate with the detached pleasure of gods. One day, through genetic engineering, we might even create animals, designing them to "adapt" to our manufactured "habitats" and to satisfy increasing numbers of bored and jaded urbanites.

To the accusation that they are wasting money on frills, money that could be spent on habitat protection, zoo people reply that the money they receive is not money that would otherwise be available for that

purpose. I am inclined to agree. Such is the depth of our society's commitment to conservation—not to mention our love of nature—that we will gladly donate vast sums to keep animals in elaborate cages but not to let them live wild.

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THE HOWL

PETER J. BRALVER NOV. 10, 1992

Cars, Deer, And Ecocentrism

by Chris McGrory Klyza

This June, driving through the town of Ohio in the southern Adirondacks, I hit a deer. It took us quite by surprise since it was about 1 in the afternoon. We were coming up over the West Canada River, entering a curve, when it ran from the brush to the south (my left). My wife saw it first, and yelled "Deer!" I saw it out of the corner of my eye, on a collision course with our Volkswagen. The deer clearly saw us. I hoped that it would veer off, once it saw that it could not outrun us. We didn't have many options; to the right were trees; if I slowed, chances are it would have gotten in front of the car before we hit. It didn't veer. The deer and the car collided, just above the left front tire. I peered in my side mirror and saw the deer reeling backwards from the impact. We stopped, checked to make sure each other was alright, looked at the damage to the car, and started back down the road to check out the deer. Before we got far, a car that had been traveling beside us pulled over. The women driving advised us against going back to look at the deer. "It will really shake you up," she said. "Drive to the tavern down the road and they will call the game warden to take care of the deer."

So, we got back in the car and drove to the tavern. I told the bartender what had happened, and she called the local game warden. He wasn't in, so I called the state police.

Not much of a story so far. With the exception of the collision taking place on a hot afternoon, this scene probably repeats itself hundreds of times every day in the United States. The collision, however, served as a catalyst to some thinking. It being a Saturday afternoon in sparsely populated country, we knew that it would be a while before the trooper arrived. During this time I started to think about ecocentrism and how one comes to support that way of thinking.

In discussions of ecocentrism and deep ecology, it is often suggested that we rely more on our emotions, our instincts, than on rational thinking to come to the conclusion that ecocentrism, rather than anthropocentrism, should be the basis of our worldview. The Enlightenment and rationality have led us to much of our trouble, some deep ecology proponents say.

Upon some reflection after our collision, though, it appeared to me that the reverse was true. I was ecocentric based upon rationality (at least as I understand it). When I relied on my emotions, I lapsed back into anthropocentrism. Let me flesh this out a bit. After hitting the deer, I was a bit upset, but I was able to get in the car and drive to the tavern, and later, to drive on to Buffalo without major psychological trauma. What would it have been like, I asked myself, if I had hit a human? A young human, as this deer was young?

My reactions, on an emotional level, would have been completely different. I have never hit a human before, so I cannot make any direct comparison. Nevertheless, I am sure that I would have been very upset if I had hit and killed a small child. Maybe I would have gotten drunk, or broke down in tears, or returned for the funeral, I'm not really sure. But I am sure that I would have been much more upset. From an ecocentric perspective, I don't think I should have reacted much differently had the deer instead been a human. I should have been sad over the loss of life, but why would the loss of a human unrelated to me be more upsetting than the loss of a deer? In fact, given the rampant overpopulation of the planet by humans and the ecological destruction that has been brought by them, an ecocentric approach might even suggest

some solace that the population of enemy species number one had been lessened.

But then I started to think, what would an ecocentric response be to this collision? I wasn't sure, but at first I assumed that the responses to the death of a deer and the death of a human should be similar, if not identical. If, as Leopold suggests, we are plain citizens in the ecological community, shouldn't our grief over the death of a fellow citizen (whom we did not know) be roughly analogous whether it be a deer or a human? If so, does that mean an ecocentric response to the deer's death would have also come from some array of grieving rituals, such as getting drunk or crying? Or would some other, new ritual have been more appropriate? Perhaps some primitive emotional display, such as howling or running your hands through the deer's blood. Perhaps an ecocentric response would not have centered on grief, but rather on a more primal concern with food.

It also occurred to me that maybe we cannot become truly plain citizens in the ecological community, but that we will always be the first citizens among equals due to our capacity to wreak havoc and to reflect upon what we have done. If so, it might only be natural for us to have a stronger reaction to the death of a fellow first citizen than a plain citizen like a deer. Some are probably thinking that it's only natural to be saddened more by the death of an individual of our same species. Those of a more analytic bend might be thinking of the selfish gene theory from evolutionary biology: that the increased success of the human species increases the likelihood that my genetic imprint will be passed on and survive.

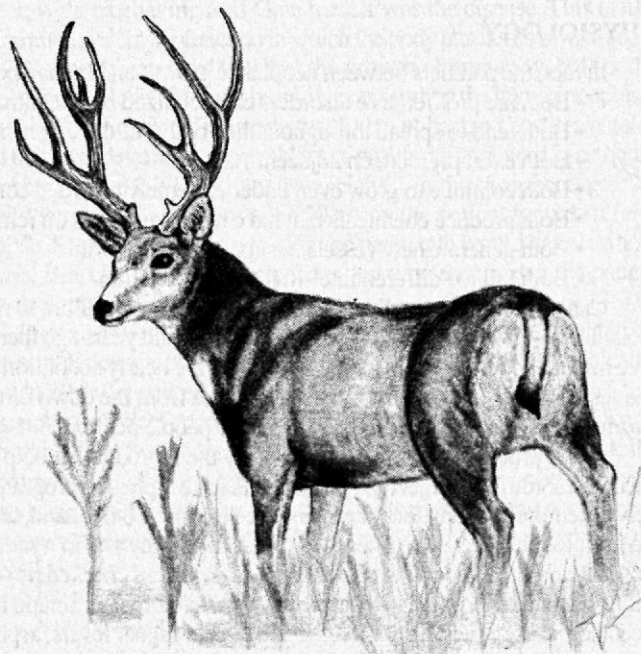
Anyway, we have drifted somewhat from the points that I am trying to make here. First, that we should not surrender rationality so easily. Second, that emotional responses are not the only way to ecocentrism. Different persons will arrive at ecocentrism in different ways. Many will come through a more emotional, gut-level response. Others, like myself, will come to ecocentrism through reason rather than emotion. Neither approach is superior to the other; they are simply different paths to the same destination: a healthier planet for all that exists on it. And third, ecocentrism is damn complex.

I was soon taken with another question that had no easy answer for me: what should we do with the deer? The deer was still alive after the collision, but in very bad shape. At least one leg was broken, blood oozed from its anus, its skull was exposed. There were three options: let the deer die on its own, enduring hours of suffering; have the deer shot, put out of its misery, but leave it in the woods; or have the deer shot, and give my tag to someone who would use the deer for venison. At the tavern, people wanted to know if the deer was still alive. When I said yes, they immediately said we must get someone to put it out of its misery. Within fifteen minutes, two different people who had heard the call to the trooper go out on the police scanner had approached me said if I wasn't going to use the deer they would like to have it for the venison. Again, my quick gut reaction was that this was the proper thing to do: the deer should be put out of its misery and it shouldn't go to waste. So, I signed my tag over to a family, and drove off.

As I drove, however, I began to question what I had done. My gut reaction was purely anthropocentric. Was it proper to put the deer out of its pain? This is a difficult question. Since humans caused this pain, humans should also put an end to it, one might reason. On the other hand, when a deer dies of starvation, or disease, or falls to a pack of wolves, it experiences pain. Pain is clearly a part of nature; should we attempt to minimize it in all cases? The other question, the one dealing with wasting the deer, is a little easier to see as a wholly anthropocentric one. It is premised on the idea that if the deer isn't somehow used by humans, it will go to waste. This is of course blatantly wrong. The death of the deer can be a boon to a number of other species. Would it have been wiser to leave the deer in the woods (to die on its own, or after being shot) to provide a feast for foxes, coyotes, birds, insects, etc.?

I'm not sure what the answers to these questions are. But I am sure that it is difficult to shake the pervasiveness of the anthropocentric worldview... Just one person's reflections on that pervasiveness, stimulated by a collision with a deer.

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White-tailed Deer (Odocoileus virginianus) by Celeste Poulin

Homo Carcinomicus

a look at planetary oncology¹

by Frank Forencich

When we think of cancer, we normally think of diseases of the human body: cancer of the lungs, breasts, liver and prostate. We think of viruses, DNA, asbestos, cigarettes and beta carotene. We think of surgery, radiation and chemotherapy.

There may be more to the picture, however; cancer may be far bigger than we think. A paradigm shift is under way: Instead of looking at neoplasia strictly as a disease of the human body, many of us are now beginning to see it as a dysfunction that can affect any living organism or ecosystem—even the Earth itself.

In 1979 James Lovelock introduced the Gaia hypothesis, which holds that the planet is a self-regulating or living organism.² But if the Earth is a living body, what physiological role do humans play? What kind of cells are we? Given the state of the planet and exponential human proliferation, the answer is unavoidable: cancer.

Numerous observers have remarked on the cancerous nature of human beings. In *Science* 13 May 1955, Alan Gregg suggested “that there are some interesting analogies between the growth of human population in the world and the increase of cells observable in neoplasms.”³ In 1990 Dr. Warren Hern diagnosed the problem in his landmark paper “Why are there so many of us?”⁴ Nevertheless, “humans as cancer” has not yet become a topic of widespread discussion. Despite the popular acceptance of the Gaia hypothesis and the rise of environmental consciousness, the “humans as cancer” metaphor has been largely avoided.

The world is an animal.

—Plato

PHYSIOLOGY

In fact, the parallels between neoplastic growth and human population are astonishing.

- Both are proliferative disorders characterized by uncontrolled growth.
- Both tend to spread throughout the “body” of the organism.
- Both exert pressure on adjacent “tissue.”
- Both continue to grow even under extremely crowded conditions.
- Both produce chemicals that have negative effects on remote regions of the organism.
- Both generate new vessels to support their growth.
- Both fail to “differentiate” in form and function.

Cancer is fundamentally a proliferative disorder, a failure to respond to normal growth controls. This is also humanity’s problem. Ten thousand years ago there were probably no more than five million people on the planet. Today there are nearly six billion. The increase in population in the last 40 years has equaled the total increase from the dawn of the human species until 1950. World population is now growing by 10,000 people per hour.⁵

The problem with cancer is not only the reproductive output of individual cells, but also their extraordinary longevity. Normal cells have a pre-set, programmed life span. They develop, serve their purpose and then die. Cancer cells, on the other hand, do not die on schedule and have no limit to the number of times they can divide. They are, in a sense, immortal. Because they do not die, cancer cell populations continue to rise unless checked by some other force. Similarly, the increase in human population has been paralleled by a dramatic lengthening of human life expectancy. We are seeking to increase this to ever higher levels, aspiring, it appears, to achieve the longevity of the neoplastic cell.

In a healthy body, normal cells adjust their growth in relation to neighboring cells. When

population density reaches a certain limit, a feedback mechanism known as "contact inhibition" causes cell division to cease. When you squeeze a normal cell, it stops reproducing. Cancer cells, on the other hand, continue to proliferate in spite of crowding and grow to much bigger densities. Human "cells" exhibit the same characteristic. Population density has had little effect on rates of reproduction; experts estimate that by the year 2000, there will be 20 cities with more than 10 million people each. Modern humanity, like cancer, seems to have lost its sense of contact inhibition.

Cancer is notorious for its tendency to spread beyond the point of origin into other regions of the body. The process begins when tumor cells break away from the original mass, travel through the bloodstream or lymphatic system, attach themselves to new sites and begin growing. In short, they "colonize" the new tissue. Human metastasis works in a similar fashion. Since *hominids* first took form in Central Africa some 2 or 4 million years ago, we have spread across every continent on the planet. We now inhabit the world's deserts, rainforests, grasslands and high mountains. We have invaded and affected virtually all planetary tissue and are even making plans to extend our growth into the solar system and local galaxy.

The similarity between humans and cancer extends even to the details of the metastatic process. In the body, cancer cells infiltrate surrounding tissue through a process called angiogenesis. A neoplastic tumor secretes enzymes that destroy nearby cellular membranes, allowing capillaries to penetrate and provide nourishment. At this point, the tumor becomes vascularized and begins to grow extremely rapidly. On the macro scale, human beings pursue a similar strategy. The capillaries are the highways, railroads and canals that bring food and raw materials to cities and neighborhoods. When human beings colonize a new region or district, one of the first priorities is to clear the land and build these vessels to facilitate commerce with the "body" of the outside world. Once the roads are built, the community is "vascularized" and begins to grow rapidly.

Cancer and human population are also related in their metabolism, the consumption of resources and production of waste. In the early 1930s Otto Warburg discovered that cancer cells use more glucose and secrete higher amounts of lactic acid than normal tissue. This is analogous to human populations that consume high levels of natural resources while generating enormous quantities of waste materials.

Another curious similarity lies in the process of differentiation. As normal tissue grows, it follows a developmental pathway, a genetically programmed sequence of changes in structure that lead to a specialized cell or tissue type such as bone, liver, connective or neural tissue. When cells mature they begin to perform the normal functions of that tissue. Significantly, they also stop reproducing. Cancer cells, however, are defective in differentiation. They get stuck on the developmental pathway and fail to develop the unique forms and functional characteristics of normal cells. In this sense, cancer is a problem of development.

We see a similar process at work on the macro scale. Like cells, human beings also differentiate. As individuals, we develop specialized social roles: one person becomes a farmer, another becomes a computer programmer, another a poet. We each follow a developmental and educational pathway that leads to unique professional form and function. Failure to achieve a functioning social role can be described as a failure to differentiate. When educational quality and economic

opportunity deteriorate, we too experience a problem of development.

Human beings also differentiate, culturally. A tribe or ethnic group develops its own unique rituals, practices and world view; it is a specialized form that makes a unique contribution to the human cultural landscape. A variety of differentiated cultural forms makes it possible for the social organism to adapt to changing conditions. Loss of cultural diversity, like loss of biodiversity, threatens survival of the larger organism.

PROGNOSIS

When we undertake a comprehensive examination of the biosphere, we find it impossible to escape the conclusion that the planetary patient is seriously ill, possibly dying. The symptoms are severe—ozone depletion, global warming, deforestation, loss of biodiversity, topsoil erosion—all the result of a rampaging and over-consumptive human population. Our major social "organs" are losing their effectiveness because of over-crowding; governmental, judicial, health care and transportation systems are all saturated and near gridlock. The patient is clearly in pain.

If an oncologist were to make a diagnosis of patient Earth, he would probably declare it a State IV condition: "The tumor is no longer encapsulated: metastasis is widespread throughout the body. Little chance for cure, although there are some notable exceptions."⁶ Since the growth is highly metastasized, it is probably malignant; we are experiencing an "oncologic emergency." We must act now.

TREATMENT

When treating a cancerous human body, the oncologist generally has three treatment options available—"cut it, burn it, or poison it" (surgery, radiation, or chemotherapy). Incredibly, this is exactly what we have been doing to the biosphere: cutting, burning and poisoning the major planetary "organs." Obviously, we are attacking the wrong target; we are behaving as if Gaia herself was the disease. This is like an immune system dysfunction in which the body attacks its own tissue.

Obviously, we need to target the growth of humanity, but for the planetary oncologist, cutting, burning, or poisoning the human neoplasm is not a viable option. Genocide would be, at best, a short-term solution that would not solve the problem of proliferation. Even if you could somehow make 2 billion humans vanish from the biosphere, growth would surge to fill the gap; after 50 years, the patient would suffer a relapse. Moreover, abruptly raising the death rate would have a whole host of side effects and repercussions that would endanger the patient just as surely as the current crisis.

Instead, we need a treatment that is systemic and rehabilitative. The population problem is more than just sheer numbers. Explosive growth rates depend on numerous social, cultural and biological factors: poverty, lack of access to health care, and denial of women's rights to name a few. Simply reducing birth rates will not be sufficient; the "treatment" must act on several levels. Just as a good oncologist will apply a variety of treatments in tandem, we too must apply several treatments simultaneously. In addition to the obvious need for vigorous birth control programs, we must:

- completely revise our economic and cultural philosophy away from growth and toward sustainability;
- reduce our consumption of resources;
- redistribute the wealth between North and South;

- enhance the rights of women
- devote more attention to the health and welfare of children
- promote "differentiation therapy," increased educational and economic opportunity for individuals and cultures;
- protect healthy "tissue," especially wilderness areas;
- slow the metastasis whenever possible with growth controls at all levels;
- moderate our death control efforts: make medical practice more life affirming and less death defying;
- start behaving more like physiological participants in the functioning of the organism and less like invading pathogens.

The treatment for this oncologic emergency must begin with education and awareness. Oncologists agree that the most valuable tool in the fight against cancer is public education; the more people know about risk factors and prevention, the easier the treatment. What is true for the micro level is also true for the macro level; of all the treatments that we might use against global cancer, by far the most promising is education and ecological consciousness. The cure for cancer is awareness of our relationship to our "host."

The fundamental difference between a cancer cell and human being is the capacity for "host awareness." The malignant cancer cell knows only its local cellular environment; the chemical and neural impulses that act on the cell membrane. A lung cancer cell, for example, cannot travel outside its host and discover the totality of its predicament; it can only "think locally."

A human being, on the other hand, has the ability to become aware of her global host. Through travel, study and communication, a person can discover the larger organism of which she is a part. She can see the effects of her behavior and the implications for her own survivability. Most important, she can change her behavior to be consistent with the health of the host.

Host awareness is vital to the treatment process. The more contracted, local or ego-logical our state of mind, the more neoplastic our behavior is likely to be. The more expanded, global and eco-logical our consciousness, the healthier our relationship with the planetary body. Death by cancer is not inevitable if we pay attention to the welfare of the host. Unlike a cancer cell, we can exercise personal and political choices. We can understand the ways of the host. We can act to save Gaia and thus ourselves.

The biggest obstacle to effective treatment is denial. No one wants to talk about planetary cancer; the subject is strictly taboo in almost every field of discourse. But treatment demands that we overcome the social and psychological obstacles to cancer and human population growth: fear, procrastination in seeking treatment, reluctance to self-treat, and denial that the condition actually exists. The planetary oncologist must act to bring the issue into the public forum. We must force the issue of human population into the spotlight and keep it there.

As with all cancer cases, time is precious. If we procrastinate in treating our condition, we will be forced to face two extremely unpleasant alternatives. On one hand, we have to suffer the extremely high level of "collateral damage" that comes with aggressive treatment. The longer we delay in controlling our growth and reducing our consumption, the more radical the treatment will have to be. Drastic measures such as government mandated family size limits, enforced birth control, and severe rationing will cause collateral damage in the form of repression, martial law, tyranny and widespread social conflict.

If, on the other hand, we fail to take action, the consequences will be grim indeed. The carrying capacity of the biosphere is finite; only so many humans can live on the planetary body. If we do not change our behavior, Gaia will treat the problem for us. Our death rates will go exponential through famine, disease and density-inspired violence. The human population will be reduced, one way or the other.

The extent and severity of global cancer calls for immediate and decisive treatment; palliative or "Band-Aid" treatments will not be effective. Unfortunately, most current environmental action is directed as symptoms, not at underlying causes. Action on air pollution, deforestation and recycling is necessary, to be sure, but primarily serves to relieve the patient's short-term suffering, not effect a cure. Without vigorous birth and growth control, our environmental efforts will amount to little more than "planetary hospice care"—aid and comfort to the dying.

Accepting the proposition of "humans as cancer" can be terrifying and depressing. No one wants to think of himself as a malignant cell. No one wants to think of his community as a tumor. The implications are intimidating; the specter of planetary cancer demands that we reevaluate our basic beliefs on such subjects as motherhood, family, growth, health, birth control, social responsibility and criminal behavior. This treatment process will be resisted by many people, cultures and organizations.

Nevertheless, the payoff of this inquiry could be tremendous. "Humans as cancer" describes us as a disease agent, but it also puts us into an intimate relationship with the natural world, our host. In this perspective, we are not apart; we are of the Earth. We may be defective in growth control, but we are nevertheless cells in a larger organism. Even as neoplastic tissue, humanity does belong to the Earth.

When we ask the question "are we cancer?" we place ourselves in a new universe of relationships and possibilities. Simply by accepting the possibility of "humans as cancer," we declare ourselves willing to review our most closely held assumptions about who we are, what our role is, and what constitutes intelligent and moral behavior. This acceptance may be exactly the prescription we need to effect a cure.

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NOTES

¹ An extended discussion of this subject will appear in an upcoming book by Frank Forencich.

² Lovelock, J.E. *Gaia: A New Look at Life on Earth* Oxford University Press 1979

³ Gregg, Alan "A Medical Aspect of the Population Problem Science" , May 13, 1955

⁴ Hem, Warren "Why Are There So Many of Us? Description and Diagnosis of a Planetary Ecopathological Process" *Population and Environment: A Journal of Interdisciplinary Studies* Vol. 12 Number 1 Fall 1990

⁵ *Vital Signs: The Trends that are Shaping Our Future* Lester Brown Worldwatch Institute

⁶ *Cancer: The Outlaw Cell* Richard E. LaFond, Editor American Chemical Society. Chapter 2 "Cell Growth and Cancer" Arthur B. Pardee and James G. Rheinwald

A Response to Nollman

by Bill McCormick

I was intrigued by Jim Nollman's article on overpopulation in *Wild Earth* Summer 1992. There were a number of points on which I agreed with him, and a number on which I disagreed. I agree with Jim that human overpopulation is an issue often circumnavigated by our most imaginative thinkers. I also wonder how we can present "limiting family size" as the "positive, life-affirming step" it is, rather than one steeped in doom. I also have to credit Nollman with attempting an objective overview of that unsteady quagmire he calls "natural law," the theories of Garrett Hardin, whether starvation or AIDS is good for the planet, etc.

As a former anarcho-communist from Kent State and current social worker, I have had certain experiences which cause me to react differently to certain issues than, say, an interspecies activist like Jim Nollman.

I accept it as a given that, for the time being, unfortunately most people still accept the illusion that we humans have some sort of 'noble' purpose to convert as much of the biosphere as possible into our exclusive habitat, and react very negatively when confronted with the reality that this process can not continue much longer. If 'imaginative' people do their best to duck the population issue, imagine how the unimaginative react.

Please bear with me as I attempt an illustration. In some communities in the West, the issue of logging old-growth forests has so polarized some towns, that when deep ecology activists show up to protest there may be large groups of locals just standing around looking for an excuse to start bashing heads. Self-preservation and simple common sense would seem to dictate that in such a situation, some sort of non-violent code should be the order of the day. No one wants to see needless bloodshed.

As I see it, a similar set of circumstances exists in the arena of population concerns. As we have seen in the last 5-10 years, in some instances, even the slightest off-the-cuff remark about population can set off a flood of hysterical name calling and other theatrics. We then have to spend so much time dealing with emotionalism and insults that we may never even get to the real issues.

Am I suggesting a certain amount of censorship in the population debate? Perhaps. I prefer to think of it as not waving red flags at people.

Nollman says: "some mainstream environmentalists refuse to acknowledge that the more violent solutions to overpopulation may ac-

tually be the most natural and ecological solutions. To connect mass starvation with planetary preservation does not fit the planet-saving image promoted through fundraising brochures."(1)

This is an unfortunate statement, I think, for a number of reasons. First, it is the sort of statement that will be gleefully culled by our opponents in the population debate, and then luridly put on display with other such carefully collected statements.

Second, this is a departure from the writings of Arne Naess and other deep ecology theorists, and in my view more of the Garrett Hardin than the deep ecology camp. For example, in a special deep ecology issue of *REVISION* (Winter 1991), Naess writes:

"The main driving force of the deep ecology movement... is that of identification with and thereby, solidarity with, all life. Humans are our nearest, in terms of identification with all life, and green parties should include political plans for participation in the fight against world hunger and for basic human dignity."(2)

An important tactic any good law student learns is that you must study and anticipate the principal points your opponent will make on any given issue, and make some of those points for them as part of your presentation, in order to take the wind out of their sails, so to speak. If this is done well, it can be humorous as well as effective. If it is not done well, you get people shouting about 'fascism' and so on. (If Richard Nixon were a zen monk, he might call it "on not giving the sword.")

In my judgement Arne Naess understands this principle very well, because not only does he emphasize that overpopulation exerts a tragic effect on non-human life, but that "very large populations create very large problems of freedom and organization, and centralization, gigantism and reduction of cultural diversity seem unavoidable features of life with a population of 5 billion."(3) In other words, overpopulation is bad for the planet; it is also bad for humans. No red flags, no grist for the rumor mills, further ideological bloodshed is averted.

Garrett Hardin's position differs from that of Arne Naess in that he often places the needs of the person and the planet in stark opposition, as in his famous (infamous?) piece in *Psychology Today* (4) which evoked reams of irate letters. Now this is all well and good if your goal is to be controversial or get people agitated. If this were the goal of the population debate, then Garrett Hardin should get a whole truck load of prizes. Consider this statement by Hardin, for instance:

"Well-fed soldiers acting egoistically (to preserve their institutional

right to be well fed) can protect posterity's interests against the egoistic demands of today's hungry people. It is not superior morality that is most likely to save posterity but an institutional design that makes use of special privilege...."(5)

I can think of situations where shocking people with the gravity of the situation, such as with aerial photos of clearcuts, has been very effective. However, I am not at all sure population is such a situation. Clearcutting is something we are doing to nature for selfish, short-term gain; this seems clear. Asking poor people to limit the number of their offspring, however, touches on a whole Pandora's box of cultural and ethical issues where shocking or outrageous statements are simply out of place. Anyone who doubts this has simply to cross the street and engage Joe and Jill Six Pack in a conversation about their "breeding problem."

In closing, let me say that the reason I was attracted to deep ecology back in 1985 was because it seemed to be the only major school out there willing to deal with the overpopulation issue in an imaginative way, or, in some cases, to deal with it at all. So while we may disagree about certain tactics or approaches, I applaud Wild Earthers and Earth Firsters for "putting this important idea on the table for everyone else to confront," as Jim Nollman says. I think the debate is improving, but it has been one hell of a slow, arduous process!

—Bill McCormick. POB 1729,
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NOTES

1. Jim Nollman, Responses and Non-responses to Overpopulation, WILDEARTH, Summer 1992, p. 77.

2. Arne Naess, Politics and the Ecological Crisis, REVISION, Winter 1991, p. 146.

3. Arne Naess, Sustainable Development and Deep Ecology, in J. Ronald Engel, Ed., ETHICS OF ENVIRONMENT AND DEVELOPMENT, Cambridge Press, 1990, p. 92. David Johns, The Practical Relevance of Deep Ecology, WILD EARTH, Summer 1992, also strikes good balance.

4. Garrett Hardin, "The Case Against Helping the Poor"; PSYCHOLOGY TODAY, Sept. 1974.

5. Garrett Hardin, THE LIMITS OF ALTRUISM, Indiana U. Press, Bloomington, IN, 1977, p. 80.

Efficiency of Natural Law in Limiting Human Population Growth

by Les U. Knight

In the discussion about whether or not we should allow "Natural Law" to control human population growth (Nollman 1992, and others), an important consideration is being ignored: Do major die-offs of *Homo sapiens* in fact keep our numbers from increasing?

Malthus and common sense tell us that war, epidemics, famine, and natural disasters will keep the human family from getting too big... but do they really? Empirical evidence doesn't support conventional wisdom.

The Population Reference Bureau's often-reproduced graph of human-population-size-through-time shows only one dip in our inexorable increase: The Plague. Immediately after this minor blip, our numbers began to shoot for the Moon.

The Industrial Revolution was no doubt a factor in allowing us to burgeon to the bursting point, but the Black Death may be the reason we *want* to breed like bunnies. Burned into our collective memory was the horror of massive deaths of our kind. Our reaction as a species, naturally, has been fertility with a vengeance. This programming could be blinding us to the obvious fact that we are enough already.

PEOPLE AS STATISTICS

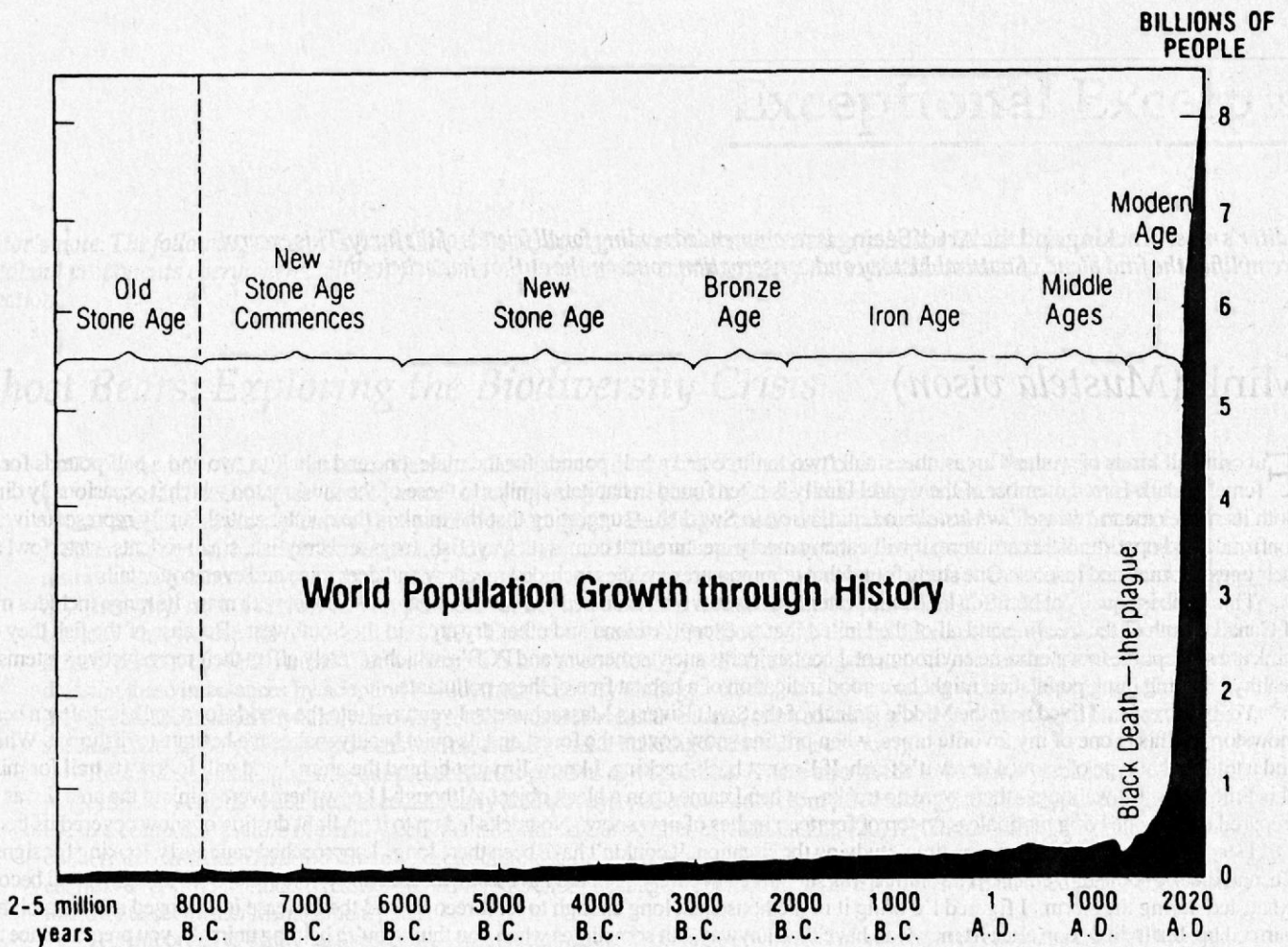
As we study the world's population problem and seek solutions, it's tempting to become detached and look at people as mere numbers in demographic equations, especially when they're halfway around the world. We should bear in mind that each one of those numbers is a member of our family, entitled to the same inalienable human rights that we value for ourselves and our loved ones.

But, for the sake of discussion, let's go ahead and ignore for a moment that inhuman conditions in Third World countries are due in part to the Industrial World's exploitation of their resources and labor. Forget the continued destabilization of their economies and governments. Down the memory hole with decades of well-meaning missionaries' death-control-without-birth-control. Disregard the incumbent interest on debts to rich countries which require cash crops and liquidation of forests. Oh, and nevermind about the moral obligation to help our brothers and sisters in need. Let's just be coldly pragmatic and accept the fact that death has not held our numbers in check... yet.

DEATH ALONE WON'T LOWER POPULATION

Today, our population growth is so rampant that a million lives lost for any cause are replaced in about four days. Withholding aid to starving children, flood victims, or war refugees will do nothing to improve the density of our population as long as we continue to replicate like cancer cells (Hern 1990).

Each day, 386,964 new people are created, and 137,540 of us die (Population Reference Bureau 1992). In order for death alone to reduce our numbers, three times as many people would have to be dying as are now.



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HIGH MORTALITY CAUSES HIGH FERTILITY

As paradoxical as it may seem, a *lower* death rate will bring our numbers more in line with the carrying capacity of Earth's biosphere. For example, where child mortality rates are high, couples commonly over-compensate by producing six or seven offspring in hopes that two or three will survive. A lower death rate will bring about a lower birth rate, and a lower birth rate will cause death rates to fall. Nearly one-third of today's mortalities are children who might not have been born if their mothers and fathers had a choice.

REPRODUCTIVE FREEDOM

It has been estimated that at least half of the world's births are unwanted (Knight 1992). If reproductive freedom were universal, this deplorable situation would be inconceivable. A large percentage of the remaining half of today's births are wanted mainly for economic or superstitious reasons, such as free labor or carrying on the family name. Reproductive freedom, economic opportunity, and education are far more effective methods of improving the ratio of people-to-wildlife than promoting death could ever be.

AFTERWARD

When there are fewer people on Earth, conditions for all of Nature's living beings will begin to improve. We can best achieve this by reducing death rates, while at the same time supporting reproductive rights. When everyone has freedom of choice in procreation, and the heightened awareness to not do so, the size of our human family will slowly improve thanks to deaths from a truly natural cause: old age. May we live long and die out.

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 Nollman, Jim, 1992, "Responses and Non-responses to Overpopulation" *Wild Earth* 2 (2) pages 76-79.
 Population Reference Bureau, Inc., mid-1992 computation.

Editor's note: *Tracking and the Art of Seeing* is recommended reading for all friends of the furry. This excerpt exemplifies the fine blend of natural history and conservation concern the author has achieved.

Mink (*Mustela vison*)

Favoring all kinds of wetland areas, this small (two to three and a half pounds for the male, one and a half to two and a half pounds for the female), dark-furred member of the weasel family is often found in habitats similar to those of the muskrat, on which it occasionally dines. Both its names mean "weasel"—*Mustela* in Latin, *vison* in Swedish—suggesting that the mink is the quintessential family representative. A confirmed and opportunistic carnivore, it will eat any meaty creature that comes its way: fish, frogs and crayfish, small rodents, waterfowl and their eggs, worms, and insects. One study found that common prey species included meadow and deer mice and even cottontails.

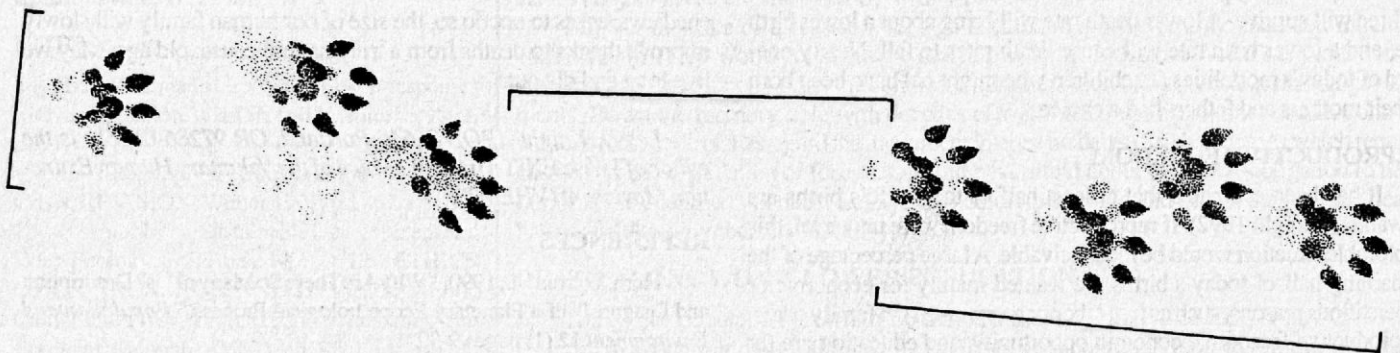
This mink is equally at home on land or in water and has survived even in areas where it shares its habitat with man. Its range includes most of Canada south of the tree line and all of the United States, except Arizona and other dry areas in the Southwest. Because of the fish they eat, mink are susceptible to waterborne environmental contaminants such as mercury and PCB's, which severely affect their reproductive systems. A healthy breeding mink population might be a good indication of a habitat free of these pollutants.

Years ago, when I lived near the Middle Branch of the Swift River in Massachusetts, I ventured into the woods for a walk just after a heavy snowstorm. This is one of my favorite times, when pristine snow covers the forest and its quiet beauty makes me hesitate to disturb it. When I find a trail in that type of snow, I know it's fresh. If I'm not back-tracking, I know I'm just behind the animal and will follow its trail for miles. This time I was just walking—there were no tracks—when I came upon a black object. Although I knew there were mink in the area, I was not prepared to find one lying motionless on top of fourteen inches of new snow. No tracks led up to it. A light dusting of snow covered its body.

I stood without moving for some time, studying the situation. It couldn't have been there long. I approached cautiously, looking for signs of life, and did see some movement. The animal was still alive but barely. I should have known better and left it there, but I thought it had become exhausted during the storm. I figured I'd bring it in the house just long enough to let it recover and then release it. It moved around a bit as it warmed up, but it died soon after. It may well have died anyway, but sometimes when you think you're helping animals, you aren't. Since that incident, I've learned that wild mink cannot live in captivity, so it's not a good idea to bring one indoors, regardless of its condition.

Like all weasels, the mink has an anal musk gland that discharges a liquid as malodorous as that of a skunk, especially during the mating season. It cannot spray like a skunk, however, and its scent does not carry as far. Its greenish yellow urine also has a distinct, musky odor. The word *mink* comes from the Swedish *menk*, which means "the stinking animal from Finland."

The mink sometimes has a very casual, almost reckless nature. I've often stood on the banks of a stream or beside a swamp, being careful not to move, and had mink run right up to me or pass within five feet of me and seemingly not notice that I was there. Mink are very powerful for their size, but they may occasionally be preyed upon by gray and red foxes, coyotes, wolves, fishers, bobcats, lynx, and great horned owls.



mink in mud, 3-4 pattern by Heather K. Lenz

From *Tracking and the Art of Seeing*, 1992 by Paul Rezendes, with illustrations by Heather K. Lenz. Reprinted by permission of Camden House Publishing, Charlotte, Vermont. Available in better bookstores, or by calling 1-800-344-3350.

Exceptional Excerpts

Editor's note: The following excerpt is from Ghost Bears by naturalist and wilderness trip leader Ed Grumbine. Wildland proponents everywhere will benefit from this far-reaching explanation of the extinction crisis and call to action.

Ghost Bears: Exploring the Biodiversity Crisis

Conservation biology has made clear that there is not enough protected habitat for at least most of the largest animals in the world. The ecological consequences of losing many of the planet's whales, bears, big cats, and other top-level carnivores are not completely known, but predictions are grim. Building a biodiversity-protection network will not resolve this problem. Too much habitat has been destroyed or fragmented. The only prudent scientific response to the biodiversity crisis is to restore some balance between what humans have appropriated from nature and what nature needs to maintain functional integrity. Integrity, from a narrow human perspective, might be defined as the continued provision of the "ecological goods and services" that we depend on for survival. (19) Loss of a functional Pacific Northwest ancient forest ecosystem or protecting a mere 5 percent of North America as wilderness is not scientifically justifiable. Long-term ecosystem management means addressing these imbalances by adopting a wilderness recovery strategy: closing and revegetating roads, allowing wildfires free play to set successional rhythms, removing settlements from sensitive areas, reintroducing grizzlies, wolves, and other extirpated species, creating polyculture agro-ecosystems, and in general building a restoration economy.

Restoration entails puzzling out presettlement patterns of vegetation. There also needs to be some yardstick by which to judge recovery efforts. Historical accounts, early land surveys, pollen evidence from paleoecology, and soil types can all contribute to a composite picture of healthy ecosystems prior to Euro-American settlement. (20) From such data, and taking into account native American land use where possible, biologists and managers could construct a computer model to track how vegetation changes over time without excessive human interference. Managers could use this as a rough empirical standard of ecosystem integrity to set further management goals.

It is important to distinguish restoration from reclamation, as biologists William Jordan, Robert Peters, and Edith Allen make clear: "By restoration we mean the recreation of entire communities of organisms, closely modeled on those occurring naturally, and we . . . use the term reclamation . . . to refer to any deliberate attempt to return a damaged ecosystem to . . . productive use or socially acceptable condition short of restoration." (21)

Economic goals can be woven into ecosystem restoration. In 1978, when Congress expanded Redwood National Park in California, most of the new parkland had been heavily logged. Between 1979 and 1987 the Park Service spent over \$30 million on payroll, leases, and contracts to rehabilitate these damaged lands. (22) On a regional scale, if the Forest Service could secure funding for erosion control, retiring roads, and prescribed burning to reduce fuel loads and mimic natural fire patterns, an entirely new restoration economy of hundreds of millions of dollars would be created.

The scientific tasks called for by the biodiversity crisis may in time bring us to large-scale ecological restoration, returning wolves and grizzlies to California and Colorado and linking greater ecosystems across the country. If so, we will have become a different people. By 2090, humans will have burned almost all of the planet's currently known reserves of fossil fuels. (23) Douglas-firs 100 years old in the 1990s will have become part of an established pattern of ancient forest. With the wounds caused by resourceism healing, ecosystem management will have evolved into something new. This vision of a sustainable future inspires hope. It renews commitment to what most certainly will be decades of difficult work. In time, we may finally begin to experience what it means to be a part of, rather than the ruler of, nature. We, too, could become "native."

19. P. and A. Ehrlich, *Extinction* (New York, 1981), 86-100.

20. R. Noss, "On Characterizing Presettlement Vegetation: How and Why," *Natural Areas Journal* 5: 1 (1985), 5-13.

21. W. Jordan et al., "Ecological Restoration as a Strategy for Conserving Biological Diversity," *Environmental Management* 12: 1 (1988), 55.

22. See in general U.S. Park Service, *Tenth Annual Report to Congress on the Status of Implementation of the Redwood National Park Expansion Act of 1978* (Crescent City, California, 1987).

23. G. Miller, *Living in the Environment* (Belmont, California, 1990), 378.

Book Reviews

BEYOND THE BEAUTY STRIP: SAVING WHAT'S LEFT OF OUR FORESTS

by Mitch Lansky, Tilbury House, Publishers,
Gardiner, Maine, 1992. Paper, 450 pp., \$19.95.

Industrial forest myths are intended to establish that, by some extraordinarily happy coincidence, whatever industry does in pursuit of growth and profit just happens to be good for the forest and society. (p.10)

Beyond the Beauty Strip is the most important book ever written on industrial forestry. It will swiftly become the Bible of Forest Defenders throughout the world.

Beyond the Beauty Strip (BTBS) is much more than a case study of industrial forestry in Maine—it is one of the most penetrating critiques of industrial civilization ever penned. If you believe, as I wholeheartedly do, that industrial civilization is incompatible with biological diversity, you must read, re-read and read again this work. Mitch Lansky dissects the industrial paradigm so that the reader clearly understands why the Global Industrial Growth System (GIGS) can only exploit, degrade and exhaust natural and human communities.

As a case study of Maine industrial forestry, *BTBS* is obviously a valuable tool for forest activists in the Northern Appalachians. But I believe that activists outside the study region may find the book even more valuable precisely because it is a study of another region. Quite simply, when we see how industry operates in another region, we are not distracted by facts and figures; we see the industrial paradigm—the essence of the problem—laid bare.

Mitch has painstakingly documented factual assertions and has provided a wealth of charts, graphs and photos. The photographs of the industrial clearcuts that have devoured entire townships in northern Maine offer unarguable proof of what is going on beyond the beauty strip. The "Beauty Strip" is what Maine loggers call the buffers of trees around roads and bodies of water, creating the illusion that there still is a forest out there.

In 1976, while working in his organic

garden in northern Maine's Aroostock County, Mitch, his gardens, spring, woodlot and house were sprayed with chemical insecticides by three former World War II bombers as part of the federal and state-sponsored effort to kill the spruce budworm. Mitch has been the most informed and eloquent defender of the Maine woods ever since. He soon discovered that clearcuts, roads, and chemical sprays were degrading over 10 million acres of northern Maine.

Lest anyone think that Mitch is working out a vendetta against the region's "benefactors", please note that his small community—which relies almost entirely on logging for employment—recently elected him selectman. Mitch is no "outside expert"; he is a respected member of a community that has been ruthlessly exploited by absentee corporate owners.

In the "Pro-log," the selectman objects:

"The beauty strip works somewhat like Lewis Carroll's looking glass. To step beyond the beauty strip is to step into a world of distorted priorities, distorted metaphors and distorted logic...

"The combination of industrial priorities and metaphors leads to a bizarre form of logic which asserts, for example, that:

- the way to improve forest health is to remove the forest;
- the way to increase wildlife diversity is to fragment and simplify wildlife habitat;
- the way to regulate forest practices is to legitimize what industry is already doing;
- the way to protect forest jobs is to invest in machines and chemicals that replace forest workers;
- the way to prevent timber shortfalls is to accelerate and intensify timber harvest." (p. 9)

In Chapter 3, "Industrial Forest Fixes," Lansky shows how industry "repairs" the damage previous mismanagement has inflicted on the forest ecosystem. Such "fixes" as whole-tree harvesting, herbicides, and the spruce budworm spraying of the 1970s and early 1980s have invariably hurt the forest and the forest-dependent communities of Maine. The section on the spruce budworm spraying touches on every aspect of the current crisis in our industrial forests: in particular, the corruption of science by industry, and the complicity of both

government and mainstream environmental groups that accept money from industry or permit industry leaders to control policy decisions, such as the acceptable size of a clearcut (200-350 acres).

Chapter 4, "Industrial Wildlife," has a section on "Wilderness." "The best way to protect native wildlife species," Mitch writes, "is to protect the environment to which they have adapted over thousands or even millions of years. And the best way to protect that environment is to leave it alone—to let it be wilderness." He notes that only 1.5% of Maine's land is considered wilderness.

Chapter 5, "Industrial Government," addresses the question: "Why is this happening?" The sobering answer is: This is no accident brought about by well-meaning but incompetent foresters and loggers. No. This is intentional; this is the way industrial society works. Mitch documents how industry has controlled the government of Maine for over a century. Policy, research, education, taxation, regulations, and the management of public lands (State Forests) are designed to benefit industry, not the natural and human communities they allegedly serve. Regulatory boards have sweetheart relationships with industry; often a majority on these boards have direct or indirect ties to industry. Mitch lists numerous former representatives of environmental groups, such as Maine Audubon Society, who later went to work for industry.

The problem with many exposés of society is that they offer few realistic positive alternatives to business as usual. *BTBS*, however, points us in the right direction and provides a directory of community-based alternative initiatives.

Chapter 6, "Changing Directions," begins by summarizing seven "metamyths" of industrial society. I'll only quote #7: "There are no limits to industrial growth." Mitch's critique of this delusion concludes: "Sustainable growth is an oxymoron."

Next, he offers what he calls "metashifts" which are "changes in the dominant societal models":

#1) "We must begin to treat ecosystems not as the content of the economic system but as the context for society."

#2) "We must recognize that the biological systems upon which we depend have limits and we must live within those limits (the carrying capacity)."

#3) "The scale and organization of society's technology, economy, and government must be changed to be more responsive to corrective environmental and social feedback."

Now, I don't presume that these ideas surprise any reader of *Wild Earth*, but I submit that Lansky's is the clearest statement of the problem and alternatives available to Earth defenders. The message of his masterpiece is simple: Society only works, really works, on a grassroots-up, watershed-based model. The top-down, absentee, centralized model is unsustainable. We need metashifts, not reforms.

If you are serious about defending the forests of the world, you'll never be caught without your tattered copy of *Beyond the Beauty Strip*.

—Reviewed by Jamie Sayen, founder of Preserve Appalachian Wilderness, and editor of the Northern Forest Forum.

**SACRED LAND SACRED SEX:
RAPTURE OF THE DEEP—
CONCERNING DEEP ECOLOGY
AND CELEBRATING LIFE**

by Dolores LaChapelle; Kivaki Press, 1992 (originally published by Finn Hill Arts, 1988); softcover, \$24.95; 384 pp. Available through Way of the Mountain Center Orders, 585 East 31st St., Durango, CO 81301 for \$26.95, including shipping.

Too often we unearth books that we would like to have for our own, only to discover that they've gone out of print. Fortunately, in this case, through a generous grant from the Ira Hiti Foundation for Deep Ecology, *Sacred Land Sacred Sex* is now available in a second printing. The book is rich beyond description, crammed with deep ecological insights gained through experiential living in place (the San Juan land community of southwestern Colorado) and a scholarship unfettered by convention. LaChapelle grasps and makes accessible a sense of what the vast majority of

modern human beings have lost: that is, the experience of living in place, of living life down to its roots before the advent of Euroculture and the industrial growth society.

Readers familiar with LaChapelle's earlier work, particularly *Earth Festivals* (1973) and *Earth Wisdom* (1978), will find much that is familiar, such as illuminating discussion of the importance of recovering and incorporating ritual into our lives, the Greek language problem and how to escape it, and insights derived from Chinese philosophy that take us beyond our own predominating and alienating Western worldview. On these subjects LaChapelle incorporates fresh materials, so that even the reader familiar with her previous work finds new developments. Indeed, the main thrust of the book is to take us into unexplored territory, led by an unparalleled guide.

Those who have had the pleasure of walking in the San Juans with Dolores know what I mean. She is always there, always offering suggestions, yet never an obtrusive presence; always cutting to the quick of things, yet never pontificating. So with this book, which takes us on an almost ten year journey (from *Earth Wisdom* and her 1980 paper, "Systemic Thinking and Deep Ecology," in Schultz and Hughes, eds., *Ecological Consciousness*) through a varied conceptual terrain that coheres around a deep ecological center. No review can do justice to the content; as Gary Snyder remarks, *Sacred Land Sacred Sex* is "like a wild ecosystem, full of surprises and challenges." For example, LaChapelle offers a detailed discussion of how romantic love has replaced sacred sex in our own *biosphere culture*. Human sexuality was once, she argues, "natural, inevitable and sacred because it (was) part of the whole inter-relationship of humans and nature in place." (260) What an irony that sexual neurosis is today a primary contributor to human malaise! LaChapelle suggests that we can, however, rediscover sex as "relationship" (between humans and the more than human) and not just as an act between human beings.

If our dangerously out of control industrial growth society somehow finds its way to an age of deep ecology, to people living bioregionally, then *Sacred Land Sacred Sex* will be celebrated as one of the texts that helped us recover the old ways and invent the new.

—Reviewed by Max Oelschlaeger, author of *The Idea of Wilderness*, and editor of *The Wilderness Condition*.

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LAST ANIMALS AT THE ZOO: HOW MASS EXTINCTION CAN BE STOPPED

by Colin Tudge; 1992; \$22, 250p.; Island Press, 1718 Connecticut Ave NW #300, DC 20009

For the ecological purist, *Last Animals at the Zoo* is an upsetting book. Colin Tudge speedily disabuses his readers of the notion that we could save all remaining species by saving all remaining natural habitat. First, this is politically impossible, Tudge says; and second, some species are already doomed unless active propagation efforts are taken on their behalf. He summarizes his basic contentions early and clearly:

From all this discussion, four points emerge. First, although habitat protection is difficult—far more difficult and precarious than most people realise—we cannot give up on it. It must remain the priority. Every opportunity to protect wild places must be taken. Even with the best will in the world, however, we cannot save all animals by habitat protection. Some habitats cannot be protected at all; and those that can be are liable to be compromised in ways that we can in practice do nothing about, for we can do nothing about other people's wars, or the realities of population dynamics. Captive breeding can save some of the animals that cannot be saved in the wild.

Thirdly, [sic] an increasing number of wild populations that are apparently thriving in reserves will be "on the edge"; their numbers just above what is needed to be viable, but liable to dip dangerously low if they are hit by forest fire, or epidemic, or (like the last remaining population of native Puerto Rican parrots) by a hurricane. Captive populations can keep animals in reserve to boost the indigenous populations when they flag ...

Finally, note that whereas millions of Amazonian beetle are becoming extinct because their habitat is being destroyed, most of them could be saved if their habitat was reasonably protected. For a growing catalogue of large animals, such as the Sumatran tiger and possibly for the Sumatran rhinoceros, this is simply not true. To be sure, if we banished the human population of Sumatra, or at least curbed the growth of population and replanted the trees post-haste, then they could be saved in situ. But these things are not going to happen; and indeed, people are now being "trans-

migrated" into Sumatra. In other words, for more and more big animals, habitat protection would not be enough even if it was carried out as well as is feasible.... (p.45-46)

Occasionally, Tudge's reasoning seems suspect, but in the main, he argues persuasively enough and rests his case on enough solid bases—including conservation genetics, island biogeography, the overkill hypothesis, and animal ethology—that even veritable Neanderthals will find themselves wanting for reasons to reject the call for captive breeding. They may, however, question the author's optimism. For Tudge claims, even after acknowledging and explaining the difficulties and the unproven record of reintroduction programs, that captive breeding could save virtually all of the world's most endangered land mammals and birds.

Drawing from the ideas of conservation biologists Michael Soulé and Jared Diamond, as well as various zoo curators, Tudge concludes that, theoretically at least, all 2000 or so terrestrial vertebrates now thought to be in need of captive breeding could be preserved in zoos until such time, perhaps 1000 years from now, as they can be reintroduced to the wild. (49-50) Tudge freely admits that zoos will be unable to rescue a significant proportion of the world's imperiled fish, cetaceans, and arthropods, not to mention the 4 kingdoms scarcely represented in zoos—plants, fungi, bacteria, and protists.

Tudge and other captive breeding proponents base their case in part on an unproven assumption: Captive breeding programs will not displace habitat protection efforts; monies devoted to captive breeding will not subtract from habitat protection funds. This assumption needs to be tested soon somehow.

Tudge reasons that zoos are where captive breeding programs should be centered. It is possible, though, to support captive breeding but oppose zoos. In Tudge's vision, zoos become focused primarily on conservation breeding, which would seem to make them much less objectionable. However, another part of Tudge's vision involves the habituation of wild or soon-to-be wild animals. This would be a potentially pernicious process. Developers might start arguing that to save Grizzly Bears, for instance, we don't need bigger wild areas; we just need to make kinder gentler more human-tolerant bears (like Brown Bears in Europe).

To his eternal credit, Tudge makes special mention of mites. Noting that biologists

do not even know within an order of magnitude how many species exist, and that the number is likely over 30 million, he cites mites as a group of organisms that might be incredibly diverse but has barely been studied. (32)

Tudge explains well the complexities of conservation breeding. Difficulties include determining what is a true species, what to do with the many hybrids now held by zoos, how to maintain genetic diversity in small captive populations, and how to set priorities given the limited zoo space available and the great number of species and subspecies nearing extinction.

One complaint needs to be aired, concerning typographical errors; and it is aimed not at the author, and not even at his particular publisher (Island Press produces many excellent environmental books) so much as at publishers in general. Misspelling typos, as occur occasionally in this book, may be inevitable; but surely publishers can afford to hire enough proofreaders to catch the typos that change the meaning of a statement, such as apparently happens on page 152, where a sentence that should say "captive population" instead says "wild population" twice.

In conclusion, this book should be read, discussed, and debated by conservationists everywhere. If Colin Tudge is right, whether and how captive breeding programs are initiated throughout the world could decide the fate of Earth's remaining terrestrial megafauna. Wildlife advocates must not let decisions on such issues be decided by default—or extinction.

—Reviewed by John Davis.

ECOLOGICAL LITERACY: EDUCATION AND THE TRANSITION TO A POSTMODERN WORLD

by David W. Orr, 1992, State University of New York Press, 211pp.

"As the sun sets tonight over the offices of the Social Science Research Council, *Homo sapiens*, the council's primary object of study, will have: (1) deforested another one hundred and fifteen square miles, mostly in the tropics; (2) added some fifteen million tons of carbon to the atmosphere; (3) driven between forty and one hundred other species into extinction; and (4) eroded seventy-one million tons of topsoil. Because of this hyperactive biped with the big brain, the planet will be a little warmer, the rain a little more acidic, the ozone layer a little thinner and the fabric of

life a little more threadbare." This is the daily scenario on planet Earth, as described by David Orr, the author of *Ecological Literacy: Education and the Transition to a Postmodern World*. The previous quote begins Chapter XIII, titled "What Good is a Rigorous Research Agenda if You Don't Have a Decent Planet to Put it On?" Indeed!

David W. Orr is the head of the Environmental Studies Department at Oberlin College in Ohio (not to be confused with the David G. Orr of ASCMEE). He writes a column in *Conservation Biology*. He is co-founder of the Meadowcreek Project, an example of humanity living and working in accordance with Aldo Leopold's ethics of sustainability.

Ecological Literacy deserves superlatives. David Orr weaves together facts and foresight, humor and honesty. His vision is sharpened by a deep awareness that honesty is ecological integrity and that the biped with the big brain has the same potential to serve biological systems as it does to dismantle them.

David Orr is an educator. Every page bears the marks of a passionate and gifted teacher. He speaks to us as equals, as student of the earth, as teachers by example. The future of the world lies in the minds and hands of us biophiliacs and of those who will follow. "The problem for the modern hero is that of rendering the modern world spiritually significant... making it possible for men and women to come to full human maturity. In other words, modern heroes must help people grow up. Leaders in the United States in the decade just past pandered to and promoted fantasy, whim, caprice, indulgence and the evasion of reality—the very antithesis of heroism."

"Those whose decisions are wreaking havoc on the planet are not infrequently armed with B.A.'s, B.S.'s, LL.B.'s, M.B.A.'s and Ph.D.'s." Clearly the earth is not being served by current institutional education.

Ecological literacy forms the backbone of all practical learning because it focuses on the connections among all disciplines. It gives the student a sense of place, an awareness of biological systems and the practical realities of thermodynamics. David Orr's design for ecological responsibility in learning and in institutions for learning is clear and insightful. He sees education's role as fostering thinking that moves at right angles to traditional ideologies. The test of ecological literacy is in the way we live our lives. "If literacy is driven by the search for knowledge, ecological literacy is

driven by the sense of wonder, the sheer delight in being alive in a beautiful, mysterious, bountiful world."

Ecological Literacy is a work of intellectual brilliance and inspirational passion. And it is clear in its priorities. "Instead of organizing a research posse at this late hour, perhaps a stroll in the woods might do as well."

—Reviewed by Ernie Reed, *Virginians for Wilderness, Rt. 1, Box 250, Staunton, VA 24401.*

EARTH IN THE BALANCE, ECOLOGY AND THE HUMAN SPIRIT

by Senator Al Gore, 1992, Houghton Mifflin, 408 pp.

Senator Gore's book has the potential to be the vehicle that interjects principles of ecology into the realm of politics. The book clearly presents the history that has brought us here. The greatest ecological crises of our day are all laid bare: global warming, ozone depletion, desertification, species extinction, overpopulation and the breakdown of biological systems. The senator shows how our civilization has become dysfunctional and valueless, and that what we stand to lose by continuing on this path is virtually everything.

Gore's great talent is in making ecological reality accessible for the literate masses. He weaves personal experiences throughout in ways that allow readers to see the ecological crisis through their own eyes. In personifying the problems, Gore reaches readers previously unaware, uncaring or simply in denial of our ecological crisis.

The senator concludes his book by outlining his political plan for delivering us from the ecological dark ages. His recommendations on environmental economics are major steps in the right direction.

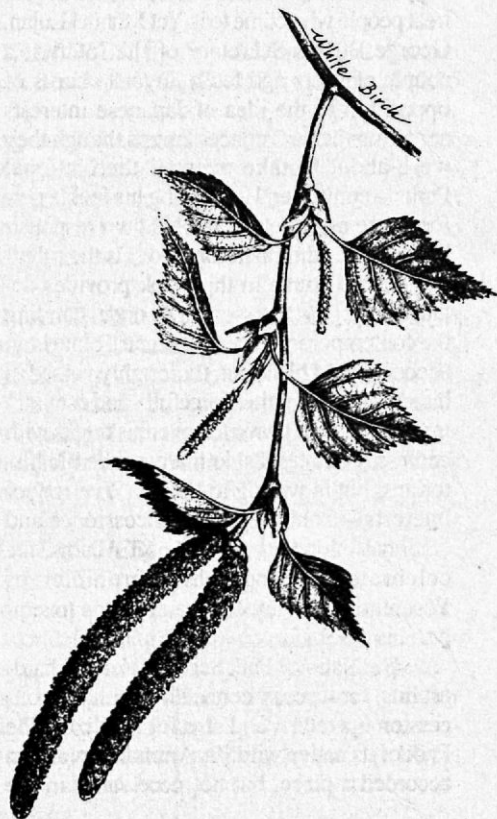
Earth in the Balance has its limits though. Senator Gore's views can hardly be called visionary. This is the work of a concerned student of ecology. All of the recommendations have been made by others before. This volume also lacks a clear sense of the author's identity. Sometimes Al Gore sounds like Carl Sagan, sometimes like Jacques Cousteau, sometimes like Ralph Nader quoting Lester Brown. But, hey, these guys are no lightweights. He does keep good company.

There are some glaring holes in Gore's book. He is naive in expecting that corporate

government, even with the changes he espouses, can be a leader in environmental protection and restoration. He never really addresses the issue of centralization of power. Decentralization is essential to taking energy out of corporations and putting it into the hands of the people. The importance of thermodynamics, bioregionalism, community economies, and earth education at all public, private and local levels is also missing from the author's ecological and economic equations. The senator believes that "energy is the lifeblood of economic progress" and does not recognize that future economies must be much more labor intensive and less energy consumptive. Finally, the senator's bad-mouthing of Deep Ecology reflects an extremely shallow familiarity with the new conservation movement and the scientific discipline of conservation biology.

Perhaps the greatest promise of this book is that it shows that the hunger for ecological understanding is not limited to activists. One hopes the book represents just one of many steps in the ecological education of Vice President-elect Gore. *Earth in the Balance* is a useful tool to educate and pry open closed minds.

—Reviewed by Ernie Reed



YOSEMITE: THE EMBATTLED WILDERNESS

by Alfred Runte. University of Nebraska Press. 271 pp. \$24. 95.

As a wilderness, dear Yosemite, the pride of California and the American West, is more than embattled; it is beleaguered, bedeviled, abused, and exploited. The way the Park is run, the way it has been for years, preserving wilderness comes after jingling the cash registers. Of course, "parks are for people," as they like to say, but people aren't the issue so much as the money they bring with them. Whether Yosemite should be restored, safeguarded and sanctified as a priceless fragment of the original America, or operated as a resort or popcorn playground—that is the overriding issue. Why else are so many corporate powerhouses competing for the park concession now up for grabs?

Lots of Japanese come to Yosemite. Many come in groups and are processed through the Park on package tours like an assembly line, stopping here long enough to take their pictures and there long enough to buy their souvenirs. And away they go. That is no way to experience a wonderful place, and no way to treat people who come to it. Yet Manuel Lujan, George Bush's Secretary of the Interior, a couple of years ago led a jingoist chorus of opposition to the idea of Japanese interests acquiring the park concession, as though they were about to take over all the National Parks—conveniently covering his feeble performance as secretary and his own responsibility as the administrator who sets the rules.

Alfred Runte in this book provides detailed background essential to understanding the contemporary Yosemite scene. Runte is an accomplished historian, thoroughly versed in his subject, who writes forcefully and convincingly. He doesn't have to cover his tracks with endless footnotes, as do many academic historians, but is willing to take on a variety of interests—from the park concessioner and National Park Service to Ansel Adams, the celebrated photographic chronicler of Yosemite—then lay out the evidence to support his case.

The National Park Service earns the hardest hits, for its cozy connection with the concession operators, and also for sterilizing the Park of its native wildlife. Animals have been accorded a place, but not necessarily in the

wild. The reader learns that "good" animals used to be displayed in cages in Yosemite Valley. In addition, feeding platforms were erected at government garbage dumps so that people could (as the Park Service said) "feed bears sweets from their own hands at their feeding grounds." Then bears became a "problem" by bothering tourists. The scandal of 1973 revealed that more than two hundred bears had been killed in a dozen years, their carcasses dumped unceremoniously off a cliff along Big Oak Flat Road.

The public raised hell. "Bears have a right to live just like you and me and maybe even more," a sixth grader wrote to NPS. "At least they don't kill each other for no reason or pollute air and water like we do." But John Morehead, chief ranger at that time (and later park superintendent), set the little guy straight:

You'd be surprised at how much damage a bear can do—many thousands of dollars a year and, although we are responsible for protecting wildlife, we are also responsible for life and property of visitors to the park.

But it wasn't only bears that needed dispatching. In an earlier year, after a woman died from some kind of bite on the trail, the order went out to kill immediately every rattlesnake on sight—though there was no positive evidence that a rattlesnake bite had been the cause of death.

Runte has dug deep into the files to bring these incidents to light, not to be mean but to prove a point about National Parks in general and Yosemite in particular. In his earlier book, *National Parks: The American Experience*, he showed that the first National Parks were established strictly for their scenic spectacles, without real understanding of ecological values or concern for them. In *Yosemite*, he points to the emergence of genuine biological conservation in the parks, largely through the influence of Joseph Grinnell, of the University of California, and George Wright, the vigorous young National Park biologist (who died much too early in his promising career).

Grinnell saw the snakebite case as a missed opportunity to raise the sights of Park visitors, so they could see themselves as part of the natural world rather than apart from it, and so they could recognize risk as implicit in the Park experience yet no greater than personal risks in everyday urban life. The principle of biological conservation, of caring for

Yosemite as an ecological whole, conflicts directly with the dominant principle that "parks are for people" and that people must be accommodated—as at the 35 outlets in Yosemite selling beer, wine or liquor; and on the Merced River, congested on a good weather day with hundreds of rafts rented from the concession.

Now where does Ansel Adams fit in? Runte recounts Adams's connection with the celebrated Christmas Bracebridge Dinner at the Ahwahnee Hotel. The Ahwahnee was a classy place when it was built in 1927, the showpiece of Yosemite Valley, but special promotion was needed to fill it in winter. The concessioner invited Adams to direct an elegant Yuletide pageant, English style. Adams apparently exulted in the Bracebridge Dinner throughout his life, despite its manifest inappropriateness. Moreover, in his later years he was all for more and more visitors, without restraint: "The maximum number of people should see Yosemite and should experience its incredible quality. To shut it off from the world would be somewhat similar to closing St. Paul's Cathedral for the sake of the architecture!"

Maybe so, but that's not the way John Muir saw it. Muir in his own way promoted recreation, encouraging people to come for their share of wilderness—providing they accepted it on its own terms. At Yosemite in 1912, when the major question on the agenda of the conference of National Park superintendents was "Shall automobiles be allowed to enter Yosemite?", Muir was reduced to despair. "Good walkers," he wrote a friend, "can go anywhere in these hospitable mountains without artificial ways."

That sounds right to me. Artifice makes things easier, but it dilutes and detracts. "These sacred mountain temples are the holiest ground that the heart of man has consecrated," Muir wrote, "and it behooves us all faithfully to do our part in seeing that our wild mountain parks are passed on unspoiled to those who come after us, for they are national properties to which every man has a right and interest."

Alfred Runte in *Yosemite: The Embattled Wilderness* has done his part with eloquence and conviction. Concerned, caring people on the staff of Yosemite National Park will take heart from it, while citizen conservationists will find valuable source material and reading to remember.

—Reviewed by Michael Frome, author of *Regreening the National Parks*.

State of the World's Mountains, edited by Peter Stone; Zed Books, 165 First Ave, Atlantic Highlands, NJ 07716; 1992; 390p. This global report was prepared in part to put mountains on the UNCED 1992 agenda. The founders of the new World Mountain Network recognized that mountain ecosystems worldwide were being thrashed but not acknowledged. To give mountains the type of attention that has been given rainforests and old-growth temperate forests recently, Mountain Agenda prepared this preliminary yet ambitious status report. Although focusing on human communities in the mountains, predictably, it nonetheless is of great value to all who aspire to save highland ecosystems. Special attention is given to Africa's highlands, in Ethiopia, Morocco, Kenya, Madagascar, Uganda, and southern Africa; Europe's Alps; Asia's Himalayas; Canada's eastern Arctic mountains; Hawaii's volcanoes; China's Hengduan Mountains; Iceland's putative mountains; South America's Andes; Russia's Pamir; and mountains of Japan (Tateyama), northern Thailand, Papua New Guinea, and Poland (Tatra).—JD

Exploring the World of Insects: The Equinox Guide to Insect Behavior, by Adrian Forsyth; Camden House Publishing, 210 Ferry Rd, Charlotte, VT 05445; 1992; 65p. \$9.95. Aimed at "young adults and beginners," the text and photos of this small book beautifully illustrate selected glories from the huge and unruly class *Insecta*. Biologist Adrian Forsyth, co-author of the classic *Tropical Nature*, draws his readers into the class with facts like these:

"In fact, most of the animals that walk, fly and burrow about this planet are insects. They dominate Earth not only by their sheer numbers but also by their variety. Roughly 800,000 species have already been scientifically described, and that number represents 80 percent of all known animal species. Some scientists believe that there are approximately three million different kinds of insects alive today. Others claim that the total number of insect species is closer to 30 million." (p.4)

"Nothing on Earth can leap farther for its size: a flea is able to make jumps that are more than 100 times its body length. And it can do so over and over again. One researcher demonstrated that rabbit fleas could leap once every second for three straight days without stopping." (p.28)

Forsyth finishes with a simple and compelling warning about the dangers of pesticides and the importance of biodiversity.—JD

Embracing Earth; New Views of Our Changing Planet by Payson R. Stevens and Kevin W. Kelley; 1992; Chronicle Books, 275 Fifth Street, San Francisco, CA 94108; 176pp. \$ 9.95.

Through colored photographs that cameras and remote sensing devices took from space, Stevens and Kelley present the beauty and the fragility of Earth. The titles of the oversize book's three sections underline the approach: Natural Rhythms (Land, Air, Water, Ice, Life); Human Impacts; Embracing Earth. Though the artificial colors and stylized outlines of the photographs may become tiresome, some of the individual pictures are breathtakingly lovely. Many others display shocking facts. Photographs accompanied by concise texts dramatize the extent of desertification in West Africa, the horror of the oil fires during the Gulf War, the growth of the ozone hole over the Antarctic Wild Earthlings may deplore the use of satellites, computers, and even cameras; but we can hope that this book's strong message reaches the broad audience for which the authors intend it.—MBD

Other Recommended Titles

Buddhism and Ecology, ed. Martine Batchelor and Kerry Brown
Christianity and Ecology, ed. Elizabeth Breuilly and Martin Palmer
Hinduism and Ecology: Seeds of Truth, by Ranchor Prime
Islam and Ecology, ed. Faziun Khalid with Joanne O'Brien
Judaism and Ecology, ed. Aubrey Rose: Cassell Publishers Ltd., 387 Park Ave. S., New York, NY 10016-8810. \$9.95 each paper.

Each of the books in this series, World Religions and Ecology, sponsored by the World Wide Fund for Nature, discusses the relationship between ecology and the teachings and practices of a major religion. The editors and authors are environmentalists and speak of their own religions; but within these parameters, each book includes diverse points of view. The volume on Christianity faces honestly the contribution Christianity has made to the destruction of Earth and asks readers to help to formulate "a new morality." Since the series is designed to stimulate thought and discussion, the books will be particularly useful for study groups.—MBD

1993 MAKING A DIFFERENCE COLLEGE GUIDE: Education for a Better World, edited by Miriam Weinstein: 1993: Sage Press, 524 San Anselmo Ave #225, San Anselmo, CA 94960; 216 pp.; \$12.95 paper.

What college students want from their education has changed in the past few years and Weinstein's guide addresses the desires and questions of prospective students. Ms. Weinstein has combined socially conscious guidelines with college information to form a well rounded overview of colleges, universities, and natural resource schools. In reference to the guide David Brower stated, "Never before has *Making A Difference* been so important for our future."—KF

IN BLUE MOUNTAIN DUSK, by Tim McNulty: 1992: Broken Moon Press, POB 24585, Seattle, WA 98124-0585; 128 pp.; \$12.95 paper.

McNulty's strong poetic voice reveals the beauty of mountains, streams, moss... and the interaction of humans and wildlife. His poems are full of awareness, emotions and humor. His writing creates an intimacy between the reader and wilderness, and inspires efforts to protect the remaining wilderness.—KF

PLANET EARTH PAGES: Banyen Books' Guide to Environmental Literature, edited by Joel Russ & Kolin Lymworth: 1992, Banyen Books, 2671 W. Broadway, Vancouver, BC V6K 2G2; 68 pp.; \$3.

Russ and Lymworth have created a comprehensive list of environmental resources and readings from the book world. The catalog's topics range from Natural History to Animal Rights to Children's Books, and each work is clearly described.—KF

TAKING CARE OF BUSINESS: Citizenship and the Charter of Incorporation, by Richard L. Grossman & Frank T. Adams,

In this booklet Grossman and Adams address crucial issues pertaining to the corporate world, focusing on how corporations harm citizens and the land. The authors claim that since the 19th century corporations have stripped citizens of their political power, yet they have not taken away our Constitutional sovereignty. Through exercising their sovereign authority citizens can regain their political power.—KF

Noteworthy Articles

A Look at Conservation Literature

by John Davis

"*Making Amends to the Myriad Creatures*," by Stephanie Mills; presented at the 11th Annual EF Schumacher Lectures, 10-91; Box 76, RD 3, Great Barrington, MA 01230. Ecological restoration seems to be a topic—nay, avocation; nay, art—that attracts good writers and draws forth their best thoughts. Nonetheless, you'll not easily find a restoration explication so compelling and eloquent as Stephanie's. Order this from the EF (*Small Is Beautiful*) Schumacher Society and gain insights on salmon restoration in northern California's Mattole River watershed, Tallgrass Prairie and Oak Savanna restoration in Illinois's Greater Chicago Death Zone (not the author's words), Stephanie's recovery efforts on her Scotch Pine and knapweed infested acreage in northern Michigan, and the overall importance of ecological restoration wherever industrial civilization has left its poisons.

"Helping Endangered Species: COSEWIC and RENEW. Is this the best we can do?" by Jacques Prescott & Theresa Aniskowicz; *Canadian Biodiversity*, spring 1992, p.23-29. The quarterly of the Canadian Museum of Nature (\$25/yr; Canadian Centre for Biodiversity, Museum of Nature, PO Box 3443, Station D, Ottawa, Ontario K1P 6P4) this time includes an overview of the weaknesses and strengths of Canada's two main endangered species programs: Committee On the Status of Endangered Wildlife In Canada and Recovery of Nationally Endangered Wildlife. COSEWIC has listed only 213 Canadian species, of an estimated 8643 species on Canada's lands and in its waters that are in fact imperiled; and RENEW plans have been completed for only 3 of these.

The Future of the Pre-Columbian Landscape: Prospects for Replanting Two Continents; *Restoration & Management Notes*, summer 1992. *R&MN*, the twice-yearly publication of the Society for Ecological Restoration (1207 Seminole Hwy, Madison, WI 53711; \$25 membership

includes subscription), commemorates the quincentennial of Columbus's first voyage to the New World with an issue of articles on attempts to restore the pre-invasion landscapes of North, Central, and South America. The following articles are especially noteworthy: Daniel Janzen in "The Neotropics" (p.8-13) asserts that in Central and South American forests it makes no sense to postpone restoration until we know the pre-degradation community structure; neotropical sites are so rich in species, and have been managed by humans for so long, that such determinations are not feasible. Marietta Tanner and others in "The Big Apple: Restoration Education on the Bronx River" describe the ecological and educational benefits of engaging a school class in the restoration of a riverside meadow on Staten Island. Robert Betz in "The Tallgrass Prairie" (p.33-35) proposes "large reconstructed prairies," using prairie fragments as a base. Ruth and Richard Sparks discuss steps "being taken to restore the great river that drains 41% of the continental United States," in "The Mississippi River" (p.39-44). Standing Rock Sioux Tribe member and law professor Vine Deloria Jr. in "Prospects for Restoration on Tribal Lands" proposes "spiritual management"—"the Indian manner of living"—as a means of grasslands restoration (p.48-50). In "The Arid West" (p.56-59) Edith Allen and Laura Jackson describe the dire straits of deserts and semiarid lands in the West, restoration of which may be possible but is presently being attempted only on small patches. Society for Ecological Restoration board member and Intertribal Sinkyone Wilderness Council consultant Dennis Rogers-Martinez explains in "The Sinkyone Intertribal Park Project" (p.64-69) how a coalition of Indians plans to restore a California Coast Redwood region. "Notes and Abstracts" #23 discusses the potential for restoration of "Switchcane (*Arundinaria gigantea*), the only species of bamboo native to the continental US," which formerly grew in large canebreaks along rivers in the Southeast (p.84-85).

"Characteristics of Old-growth Mixed Mesophytic Forests," by William Martin; *Natural Areas Journal*, summer 92, p.127-135. Always of great value to those who like Nature at least as much as culture, Natural Areas Association's quarterly (320 S Third St, Rockford, IL 61104; \$25/yr) this time includes a summary of old-growth characteristics of the forest association identified by the late great ecologist Lucy Braun as the most diverse temperate deciduous forest in North America. Traits of old-growth remnants in this Southern Appalachian forest type include high diversity of species, dominant trees, and communities; uneven-aged and sized structure; trees 200 or more years old; logs and snags; tree-fall gaps formed by windthrow; undisturbed soils, and of especial importance MACROPORES—yes, those tunnels left by burrowing animals and rotting roots perform key hydrological, vegetational, and edaphic functions, which scientists are only now beginning to appreciate (trained scientists only belatedly appreciating edaphic functions... is there no justice?!).

"The Russian Timber Rush: Multinational logging companies threaten Siberia's vast forests," by Antony Scott & David Gordon; *Amicus Journal*, fall 92, p.15-17. The Hyundai Corporation of South Korea is now clearcutting in the Russian Far East, and Weyerhaeuser plans to begin cutting there soon. Timber companies are also eyeing the Lake Baikal region with especial interest.

"Can Wildlife Traffic Be Stopped?" by Ann Misch, p.26-33, and "Alpine Slide," by Derek Denniston, p.36-38; *World Watch*, 9-10/92. In what could prove to be a controversial article, Misch discusses the growing interest in "pragmatic conservation": allowing carefully regulated trade in endangered species, with profits accruing to local people, rather than strictly protecting the species at the risk of alienating locals. Denniston describes how the remaining semi-natural areas of the Alps are being assaulted by tourists.

Note: This column mostly calls attention to articles from national publications. This is done with the assumption that most Wild Earth readers already follow the publications of their local and regional conservation groups, and that they can learn of the efforts of grassroots groups outside their region in Wild Earth's Strategy, Biodiversity, and Wilderness Proposal sections. Nonetheless, it is well to remind readers that much of the best wildlands work, including writing, comes from the small groups and newsletters.

"Conserving Circumboreal Forests for Martens and Fishers," by Steven Bushkirk (p.318-320), "Disturbance, Diversity, and Invasion" by Richard Hobbs & Laura Huenneke (p.324-337), "Using Montane Mammals to Model Extinctions Due to Global Change" by Kelly McDonald & James Brown (p.409-415), "Polynyas as Centers of Organization for Structuring the Integrity of Arctic Marine Communities" by R France & M Sharp (p.442-446); *Conservation Biology*, 9-92 (membership \$41; Conservation Biology, Blackwell Scientific Publications, 238 Main St, Cambridge, MA 02142).

The American Marten, Fisher, Sable, Japanese Marten and other members of the genus *Martes* make ideal "umbrella species." (Gary Larson please note; note also that some of their habitat remnants may be undergoing "faunal relaxation," and that their habitats might benefit from identification of "flagship species.") They need structurally diverse, mature or old-growth forests, and have enormous home ranges (for American Marten and Fisher, "about 50 times that predicted on the basis of body size").

Hobbs and Huenneke show well that natural disturbances are essential to ecosystem integrity but that in this age of fragmentation disturbances can facilitate invasion of exotics. Taking a characteristically fatalistic perspective, these scientists assume that natural disturbance regimes are history and thus that we must select disturbance patterns to encourage those species we deem desirable. Moreover, they gratuitously conflate natural disturbances (e.g., wildfire) with human disruptions (e.g., livestock grazing).

Montane mammals of the isolated mountain ranges of the Great Basin will fare badly if anthropogenic climate change proves as severe as expected by scientists not in the employ of the Bush administration. Drawing from island biogeography and general circulation models (GCMs; not to be confused with *Time* magazine reader surveys), the authors speculate that 3 of the Great Basin's 14 small mountaintop mammals will be altogether lost from the region, and 4 of 19 mountain ranges will lose at least 50% of their small mammal species.

France & Sharp report their findings on the ecological richness of polynyas. These open areas amidst the pack ice are nodes of diversity, attracting sea birds, seals, Polar Bears, and other polynaphiles. Again, human-induced climate change could affect these phenomena.

"Deep Evolution," by Kevin Kelly; *Whole Earth Review*, fall 92, p.4-20. Even those expecting an article on benthic adaptations will not be

disappointed by this profound article. A former *WER* editor presents here some of the post-Darwinist views of evolution being voiced by Lynn Margulis and other heretics. Kelly suggests that natural selection is only a part of evolution. Symbiosis, directed mutations, self-organization, and of course the algorithmic search also may play key roles in the evolutionary process.

"No Dogs Allowed," by Ted Williams; *Audubon*, 9-10/92, p.26-35. "The prairie dog is still denied its rightful place in the American West," due to ranchers and their friends in the Animal Damage Control agency, the Forest Service, the BLM, and even the National Park Service. Biologist Jon Sharps is trying to stop poisoning programs and restore prairie dogs to 10% of their original range.

"Environmental Action's Dirty Dozen of 1992," by Marlene Harris; *Environmental Action* (6930 Carroll Ave 6th Floor, Takoma Park, MD 20912; \$15/yr), fall 1992, p.20-27. Each year, Environmental Action describes the nefarious actions of 12 of DC's worst politicians. This year, EA chose Senators Don Nickles (R-OK) and Richard Shelby (D-AL); Vice President Quayle; and Representatives Wayne Allard (R-CO), John Doolittle (R-CA), Mel Hancock (R-MO), Dan Burton (R-IN), James Hansen (R-UT), Ron Marlenee (R-MT), Bob Stump (seriously; R-AZ), Don Young (R-AK), Mike Oxley (R-OH), and Rick Santorum (R-PA). Patterns emerge: all 12 are white men; most are over 40; most are Republican.

"Cliff Hanging Science: Sheer cliffs protect a unique ecosystem," by Kathryn Hoppe; *Science News*, 9-26-92, p.200-202. "The Weekly Newmagazine of *Science*" this time reports on the discovery of 1000+ year old Northern Whitecedars (*Thuja occidentalis*) along the cliffs of the Niagara Escarpment of southern Ontario. Also newly discovered by science, and uniquely vulnerable to anthropogenic disruptions, is the cryptoendolithic community of the Escarpment's white dolomite rocks. Here lichens, algae, and fungi live "inside rocks ... to escape the conditions at the surface." (Ah, to be young and a cryptoendolithic alga ...)

"Polluted Air: a wilderness crisis in the making," by Lucy Rosenau; *Wilderness Record*, 9-92, p.1, 5-6. September's Proceedings of the California Wilderness Coalition (2655 Portage Bay East, Suite 5, Davis, CA 95616) discuss the damage air pollution—especially ground level

ozone—is doing to California's Wilderness Areas and why the Clean Air Act is failing to rectify the situation. This *Record* also nonchalantly notes the comment deadline on—get this—"recreational mining ... for the East Fork of the San Gabriel River in the Sheep Mountain Wilderness." (Write the Supervisor, Angeles NF, 710 N Santa Anita Ave, Arcadia, CA 91006. Say you also oppose recreational chainsawing.)

"Amphibians of the Northern Forests," by Steve Trombulak; *The Northern Forest Forum*, Autumn Equinox 1992, p.4-5. PAW founder Jamie Sayen has started a bimonthly tabloid dedicated to restoring "sustainable natural and human communities" in the Northern Appalachians and Adirondacks (\$12/yr; Forum, POB 6, Lancaster, NH 03584). This inaugural issue features a fine article by a Middlebury College biology professor on the Northern Forest's 22 species of salamanders, frogs, and toads, many of which are threatened by acid deposition, water pollution, clearcutting, and other human insults. A bit of good news is that the Mudpuppy (*Necturus maculosus*) still survives in the Champlain Basin of New York and Vermont.

"The Mysterious Haunts of the Marbled Murrelet," by Kim Nelson; *Forest Watch*, 9-92, p.15-18. The "Citizens' Forestry Magazine" published by Cascade Holistic Economic Consultants (CHEC, 14417 SE Laurie, Oak Grove, OR 97267) profiles the old-growth dependent seabird—the auk that nests like a hawk, in mature conifers of the Pacific Northwest. Late in 1992, under court order (and after ...)

"Fish & Wildlife Service Slashes Species" and "Grizzlies on Knife-Edge of Extinction," by Keith Hammer; *Earth First!* (POB 5176, Missoula, MT 59806), 9-92, p.19-22. Keith Hammer and the Montana Ecosystems Defense Council (POB 1901, Kalispell, MT 59901) have filed suit against FWS policy on the Grizzly Bear, a Threatened species, and the FS's Upper Yaak timber sale program. This article explains.

This *EF!* has other urgent articles too: "Sikhote Alin: The Old World Wild" describes threats to Siberia's forests: "perhaps half of the taiga (the size of the US west of the Mississippi) is old growth," but Weyerhaeuser, Hyundai, and other transnational companies plan to reduce this fraction. George Wuerthner's "Cattle Number One User of Western Water" continues his tireless and effective attack on welfare ranching.

"Hurricane Andrew: The Population Factor," by Robert Fox; *Footnotes*, 9-92. *Footnotes*, newsletter of Negative Population Growth (\$30/yr; POB 1206, Teaneck, NJ 07666), "the only population/environmental organization that calls for a smaller US and world population, and for specific realistic measures to achieve those goals," here warns that Andrew presages more severe crises stemming from population growth in combination with natural "disasters." Disproportionate growth is occurring in areas prone to hurricanes and other costly disturbances: "The 426 coastal counties have just 11% of the territory in the continental US, but hold 110 million people—45% of the population." Growth is especially rapid in Florida, where hurricanes are wont to slam, and California, where the Big Earthquake may any year now level the playing field.

"The Atmosphere Confusionists," by Rhys Roth; *No Sweat News*, fall 92, p.1,5. Though the name may sound like Gore-tex propaganda, *No Sweat News* is actually the new "Journal of the Grassroots Action to Protect the Atmosphere," to be published quarterly by Northwest Atmosphere Protection Coalition (POB 10346, Olympia, WA 98502), a project of Earth Island Institute (300 Broadway, Suite 28, San Francisco, CA 94133). Long-time anthropogenic perspiration foe Rhys Roth brings to this premier issue a rare blend of ecological and political savvy. He begins by dissecting the fossil fuel industry/White House campaign to confuse *US nationals* (that's pc for *Americans*) about the greenhouse effect. Send NAPC a generous donation for their work and journal, and read also "the Greenhouse Effect: What Every Activist Must Know," Barbara Kelley's "The Space Program, The Department of Defense, and the (vanishing) Ozone Layer," and "Ozone Depletion." By the way, *Science News* reports this week (10-10) that this year's Antarctic ozone hole is 8.9 million square miles in extent. Hot damn; we've set a new record!

"Time Is A River and The Water Is Rising: The Threat to Usumacinta River," by Christian Kallen, "Damming The Roof of The World," by Justin Lowe; *World Rivers Review*, 3rd Quarter 1992, p.8-11. The International Rivers Network (1847 Berkeley Way, Berkeley, CA 94703; \$25/yr) publishes a fact-filled newsletter for impoundment mourners everywhere. This issue covers the Mexico Federal Electric Commission's renewed determination to dam the

biggest river in Mexico south of the Rio Grande, and China's exploitation of Tibet's rivers. Other crime scenes profiled in this *Review* include India's Narmada River, Kenya's Turkwel River, Alberta Canada's Oldman River, Sarawak Malaysia's Rajang River, Russia's Katun River, Argentina's and Paraguay's Parana River, Czechoslovakia's Danube River, and Japan's (last free-flowing) Nagara River.

"Why Wild Fish Matter: A Biologist's View" by Ray White (p.25-50), "Montana Grayling—Heading for Extinction?" by George Wuerthner (p.60-64), "About Trout" column by Robert Behnke (p.65-68); *Trout*, summer 92. "Why Wild Fish Matter: Balancing Ecological and Aquacultural Fishery Management," by Ray White, p.18-48; *Trout*, fall 92. Some of the best news for salmonids lately has come from the quarterly of Trout Unlimited—not good news in the sense that fish are recovering, for wild native salmon and trout populations are at all-time lows, but good news in the sense that this large and powerful organization is increasingly speaking and acting on behalf of native fish and ecosystem protection. In successive articles, fish ecologist Ray White details the disastrous impacts of hatchery programs, dams, deforestation, livestock overgrazing, and other human factors on wild salmon and trout. George Wuerthner unveils the plight of the last fluvial population of grayling in the contiguous 48 states. Fish taxonomist Robert Behnke, also in successive issues, unclouds genetic mysteries surrounding grayling and California Golden Trout. In a welcome change from standard sportsmen's talk, these authors advocate defending and restoring natural habitat and fish populations.

"Still Logging After All These Years," by Sue Sutton; *Borealis*, fall 92, p.35-41. As Ontario's 7600 square kilometer Algonquin Provincial Park approaches its centennial (1993), it is beset by logging, tourism, and hunting. The Canadian Parks and Wilderness Society (CPAWS, Suite 1335, 160 Bloor St. E, Toronto, Ontario, Canada M4W 1B9; membership \$35 a year), the mainstream conservation group that publishes *Borealis*, has proposed a phase-out of logging in the park and establishment of a Wilderness zone to protect part of the park's eastern portion. Algonquin, unfortunately, typifies the state of provincial parks in Canada.

"When Is Wilderness Wilderness," by Roberta Clowater and John Theberge, on page

45 of this issue adds statistics to show how little of Canada is protected. Only 2.6% of Canada is protected as wilderness (a figure similar to that of the US) and only 35% of designated wilderness (compared to most of the paltry US Wilderness System) is protected from destructive land uses. Elsewhere, dams, sport hunting and fishing, trapping, airplanes, and other intrusions are common.

Endangered Spaces Progress Report 1992. World Wildlife Fund Canada's 3rd Progress Report on its Endangered Spaces Campaign, to protect samples of all natural regions in the country, grades the federal and provincial governments. WWF Canada President Monte Hummel summarized this campaign in *Wild Earth* volume 1 #4. Progress has been slow and uneven, but WWF Canada has gained commitments from most of the governments to accept the Endangered Spaces goal. To help, write Endangered Spaces Campaign, c/o WWF Canada, 90 Eglinton Ave East, Suite 504, Toronto, Ontario M4P 2Z7 CANADA.

"Crisis in the Hot Zone," by Richard Preston; *The New Yorker*, 10-26-92, p.58-81. This is a true story about viruses, and the havoc these parasitic proto-organismic proteinaceous capsules may wreak on humanity as our population goes ever farther out of bounds. Key players in this drama include the US Army Institute for Infectious Diseases (sic[k]), Hazleton Research Products and its Reston Primate Quarantine Unit, HIV, Ebola Zaire, Ebola Reston and other viruses. Like any good story, this one conveys lessons, among which: invading wild habitats, especially tropical forests, increases risks of bringing into human populations virulent viruses once living peacefully in endemic animal hosts; importing monkeys and other exotic animals invites importation of viruses dangerous to North American peoples; AIDS likely is an indirect result of habitat destruction; AIDS is probably a precursor of worse epidemics, as human population grows and spreads into the last reservoirs of intact biodiversity—complete with viruses not yet given the opportunity to replicate themselves inside human cells.

"The Mussels' Message," by William Stolzenburg; *Nature Conservancy*, 11/12-92, p.16-20. In a more balanced society, men would march to war to uphold the dignity of the White Wartyback Pearly Mussel, the Shiny Pigtoe, the

Pink Heelsplitter, the Wavy-rayed Lampmussel, and other molluscan beauties whose interests have been transgressed. Our society, alas, is exterminating these filter feeders with nary a thought about what this will mean for water quality in the Tennessee, Clinch, and other Southeastern rivers. The Associate Editor of this fine magazine explains: "Dams, dirty water and a deadly mollusk from Europe [Zebra Mussel] threaten to dismantle much of the East's freshwater mussel fauna ... Forty-three percent of North America's matchless collection of 300 freshwater mussel species are extinct or on the way." (p.18)

"Two Faces of Japan," by Conger Beasley Jr. *Buzzworm*, 11-12/92, p.32-37. Japan is sending mixed signals: Even as it continues to devour forests in Malaysia, Indonesia, the Philippines, America's Pacific Northwest, and now South America and Siberia—as well as continuing to slaughter whales, sea turtles, and countless other imperiled organisms—it is promising to give at least \$7 billion over the next 5 years for environmental assistance programs in developing nations. Beasley tells of the huge obstacles the young grassroots-oriented environmental movement in Japan faces as it tries to overcome the Japanese public's obedience to established norms and the power structure's deadly efficiency in promoting industry: "To reverse the astounding industrialization of the past four decades, to set the country on a more ecologically responsible course, would require a set of imperatives that the present governmental system is powerless to implement. The Japanese nation today is guided by an uneasy balance of semi-autonomous groups. The most influential groups include ministry officials, political cliques, and cadres of bureaucrats and businessmen." (p.32-3)

"Beyond Ecospeak: Toward a Language for Deep Ecology," by Dennis Fritzingler, *The Warrior Poet* #1, ASUC Box 361, Berkeley, CA 94720. Wilderness poet Dennis Fritzingler has started a poetry periodical sure to inspire lyrical Earth defenders. The first issue includes a provocative essay carrying forth the discussion engendered by Christoph Manes, John Elder, Bill Devall, and others on the need for a language that does not reify Nature. Dennis warns that reification, "the objectification of subjects, creates a language of exploitation and abuse."

"Why We Need a Smaller US Population And How We Can Achieve It," by Donald Mann, NPG President; **A Negative Population Growth Position Paper**. Virtually the only environmental group that calls for smaller US and world populations, Negative Population Growth (NPG, POB 1206, Teaneck, NJ 07666; annual dues \$30) here proposes an annual immigration ceiling of 200,000, and reduced fertility to 1.5 children per woman on average (the latter encouraged partly through tax incentives) to achieve an optimum US population of around 150 million within 100 years. This will seem to many readers a bloated and unwieldy number — more like a maximum than an optimum — but vastly preferable to the more than 450 million we'll have within 100 years if we stay on our present path.

"Short-Term Dynamics of a Neotropical Forest (Change within limits)" by Richard Condit, Stephen Hubbell, & Robin Foster (p.822-828), "Biodiversity and Forest Change in Malaysian Borneo" by Richard Primack & Pamela

Hall (p.829-837), "Population Variation in a Tropical Bird Community" by Bette Loiselle & John Blake (p.838-845); *BioScience*, 12-92. In this issue, *BioScience* considers "Stability and Change in the Tropics." In the fields of ecology, particularly tropical ecology, "change within limits" and nonequilibrium theory seem to be supplanting notions of community equilibrium and stability; and these articles show why. Emphasizing that different species react differently to disturbances, and that natural disturbances are inherent to tropical forests but that modern human disruptions far exceed these in scale, the various authors draw forth the conservation implications of their findings, among which: "tropical forest diversity is only weakly self-preserving; it is quite fragile when exposed to external threat." (828) Also, "Because of the relatively low density and large size of many tropical birds, large tracts of forest will be necessary to ensure population sizes adequate for long-term survival." (843)



woodcut by Patrick Dengate

Announcements

ENVIRONMENT-FRIENDLY OLYMPICS

With Norway facing the next Winter Olympics onslaught, the Norwegian Society for Conservation of Nature has begun Project Environment-Friendly Olympics. The President of the International Olympic Committee, IOC, has asked Project Environment-Friendly Olympics to contribute to the planning for the IOC's Sub-Committee on Sports and Environment. A Project goal is for the IOC to "include environment as a third element to the Olympics, complimenting sports and culture." Project Environment-Friendly has written a thorough document on the impact of the Olympic Games, how to reduce the environmental risks, and who should be involved with the "greening" of the Olympics. To help enhance Olympic standards write for information: Olav Myrholm, Project Manager, Project Environment-Friendly Olympics, POB 454, N-2601 Lillehammer, Norway.

DEEP ECOLOGY WORKSHOP

The 1993 Deep Ecology—Way of the Mountain Learning Center Workshop will be held 16-20 August 1993. Workshop presenters include George Sessions, Dolores LaChapelle, Max Oelschlaeger, David Abram and Jody Cardamone. It will be held in the mountains of Aspen CO this year. Registration for the week is \$350 which includes lunches, materials, and a banquet. For more information write to Jody Cardamone, Aspen Center for Environmental Studies, POB 8777, Aspen, CO 81612 or call 303-925-5756. Academic Credit of 3 CEUs available. Registration is limited.

EASTERN MOUNTAIN LION IN THE ADIRONDACKS?

Catamount Investigation Network is an Adirondack research group looking for information on the possible presence of the Eastern Mountain Lion in the North Country (northern New York). If interested in working on this project or contributing field sighting data, contact Jack Gray, 315-393-4968, and Don Hassig, 315-393-1975.

1993 MIDWEST ENVIRONMENTAL ETHICS CONFERENCE

The 1993 Midwest Environmental Ethics Conference will be held on March 26-29 at the Iowa 4-H Education and Natural Resources Center in Madrid, Iowa. Bioregionalism is the focus of the conference. Set in the wooded hills and prairies of central Iowa, the conference will highlight the "Midwest bioregion" through speakers, discussion and action strategies. Speakers include Peter Berg, Martha Crouch, Frank Popper, Deborah Popper, Charlotte Black Elk, and Stephanie Mills.

Registration will be under \$75 per person, full meal package under \$60 and lodging \$15. Some REAP scholarships are available to Iowa educators and full-time students (college or high school). Please call for an application. Contact: Judy Levings or Danielle Wirth, 33 Curtiss Hall, Iowa State University, Ames, Iowa 50011, 515-294-4764.

HEADWATERS, ANCIENT FOREST ACTIVIST CONFERENCE

After a successful 1992 West Coast Ancient Forest Activist Conference, Headwaters is pleased to announce a 1993 sequel. The conference will allow activists to exchange ideas and strengthen strategies. Headwaters wants the 93 conference to focus on the development of the forest conservation movement. The conference will be held from February 5-7 in Ashland, Oregon. Contact Headwaters, POB 729, Ashland, OR 97250 Tel: 503-482-4459 Fax: 503-482-7282.

COMPETING VISIONS OF NEW WEST

A Symposium on the Environment focusing on land use and alternative economic strategies will be held 5-7 February 1993 at the University of Colorado, Boulder. The keynote speakers will be David Brower, Earth Island Institute, and Tom Powers, University of Montana Economics Department. Panels will cover issues ranging from property rights, to the Wise Use Movement to wolf reintroduction. Representatives from the Sierra Club, National Audubon Society, Wilderness Society, and other groups will attend. For information call (303)492-8308 or write to CU Environmental

Center, University of Colorado at Boulder, University Memorial Center, 331A; Campus Box 207, Boulder, CO, 80309.

KATIE LEE: A REAL COWBOY LADY

Katie Lee has released her newest collection of authentic cowboy Western songs titled "His Knibbs and the Badger," featuring Ed Stabler. The tape includes previously unrecorded poems by Henry Herbert Knibbs and Charles Badger Clark, along with other favorites. Katie's songs focus on the lost rivers and flooded canyons, the way of the land and its disappearance. *His Knibbs and the Badger* is available through mail order: \$13 (postpaid) from Katydid Books and Music, POB 395, Jerome, AZ 86331.

LETTERS NEEDED TO STOP CORRIDOR H

A monstrous force is being unleashed on the Central Appalachians—the Corridor H proposal to build an interstate across the mountains of northern West Virginia and Virginia (beginning in Elkins WV and ending at I-81 in VA). The route would pass through or near such world-class biodiversity centers as the Canaan Valley, Monongahela and George Washington National Forests, and Seneca Rocks National Recreation Area.

The Corridor H issue could set a precedent for the entire East. Virginians For Wilderness is asking concerned persons to send letters opposing Corridor H to US senators and representatives (senators, US Senate, Washington, DC 20510; representatives, House of Representatives, DC 20515), WV Governor Gaston Caperton (State Capitol, Charleston, WV 25305), and Commissioner Fred Van Kirk (WVDOT, Division of Highways, 1900 Kanawha Boulevard E., Building Five, Charleston, WV 25305). Virginians suggests advocating the no-build alternative, and stressing that the money could be far better spent on the crumbling infrastructure of cities (mass transit, bridges, etc.). The public record for receiving comments on the project will remain open until 25 January 1993. Contact Virginians For Wilderness, Rt. 1 Box 250, Staunton, VA 24401.

ABOUT SUBMISSIONS

Notwithstanding our aversion to the prevailing patriarchal paradigm, *Wild Earth* welcomes submissions. Poems should be sent directly to our Poetry Editors, Art Goodtimes (Box 1008, Telluride, CO 81435) and Gary Lawless (Gulf of Maine Books, 61 Maine St, Brunswick, ME 04011). Poets should realize that we receive hundreds more poems each quarter than we can publish.

Artwork, articles and letters should be sent to the Art Director or Editor at our main address (POB 492, Canton, NY 13617). *Wild Earth* welcomes submissions of original illustrations or high-resolution facsimiles thereof. Botanical/zoological/landscapes are eagerly sought, with depictions of any member of the class Gastropoda especially prized. Representational drawings should include common species and scientific names.

Articles/letters should be typed or neatly hand-written, double-spaced. Those who use a computer (heaven forbid) should include a copy on disk. We use Macintosh but can convert from PCs ("personal [like hell] computers"). Writers who want their material returned should enclose a self-addressed stamped envelope.

Articles, if accepted, may be edited down for space or clarity, though if substantive changes are made, the author's approval will be sought. Articles with significant scientific content (e.g., most biodiversity reports and wilderness proposals) will be reviewed by our Science Editor for accuracy and clarity. Wilderness proposals will also be reviewed by our Executive Editor, and controversial or complicated pieces may be peer reviewed. Lengthy biologically-based articles generally should include literature citations.

Wild Earth occasionally reprints articles; but due to the surfeit of submissions we receive, reprints will usually be low priority. If an article is being submitted to other publications as well as *Wild Earth*, the writer should indicate so. We usually try to avoid duplication. We generally welcome other periodicals to reprint articles from *Wild Earth*, provided they properly credit the articles.

In matters of style, we follow the *Chicago Manual of Style* loosely and Strunk's & White's *Elements of Style* religiously. Also, we suggest that authors remember several basic rules when writing for *Wild Earth*, since we always have far more material than we can print and we expect our writers to be lucid, perspicacious, and ineffably winsome.

1. Eschew surplusage (Twain).
2. Thou shalt not verbalize nouns (Abbey 1988).
3. Do not affect a breezy manner (Strunk & White 1959).
4. Watch your antecedents (Davis 1988).
5. Include a goddam floppy (Butler 1992).

Wild Earth Back Issues

Back issues of *Wild Earth* numbers 1-7 are available.
 Price: \$7 members
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U.S. Postal Service
STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
 Required by 39 U.S.C. 3685

Title of Publication: *Wild Earth*
 Frequency: Quarterly
 Issue Date: 9-24-92
 Annual Subscription Price: \$20.00

Complete Mailing Address of Known Office of Publication: 68 Riverside Dr. #1 Canton, ST Lawrence Co., NY 13617
 Complete Mailing Address of Headquarters or General Business Office: 68 Riverside Dr. #1 Canton, ST Lawrence Co., NY 13617

Full Name and Complete Mailing Address of Publisher: Cenozoic Society, Inc., 68 Riverside Dr. ST Lawrence Co., Canton NY 13617
 Full Name and Complete Mailing Address of Editor: Jim Davis, 68 Riverside Dr. #1 ST Lawrence Co., Canton NY 13617

Other Names and Complete Mailing Addresses: None

Ownership: Full Name and Complete Mailing Address: The Cenozoic Society, Inc. POB 492, Canton NY 13617

Known Bondholders, Mortgagees, and Other Security Holders: None

Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
Total No. Copies (Net Press Run)	4400	4600
1. Paid and/or Requested Circulation		
a. Sales through dealers and carriers, street vendors and counter sales	1368	1477
2. Mail Subscriptions (Paid and/or requested)	2269	2547
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3. Free Distribution by Mail (Gifts, complimentary, and other free copies)	250	250
Total Distribution (Sum of 3 and 4)	3887	4274
4. Copies Not Distributed		
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b. Return from News Agents	320	166
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Frog Lake

Leaving the Mono Creek trail
on a wild dare
from my unkempt, irregular and unfathomed
side,

I lit out
through thick brush and heavy timber,
bushwacking up
the high lake's outlet branch;

rough going—
but I don't ask "why?" like some fool—
I just go
nearly 1400 vertical feet
in less than a mile,
including the last hard pull
over the rimpop

where I found hidden treasure.
Friend, mark it on your map:
a perfect cirque
of polished granite,
its lake very deep
and coldy forbidding,
reckoned at about six acres,
cradles by sheer-wall
2,000foot grey rock spires
on three sides

Too much.
Nothing in the Boy Scout manual
prepared me for this.
My dumb mouth hangs open
in the breeze,
my dazed recesses
stammer along in silence—
unbroken but for a lovely cataract
on the south shore
below a july snowfield.

Throwing down my pack
in an instant
I do a little jig.
YAAHOO! Hurraay! Alone at last!

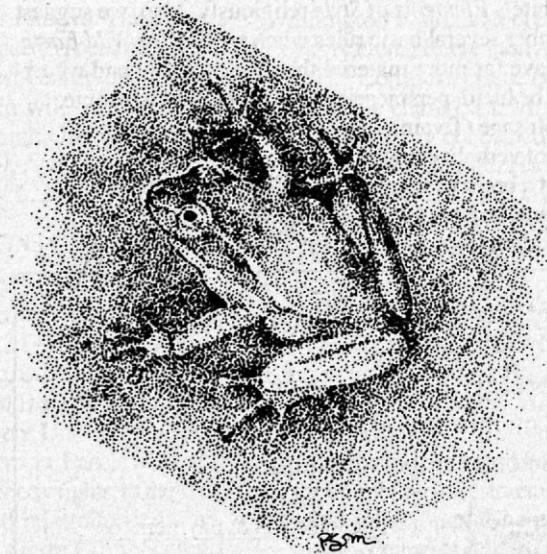
And so,
to make a long story short,
therespend four lazy nights
counting stars shoot across the big dipper,
snuggled among my knobby lodgepoles,

four careless days
by my smoky fire
on a small rise above the lake—
pondering only my tummy growling
and the pink Sierra sunsets,

somewhere
between heaven and earth.

And never saw one frog.

—Mark Gaffney, July 1986



Pacific Tree Frog by Peggy Sue McRae

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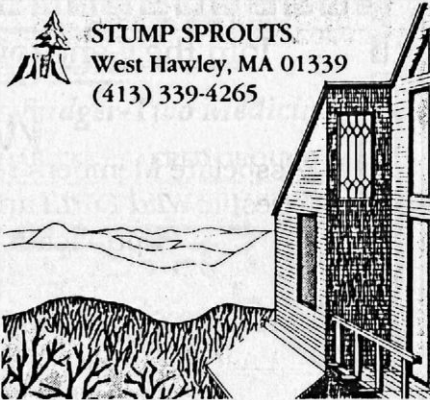
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* O.K. Here's our gimmick. For a limited time, all donors sending \$75 or more will receive a signed, limited edition print of the northern spotted owl by artist Peggy Sue McRae. This is the same, stunning image that appeared on the cover of *Wild Earth's* premiere issue.

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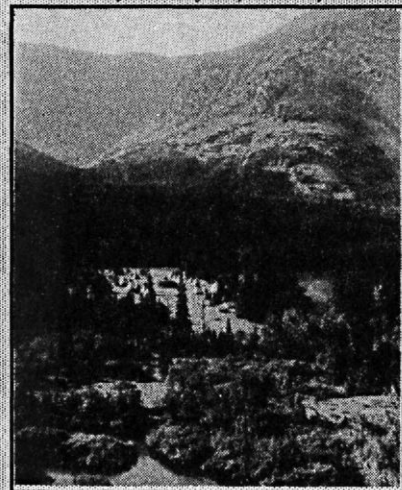
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Buy Back The Dacks

Wild Earth magazine announces the creation of a people's fund for the Adirondacks. Only 42% of the six million acre Adirondack State Park is protected by public ownership—and of this amount, less than half is designated Wilderness. Recent legislative initiatives have failed and much of the privately owned land for sale within the park is threatened by development. Here's your opportunity to help keep the Northeast's crown jewel Forever Wild.

Buy Back The Dacks, a cooperative effort of *Wild Earth* and the Adirondack Conservancy will identify and purchase imperiled lands with a particular focus on sensitive habitats and private lands contiguous to existing Wilderness. Your contributions to Buy Back The Dacks go directly toward land acquisition/preservation—not to support the other important work of either organization. Buy Back The Dacks...working to protect wild habitat for all Adirondack natives.

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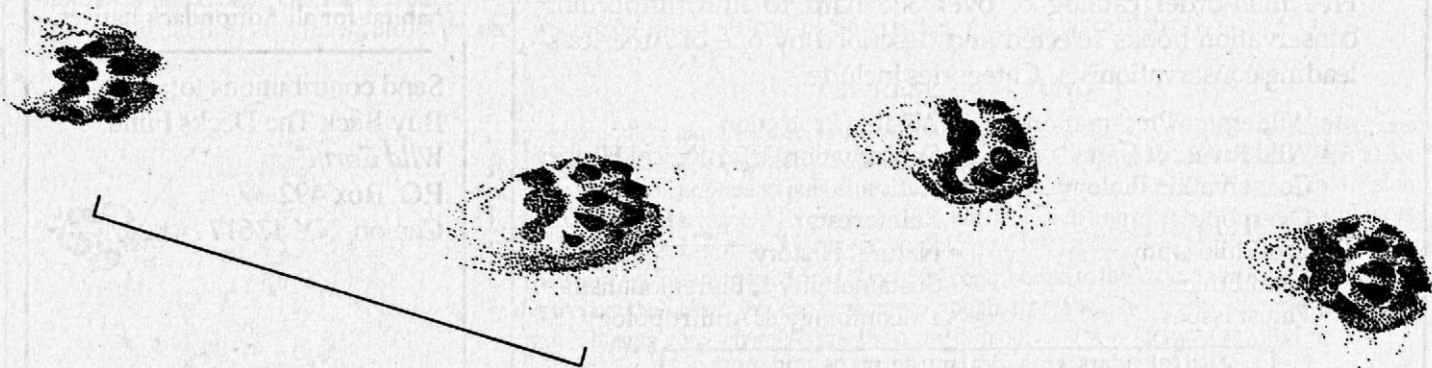


Keep it Wild. Buy it.

Fisher (*Martes pennanti*)

Seldom seen in the flesh, the furtive Fisher is more often detected through its spoor, which are larger than those of other members of the weasel family excepting the Wolverine and River Otter. Fishers need large roadless, mature forests; so look for their tracks in wild northern forest. Here's a bit of what tracker Paul Rezendes says about this consummate carnivore in *Tracking & The Art Of Seeing* (see a longer excerpt in this issue's Readings section).

The fisher was all but eradicated from most of North America for its pelt, but there are welcome signs that it has made a comeback in much of its original range. Fishers are found in the southern tier of the Canadian provinces and south to northern California and the northern Rocky Mountains in the West and to New England and northern New York in the East. (p. 128)

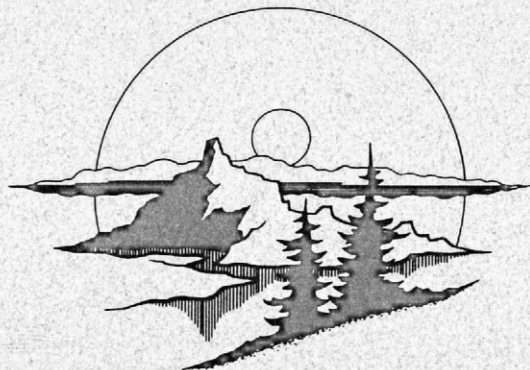


Fisher in snow, alternating walk, by Heather K. Lenz



Fisher, Running Track Pattern by Heather K. Lenz

Massachusetts-based artist Heather K. Lenz, whose work appears on the cover and on p.78, is primarily a painter. Her recent entry into the field of natural science illustration began with the production of illustrations for Paul Rezendes's *Tracking & The Art of Seeing* (Camden House Publishing, 1992). A limited number of original drawings from the book are available from the artist (8C82 Box 7-D, Wendell Depot, MA 01380) who has graciously agreed to donate a substantial portion of any sales to the Wild Earth Research Fund.



Biodiversity Legal Foundation

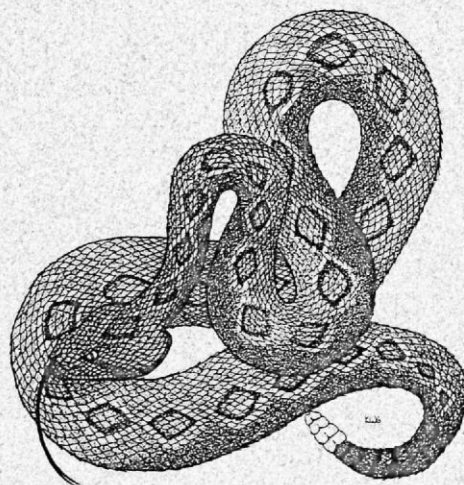
The Biodiversity Legal Foundation (BLF) is a non-profit, public interest organization dedicated to the preservation and restoration of all native wild plants and animals, communities, ecosystems, and natural landscapes in North America. The BLF utilizes creative administrative and legal strategies to prevent habitat destruction, to prod government agencies into action, and to enforce conservation law intended to protect natural diversity. ☞

Integrating Biology and Law

The BLF pioneered some of the first successful multiple species/ecosystem cases in the country. These legal and administrative actions are usually brought on behalf of grassroots activists and scientists. The BLF recently planned and brought one of the first broad-based generic lawsuits challenging the U.S. Fish and Wildlife Service for its failure to list and protect hundreds of native species under the Endangered Species Act. As part of this legal action, the courts affirmed the illegality of President Bush's 90-day moratorium on rule-making which was holding up the listings of dozens of species under the ESA.

Looking Out For The Little Guys

Though the BLF has taken a lead role in legal efforts to protect the Grizzly Bear and Woodland Caribou in the Selkirk Ecosystem, the Foundation's sharpest focus is on the aggressive defense of the ecosystems of "uncharismatic" species—which are often overlooked in the preservation efforts of mainstream environmental groups. Among others, the BLF is currently working to protect these. ➡



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