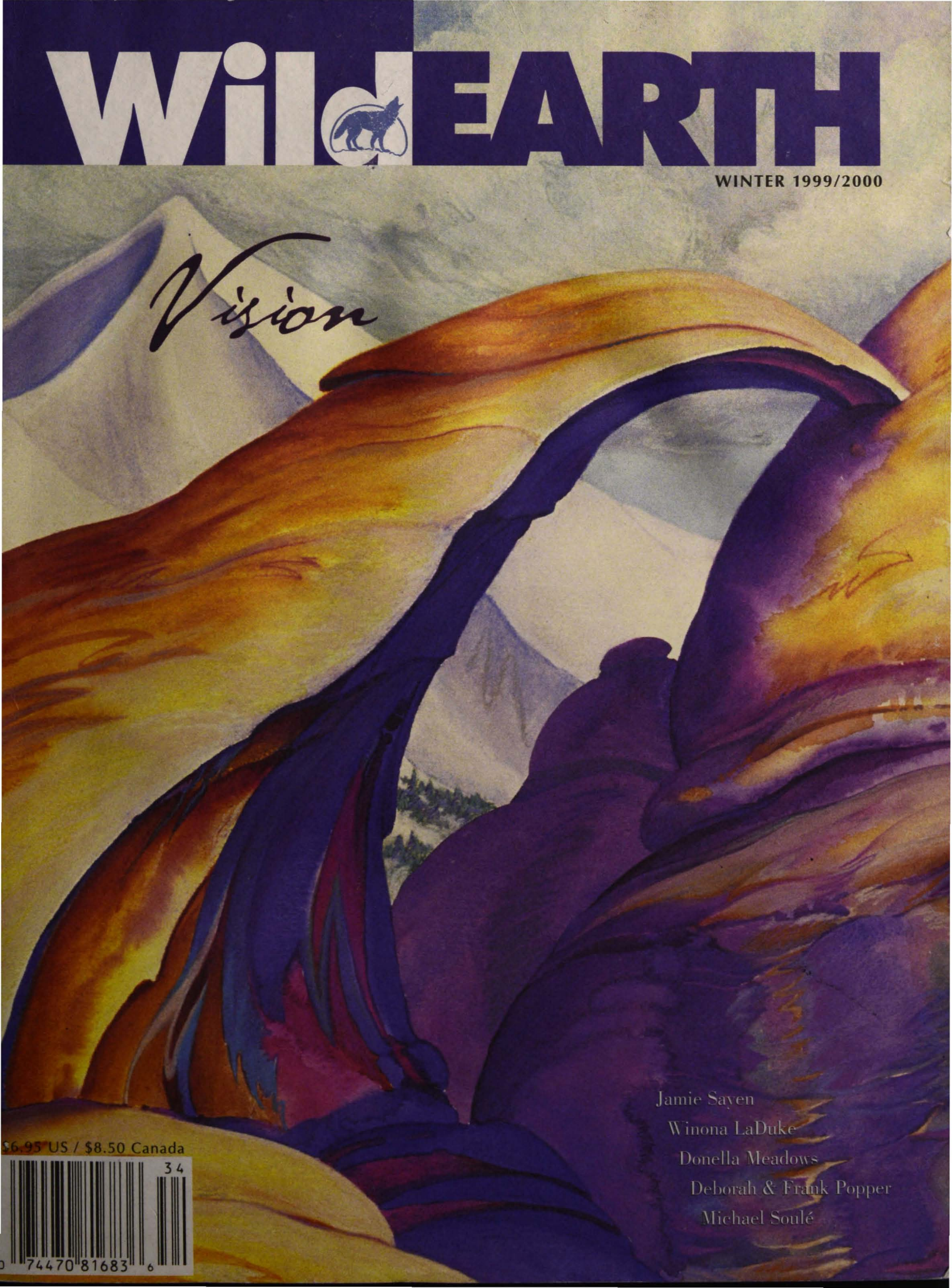
Wild EARTH

WINTER 1999/2000



Jamie Sayen

Winona LaDuke

Donella Meadows

Deborah & Frank Popper

Michael Soulé

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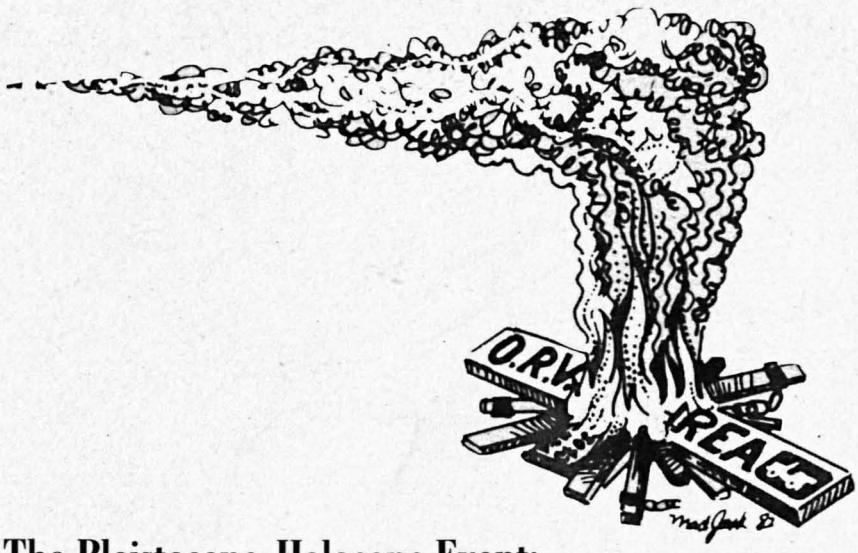
Around the Campfire

by Dave Foreman



The Pleistocene-Holocene Event: Forty Thousand Years of Extinction

IN 1996, 1500 LEADING SCIENTISTS FROM 80 COUNTRIES PUBLISHED A comprehensive report on extinction:

> *During the past 400 years, some 486 animal and 654 plant species are recorded as having gone extinct...a rate about 1,000 times greater than the [average] rate of extinction.*

Moreover, they noted:

> *No biologist has documented the extinction of a continental species of plant or animal caused by non-human agencies....*[1]

The first extinctions caused by the European Age of Exploration occurred about four hundred years ago (1600 AD). Spain, Portugal, France, England, Holland, and other European countries were discovering continents and islands to the farthest corners of the world. Today's mass extinction event began with European exploration, exploitation, and colonization—or so the argument goes.

But does this common belief hold up under scrutiny? Just as it is hard to focus on something right before your nose, so is it difficult to clearly see your age in history—much less in geology. To bring such a fuzzy view into sharpness, we must step back a tad. Drawing back also allows us to put the object of our gaze into a larger scene. By being so close to the modern horror of extinction, we hold a fuzzy view—thus we see today's extinction crisis beginning in 1600. If, however, we refocus to see a wider slice of time, we ken a truer picture of extinction.

continues on page 2

1. Stolzenburg, William, "Extinction For The Record," *Nature Conservancy* May/June 1996, p. 6.

The opinions expressed in Campfire are my own, and do not necessarily reflect official policy of The Wildlands Project or *Wild Earth*. —*DF*

About Wild Earth *and The Wildlands Project*

Wild Earth is a quarterly journal melding conservation biology and wildlands activism. Our efforts to strengthen the conservation movement involve the following:

- We serve as the publishing wing of The Wildlands Project.
- We provide a forum for the many effective but little-known regional wilderness groups and coalitions in North America, and serve as a networking tool for wilderness activists.
- We make the teachings of conservation biology accessible to non-scientists, that activists may employ them in defense of biodiversity.
- We expose threats to habitat and wildlife.
- We facilitate discussion on ways to end and reverse the human population explosion.
- We defend wilderness both as concept and as place.

The Wildlands Project is the organization guiding the design of a continental wilderness recovery strategy. Through advocacy, education, scientific consultation, and cooperation with many regional groups, The Wildlands Project is drafting a blueprint for an interconnected, continental-scale system of protected wildlands linked by habitat corridors.

Wild Earth and The Wildlands Project are closely allied but independent nonprofit organizations dedicated to the restoration and protection of wilderness and biodiversity. We share a vision of an ecologically healthy North America—with adequate habitat for all native species, containing vibrant human and natural communities.

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cover art
"A Feeling of Moab," mixed media by Serena Supplee (©1994)

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WILD EARTH (ISSN 1055-1166) is published quarterly by the Cenozoic Society, Inc., PO Box 455, Richmond, VT 05477. The Cenozoic Society is a nonprofit educational, scientific, and charitable corporation. ■ Cenozoic Society Board: John Davis (CA), Barbara Dean (CA), Dave Foreman (NM), David Johns (OR), Reed Noss (OR). ■ 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. Individual memberships $25; low income memberships $15. Subscriptions to Canada and Mexico $30 per year, overseas subscriptions $45 (air mail). ■ Periodicals postage paid at Richmond, VT and additional offices. ■ POSTMASTER: Send address changes to *Wild Earth*, PO Box 455, Richmond, VT 05477. ■ All editorial and membership correspondence should be sent to Wild Earth, PO Box 455, Richmond, VT 05477. We strongly discourage submissions of unsolicited manuscripts. We welcome submissions of artwork. Artists who want their work returned should include a stamped, self-addressed envelope. *Wild Earth* assumes no responsibility for unsolicited materials. ■ *Wild Earth* accepts limited advertising that is compatible with its policies and goals. For rates/information contact Lina Miller at (802) 434-4077. ■ *Wild Earth* is available on microfilm from University Microfilms, Inc., 300 North Zeeb Rd., Ann Arbor, Michigan 48106-1346. Statistical abstracting by Pierien Press, PO Box 1808, Ann Arbor, MI 48106. ■ Articles appearing in *Wild Earth* are indexed in *Environment Abstracts, Environmental Periodicals Bibliography, The Alternative Press Index* and *Wildlife Review Abstracts*. *Wild Earth* is printed on 100% PCW paper (cover) and 80% PCW paper, processed chlorine-free (inside).

Around the Campfire *continued*

The Hawaiian Islands are a poster child for extinctions caused by European contact—between 18 and 30 species of endemic birds have become extinct in the last 200 years.[2] But recent research by avian paleontologists Helen James and Storrs Olson of the Smithsonian Institution shows that most bird extinctions in Hawaii did not occur after Captain Cook became the first European to visit in 1778, but after the first Polynesians arrived in 400 AD. Their research has "unearthed at least 50 previously unknown species of birds which went extinct" before Cook, including a close relative of the bald eagle, an accipiter hawk, three species of long-legged owls, four flightless geese, three flightless ibises, and 15 Hawaiian honeycreepers (a group unique to Hawaii).[3]

If we shake off today's blinders and ponder carefully the historical, biological, and fossil records, we must conclude that the current extinction crisis did not begin only 400 years ago, and it has not been caused solely by colonial and then industrial European empires. Today's extinction crisis—the end of the Pleistocene, in Michael Soulé's words—has been going on for 40,000 years, and, though caused by humans, it is not only modern, European society that has wreaked ecological havoc. Indeed, it has only been in the last few decades that industrial civilization has rivaled Stone Age cultures in the number of species exterminated. Ever since modern humans began to spread into hitherto unoccupied parts of the world beginning some time before 40,000 years ago, a single mass extinction has been underway.

During these forty millennia, human beings have wrought a revolution in the diversity of life. Duke University's John Terborgh, who, along with Soulé, was

It has only been in the last few decades that industrial civilization to spread into hitherto unoccupied parts of the world beginning

selected by *Audubon* magazine as one of the 100 greatest conservationists of the century, has looked at the loss of big animals in North America and concludes,

> *That we should live in a world without megafauna is an extreme aberration. It is a condition that has not existed for the last 250 million years of evolutionary history....*
>
> *To add perspective to the above, let us reflect on the fact that the entire eastern half of the North American continent south of the North Woods supports only one ungulate, the white-tailed deer...eastern North America is unique: all other continental mammal assemblages include a number of ungulates, frequently a half-dozen species or more.*[4]

2. Pimm, Stuart L., Gareth J. Russell, John L. Gittleman, and Thomas M. Brooks, "The Future of Biodiversity," *Science* Vol. 269, 21 July 1995, p. 348.
3. Haupt, Lyanda, "Feathers and Fossils: Hawaiian Extinctions and Modern Conservation," *Wild Earth* Spring 1996, pp. 44–49.
4. Terborgh, John, "Top-down or Bottom-up, What Does It Matter?" unpublished draft in author's files. Large animals or megafauna are 100 pounds (45 kg) or larger.

has rivaled Stone Age cultures in the number of species exterminated. Ever since modern humans began some time before 40,000 years ago, a single mass extinction has been underway.

But even a half-dozen species of large ungulates is not normal. I spent three weeks in southern Africa in 1998. Traveling through an area smaller than the eastern United States, I saw 22 species of ungulates, out of a total number of 42.[5] Eastern North America is truly an empty landscape.

Even western North America has a pitifully small number of large mammals: there are only nine species of large native ungulates in the western United States and northern Mexico. It has only recently been so. Eleven thousand years ago, what is now the western United States and northern Mexico provided habitat for at least 31 species of large ungulates, including five species of mammoths and mastodons. While today the area has five species of large carnivores (counting the very rare and largely absent grizzly bear, gray wolf, and jaguar), 11,000 years ago there were ten large carnivores spread across the landscape.[6] The extinction of 23 species of large ungulates and five species of large carnivores was caused by the arrival of a skilled hunting culture of modern humans across the Bering Land Bridge.[7]

The sixth great extinction should properly be called the Pleistocene-Holocene Extinction or the P-H Event, just as the one 65 million years ago (best known for the extinction of dinosaurs) is properly called the K-T Event or the Cretaceous-Tertiary Extinction.

5. Stuart, Chris and Tilde, *Field Guide To The Mammals of Southern Africa* (Struik Publishers Ltd., Cape Town, South Africa, 1995). However, I saw wildlife only in protected areas in Africa. Outside such places, the land is more barren of wild animals than is the United States. With exploding human populations, African wildlife is crowded into increasingly smaller and more isolated reserves.
6. Martin, Paul S. and David A. Burney, "Bring Back the Elephants!" *Wild Earth* Spring 1999, p. 58.
7. The ultimately convincing case that these extinctions were caused by humans is made by University of Washington paleontologist Peter Ward in *The Call of Distant Mammoths: Why the Ice Age Mammals Disappeared* (Springer-Verlang, New York, 1997).

The Ivory-billed Woodpecker, a casualty of the Second Wave.

Homo sapiens sapiens evolved in Africa over 100,000 years ago, but, until about 40,000 years ago, we were still "just glorified chimpanzees," according to Jared Diamond.[8] Then came "The Great Leap Forward." Suddenly, with the appearance of Cro-Magnons in Spain and France, our tool kit became more sophisticated and innovative, and we became very effective hunters of big game.[9] The P-H Event is the consequence of this Great Leap Forward and of our spreading out into new lands, or, in the words of British scientist Richard Owen 140 years ago, of the "spectral appearance of mankind on a limited tract of land not before inhabited."[10]

We can see the Sixth Great Extinction occurring in three waves, each caused by new groups of humans, armed with new technologies, conquering new lands. The First Wave, the Conquest by Modern Humans, began before 40,000 years ago when skilled big-game hunters first entered lands where fully modern humans had not previously existed. It continued until 200 years ago as Stone Age farmers settled unpeopled islands in the Pacific and Indian Oceans. The Second Wave, the Conquest by Europeans, began in 1500 and ended around 1970 as European colonial and later industrial civilization spread over the world. The Third Wave, the Conquest by Overpopulation and Globalization, began about 1970 as human population exploded and new technologies and business practices tied the world into one exponentially expanding agro-techno-economy.

In the First Wave, extinctions were caused by hunting, fire-setting, agricultural clearing, and introductions of dogs, rats, pigs, goats, and diseases into areas that had not previously experienced them. The victims were primarily large mammals, birds, and reptiles on continents and islands, and small birds on islands.

The Second Wave was caused by hunting with guns; large-scale fishing and whaling; massive habitat destruction by agriculture, forestry, and domestic livestock grazing; river damming and diversion; introduction of exotic predators, browsers, grazers, parasites, and diseases; and later by industrial pollution. Islands lost birds, giant tortoises, and small mammals. On continents, some birds, fish, and large mammals have been driven

8. Diamond, Jared, *The Third Chimpanzee: The Evolution and Future of the Human Animal* (HarperCollins, New York, 1992), p. 364. *The Third Chimpanzee* is the most valuable book for understanding the human animal.
9. *Ibid.*, p. 47. Diamond believes that the evolution of the voice box to allow complex language and, therefore, culture caused the Great Leap Forward.
10. Grayson, Donald K., "Nineteenth-Century Explanations of Pleistocene Extinctions: A Review and Analysis" in Martin, Paul S. and Richard G. Klein, eds., *Quaternary Extinctions: A Prehistoric Revolution* (The University of Arizona Press, Tucson, 1984), p. 28. Grayson's chapter in *Quaternary Extinctions* is an excellent summary of how scientists came to accept the reality of past extinction, pp. 5–39.

Ivory-billed Woodpecker engraving

into extinction, but many more species of birds, freshwater fish, and large mammals have had their numbers drastically reduced to the point that their survival is shaky. In the oceans, many sea mammals, turtles, shellfish, and fish have been so wastefully exploited that their populations are mere shadows of what they were 500 years ago.

The Third Wave has just begun. Its agents of extinction are those of the First and Second Waves—overexploitation, habitat destruction, introduction of exotic species, disease, and pollution. However, three factors determine the degree of human impact: 1) our spectral appearance in previously unpeopled lands; 2) our population density; and 3) our level of technology. Human population has exploded from about 10 million people 10,000 years ago to over six billion today. With those six billion, a globalized agro-techno-economy has spread over the whole Earth. Because of population and globalization, we now storm into the last wild, remote places with an unquenchable hunger for whatever resources are in them and with the technological ability to seize those resources—whether oil, or a patch of rainforest to slash and burn, whether great schools of fish or bushmeat. Thus, we now threaten *everything*—from the last megafauna to plants to insects to coral reef organisms.

In 40,000 years, modern humans have conquered Earth in three phases, with devastating consequences for the rest of life.

—DAVE FOREMAN

This column is condensed from my book-still-in-progress, The War on Nature.

SUMMARY OF THE P-H EVENT EXTINCTIONS

The First Wave — Human Expansion: 40,000 BP to 200 BP (1800 AD)[11]

Europe and Northern Asia: 40,000 BP to 13,000 BP[12] — *Megafauna, including Neandertals.*

Australia and New Guinea: 40,000 BP to 25,000 BP — *Large marsupials: 13 genera (86.4%) and at least 38 species. Also large reptiles (including a 24-foot-long monitor lizard) and large birds.*

North and South America: 11,000 BP to 10,000 BP — *Large mammals: 33 genera in North America (73.3%) and 46 genera in South America (79.6%).*

Caribbean Islands: 7,000 BP to 3,000 BP — *Giant ground sloths, monkeys, and tortoises. 80% of all land mammals.*

Mediterranean Islands: 5,000 BP — *Dwarf megafauna, including elephants.*

Wrangell Island (Siberian Arctic): 3,500 BP — *Mammoths.*[13]

Pacific Islands: 3,000 BP to 200 BP (1800 AD) — *Around 2,000 bird species, or about 15% of all birds on Earth.*

New Zealand: 1,000 BP to 200 BP (1800 AD) — *At least 12 species of giant moas and other large birds, including the world's largest eagle.*

Madagascar: 1,000 to 200 BP (1800 AD) — *At least six species of elephant birds, two giant land tortoises, 12 species of large lemurs (one was almost as big as a gorilla), a puma-sized mongoose, and others.*

The Second Wave — European Expansion: 500 BP (1500 AD) to 30 BP (1970 AD)

Islands — *Giant tortoises, birds, mammals. 36 species of mammals on Caribbean Islands; 33 species of birds on Indian Ocean islands.*

Oceans — *Steller's sea cow. Steep population declines of many species of marine mammals and fish.*

Continents — *19 species of mammals in Australia. Many freshwater fish and mollusks. Steep population declines of remaining megafauna.*

The Third Wave — Globalization: 1970 to 2100 AD

Many species in all taxa, everywhere, are imperiled.

11. BP means before present. To convert BP dates to BC dates, simply subtract 2,000 years. To convert to AD, subtract from 2000 AD.
12. The earliest date for each area roughly corresponds to the arrival of modern humans.
13. Yes, you've translated this date correctly to 1500 BC. Mammoths still lived after pyramids had been built in Egypt.

I read a lot of books and get a lot of magazines about wilderness preservation. You people make the most sense. You are the most far-sighted. You have the most sweeping vision.

MAUREEN McCONNELL
Cambridge, Massachusetts

I was interested to see your selection for the back page (fall 1999) "Species Spotlight"—Tuberous Indian Plantain (*Cacalia tuberosa*)—and to read that this prairie species is now "sadly diminished," Threatened in Wisconsin, and so forth.

However, it may not be the *only* species in this genus in trouble. *Newcomb's Wildflower Guide* includes three northeastern *Cacalia*, without status comments. But, by 1989, the "Checklist of the Plants of New Jersey," by Karl Anderson (a superb and active field botanist) lists these same three species as "Historic," "Extirpated," and "Extirpated," respectively.

Although none of these were considered exactly "common" in the Northeast, bear in mind that they were not "prairie specialists," either. Perhaps other factors are at play here?

GUY TUDOR
Forest Hills, New York

In just over half a century, we have not improved upon Aldo Leopold's wilderness thought, although Ed Abbey awakened our passion—and our outrage. In the fall 1999 issue of *WE*, Terry Tempest Williams, writing with a great deal of heart, thought, and soul as she reflected on Leopold's legacy, recalls to us those sterling character values—wisdom, courage, and humility—needed to carry on the fight for wilderness.

One place we can carry on that fight is by getting solidly behind the Northern Rockies Ecosystem Protection Act (NREPA), which has a Republican sponsor and approximately 79 congressional co-sponsors. NREPA [H.R. 488] would put on the ground the kind of big wilderness and connectivity that we are right now merely talking about. Passing NREPA would be a landmark event, akin to the Alaska Lands Act signed into law by President Carter. It would begin to implement the Y2Y vision and actually do something to protect the griz by connecting Yellowstone grizzly habitat with northern Montana and Idaho habitat. NREPA would honor Aldo Leopold's legacy.

Quite frankly, I would like to see stronger support for NREPA from the conservation community. There should be fierce lobbying for NREPA; we should be writing letters to the editor, hassling our political representatives mercilessly, flooding them with letters and e-mails. It is time we show this kind of courage; it is time we fight for NREPA (or some equally meaningful alternative) and get it passed. As Cactus Ed says, "Sentiment without action is the ruin of the soul."

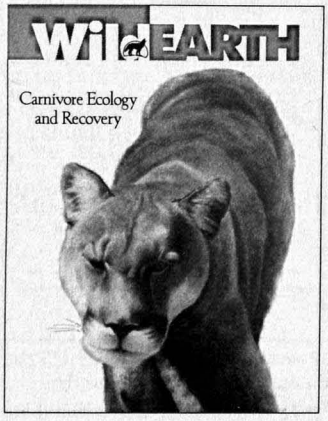
CARL D. ESBJORNSON
Bozeman, Montana

As a wildlife scientist who is concerned with accurate descriptions of nature, Thomas L. Fleischner's essay (summer 1999) was both a welcome surprise and a pleasure to read. I agree with his main thesis, that we must somehow reconnect literary and scientific nature writing, but I would have appreciated a more robust conclusion to his provocative essay, as well as a critical appraisal of contemporary works of natural history.

My main argument with current natural history writing is the striking lack of diversity that it displays, both in authorship and content. The same names seem to appear again and again on bookshelves and in periodicals, hawking the same recycled wares that are poor shadows of inspired writings once produced by these very authors.

Equally troublesome is the number of natural history titles produced by authors who have literary and not scientific backgrounds. I can quickly list a dozen popular natural history writers, none of whom are scientists. I am able to recall only two widely read natural history writers who possess rigorous scientific training. Why the paucity of writers with science backgrounds (or those who are actively engaged in scientific investigations)?

I suggest that those who are inter-



ested in the protection and appreciation of nature need to demand the same diversity in the written environment that they call for in natural ones. I do not think that we should stop with Gary Snyder's admonishment for a community of writers who are both "nature and place literate." Rather, we should insist that this community be subject to the same sort of predation (for lack of a better term) that other literary and scientific communities regularly allow in their ranks: continual critical appraisal of published work, even if this appraisal ruthlessly dissects texts written by popular authors. We need to recognize shoddy work as such, and, as readers and fellow writers of natural history, we need to create forums where works of natural history are discussed in ways other than the appreciative book review and where unpublished authors receive the opportunity to have their work read and evaluated. We must be as dedicated to the idea of thoughtful, original, and diverse natural history writing as we are to the idea of wilderness, even if this means stepping on a few cherished toes.

A.J. KROLL
Las Cruces, New Mexico

ABOUT OUR PAPER

A good supply will eventually run dry, and so it is with our paper stock of over five years. We've turned to New Leaf Paper's Eco-Offset, a 100% recycled grade containing a minimum of 80% post-consumer fiber and processed without chlorine. Additionally, we've received word that our present cover stock is now being manufactured with chlorine. With the next issue we'll switch to a New Leaf cover stock to continue our standard of high post-consumer content coupled with no chlorine bleaching. —**KC**

Thread

A butterfly remained alight
On tattered trails of color where
Dusk drove it into night.
Fruits shriveled. Stems fell bare.

Now trees are but in silence blown.
They stand unfleshed and still and gray,
Scratch against a sky like stone.
Bark is bone. The rest, decay.

A season follows this—
Is dormant in the air—
On the thread that keeps the chrysalis.
And where renewal hibernates
No loss is great. I'll meet you there.

—Matthew Orr

Waiting Out Winter

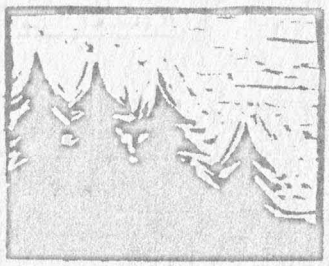
Clear and cold as cats' eyes
Idaho nights wring all obscurity
from the skies:
obsidian, ice-light, half a moon.

Bear's had a belly-full—
gone cold and stuporous—
hears only his own dreams.
Smells sow, sweet apples, old meat.

Across the darked valley
dogs in barnyards curl smug, secure
—hounds that shout with half
their hearts.
Coyotes who maimed them with escape,
stop their songs—listen stiff-legged
for the heartbeats of mice.

A thumbnail deep
from breastbone to backbone,
they huddle in tunnels of hoarfrost,
still, in the weak blue light.
Small meals at the edge of a galaxy.

—Bill Yake



A Wilderness View

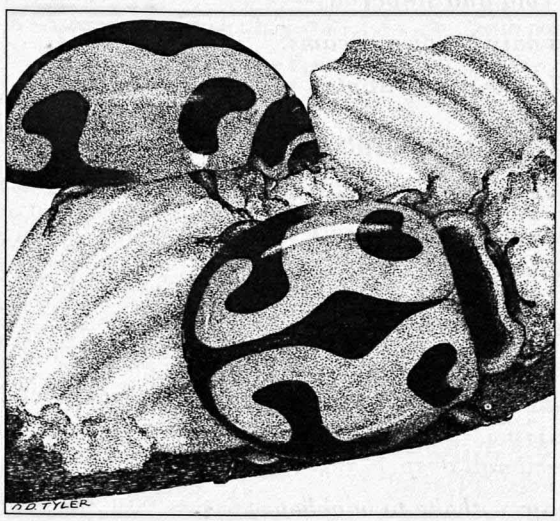
The Vision Thing[1]

Should we actually glimpse the ancient glory or hear the song of the wilderness, cities with their confusion become quiet, speed and turmoil are slowed to the pace of the seasons, and tensions are replaced with calm.

I vividly remember the first time I heard the haunting music. It was on the shore of Lake Michigan at the end of a broken pier where a translucent pool shone among the rocks. Seagulls wheeled and cried above me. Waves crashed against the pier and I was alone in a wild and lovely place, part of the wind and water and all the sounds, colors, and feeling of the natural world I had found. That day I entered into a life of indescribable beauty and delight....

Another time, at the headwaters of a little creek I found a spring pool surrounded by great trees, yellow birch, white pine, and hemlock. I lay on a shelf of lichen-covered rock above it, looking down into the deep clear water. A school of brook trout lay near the bottom, fanning their fins as they faced the flow from above. When I tossed a cone onto the surface they rose as one and the pool came alive with their splashing. Then I heard the singing clearly, for here was a bit of primitive America, untouched and unseen.

—Sigurd F. Olson[2]



While calendarial milestones may be largely meaningless, the close of a decade, century, or even millennium[3] is a convenient cognitive hook on which to hang a tale—or construct a vision of the future. Certainly such landmarks can be culturally useful, providing an impetus for reflection and speculation. Or, in the wrong hands, they can be an excuse to engage in journalistic cliché. In recent months, the popular media has produced a flood of "greatest this or that" lists: "The 100 Greatest _____ of the 20th Century," "50 Most Influential _____ of the Decade," and so on.

At *Wild Earth*, we've studiously avoided such list-making—although it was hard to resist the prospect of inviting sytematists to vote for the "Least Appreciated Taxa of the 1990s" or asking entomologists to help compile a "Best Bugs of the Millennium: Arthropods that Changed the World." But we could not resist marking the end of the 20th century, a

1. A delightfully inelegant phrase, borrowed with grateful acknowledgement from President George Bush. (The first and only one, let us hope.)
2. From the prologue to *Sigurd F. Olson's Wilderness Days*; 1972; New York: Knopf.
3. Please, no scolding letters. I know that by some reckonings a full year remains before the current millennium is kaput. As the spring of 2001 corresponds with *Wild Earth*'s ten-year anniversary, we'll defer to Stephen Jay Gould's opinion on this question and celebrate the millennial change next year.

vedalia beetles by D.D. Tyler

period notable for its extraordinary violence, both among human societies and between humanity and the rest of our living kin, with a look ahead.

The first step in preventing the premature demise of the Cenozoic Era, and ushering in the Age of Ecology, to use Paul Shepard's phrase, is to imagine it. Conservationists are, by nature, dreamers. From George Perkins Marsh to Julia Butterfly, the long sweep of American conservation history has been written by individuals who placed community above self-interest, who worked to reverse the tide of ecological destruction. Common to all conservation heroes, both celebrated and anonymous, is an ability to envision alternative futures—to see beyond the day's political "reality" and strive for something better.

One of those dreamers, rightfully celebrated, was Sigurd F. Olson (1899–1982).[4] Born at the close of the 19th century, Sig spent decades fighting to protect America's threatened wild places, particularly his beloved Quetico–Superior boundary waters wilderness. A biologist by training (who studied under legendary ecologist Victor Shelford), he worked variously as a canoe guide, biology teacher, college administrator, conservation consultant, and author. His many books, beginning with *The Singing Wilderness* in 1956, popularized the cause of wilderness preservation generally, and helped develop a national constituency for protecting the Quetico–Superior lake country, specifically. That body of wilderness lovers and canoeists continues to grow to this day.[5] Always, always, he was an indefatigable wilderness advocate.

Writing to become a member of the newly formed Wilderness Society in 1935, Olson wrote: "Please enroll me as a member who has never learned to compromise when the question of wilderness has come up." Over half a century later, he had not learned to soften or moderate his view when the wilderness values he cherished were at stake. Shortly before his death, when questioned about his vision for future management of the Boundary Waters Canoe Area Wilderness, he replied that restrictions on non-conforming, motorized use "should be continued until it is pure wilderness—no motorboats or snowmobiles...."

In this issue of *Wild Earth*, northern forest preservationist Jamie Sayen [And I Will Be Heard] considers precisely this type of uncompromising advocacy. Drawing lessons from the radical wing of the slavery abolition movement, he considers whether an unwavering, moralist stance may advance the cause of conservation better than appeasement and political accommodation. Other visionaries herein include native rights and environmental activist Winona LaDuke [The Seventh Generation], who articulates the need for an ecological amendment to the US Constitution; sustainability doyenne Donella Meadows [Chicken Little, Cassandra, and the Real Wolf], who thinks about different ways to think about the future; and professors Deborah and Frank Popper [The Buffalo Commons], who describe how an apt metaphor can help shape a region's ecological and cultural destiny. Conservation biologist Michael Soulé concludes and anchors this theme coverage with an overview of The Wildlands Project vision—the recovery of wild Nature across the continent as networks of people protect networks of wildlands.

That vision, as we've often noted, is a compelling idea for a world out of balance, and is necessarily broad both in space and time. Taking the long view, Dave Foreman [Around the Campfire] notes that modern humans have been in the extinction business for 40 millennia or more. It would be hubris, and typical anthropocentric shortsightedness, to assume that the process of ecological recovery on a continental scale might be quickly achieved. Even while benefiting from the assistance of 21st century wilderness advocates, conservation biologists, and ecological restorationists, Nature's return to robust health—as ecological and evolutionary processes reassert themselves across the landscape—is the the work of decades, centuries, and even millennia.

Elsewhere in this issue are articles on invertebrate and large carnivore conservation, a summary of a reserve design for the Klamath–Siskiyou ecoregion, further consideration of an omnibus [Big Wild] wilderness legislation strategy, and an analysis of the perceived wilderness values embodied in the Arctic National Wildlife Refuge.

In sum, this *Wild Earth* acknowledges historical lessons, considers current debates and evolving strategies within the conservation movement, and endeavors to anticipate—and help shape—emerging trends in biodiversity preservation policy and activism. May the 21st century be someday recognized as a watershed in human affairs, when a legacy of extinction was turned aside and an era of restoration and reciprocity between our species and the rest of living Nature commenced.

—TOM BUTLER

4. I am indebted to Curt Meine for alerting me to the centennial anniversary of Sigurd Olson's birth. In recognition of that anniversary, the Friends of the Boundary Waters Wilderness, in collaboration with The Wilderness Society, have produced a superb new publication celebrating Sig's life and work, with articles by T.H. Watkins, Paul Gruchow, Becky Rom, and others. Call or write the Friends for a copy (1313 Fifth St., SE, Suite 329, Minneapolis, MN 55414; 612-379-3835).
5. To honor Sigurd Olson's legacy, join the tenacious and effective Friends of the Boundary Waters Wilderness, or send a financial contribution to help underwrite your favorite regional wilderness group's defense of a great American treasure.

AND I WILL BE

Abolitionism & Preservationism in Our Time

by Jamie Sayen

In 1988, the region's conservation community was unprepared when a million acres of land in northern New England formerly belonging to Diamond International were sold. Mainstream groups, more concerned about political collaboration with the timber industry than with protecting the region's battered forests, attacked and marginalized those of us who called for wilderness protection for the Diamond lands.

Several environmental groups in Maine collaborated with the timber industry to defeat a citizen-initiated referendum to ban clearcutting in Maine's industrial forest in 1996. During this period, the Northern Forest Alliance, a consortium of more than 30 conservation organizations working in New England, supported legislation that would have given the timber industry billions of dollars in tax breaks without requiring it to reform its forestry practices.

In 1997, the Northern Forest Alliance defined "Wildlands" as: "A mosaic of wilderness and managed forests." The Alliance has not been forthcoming when asked "How much wilderness?"[1]

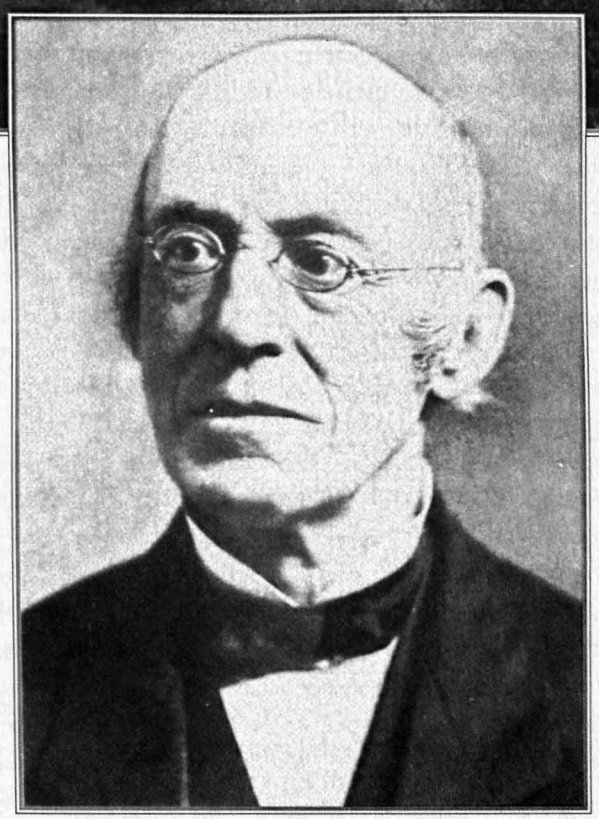
Blockbuster sales of paper company lands in northern New England have occurred with regularity since 1988. In 1998–1999 nearly four million acres in Maine alone—one-fifth of the state—were sold. Despite Maine's paucity of public land (only 5% of the state is in public ownership, roughly 1% is designated Wilderness), the region's establishment conservation groups still refuse to call for wilderness protection for a substantial portion of these lands. "Wilderness" seems to have disappeared from their vocabulary.

Similar stories of appeasement, compromise, accommodation, and failure to protect ecological integrity can be cited in many other regions of the United States. Social change movements face such internal conflicts when entrenched power tries to co-opt them.

Fundamental social change occurs only when its agents refuse to play the insiders' game. Consider the abolition of slavery.

1. *Wildlands: A Conservation Strategy for the Northern Forest*, A Proposal by the Northern Forest Alliance, February 1997.

HEARD



William Lloyd Garrison, circa 1879

I am aware that many object to the severity of my language; but is there not cause for severity? I will be as harsh as truth, and as uncompromising as justice...urge me not to use moderation in a cause like the present....I am in earnest—I will not equivocate—I will not excuse—I will not retreat \a *single inch—AND I WILL BE HEARD.*

WILLIAM LLOYD GARRISON,
inaugural editorial in *The Liberator,* January 1, 1831

photo of checkerboard clearcuts (Maine Woods) by Michael Kellet


Thoreau

The summer of 1846 was a busy time for Henry David Thoreau. It was the midpoint of his two-year stay on Walden Pond. He was hard at work on the first of eight drafts of *Walden*. On July 23 or 24, he was jailed for his refusal to pay a poll tax—his protest against the Mexican War, then being waged to extend slavery into new territory. His celebrated essay "Civil Disobedience" grew out of this experience. On August 1 he helped organize an abolitionist gathering to commemorate the anniversary of the emancipation of slaves in the West Indies.

A month later, he set out on his first trip into the Maine wilderness. Climbing Mt. Katahdin he experienced the raw indifference of Nature, which was "not bound to be kind to man." Humanity, he realized, was a part of Nature, not lord over it.

That summer, Thoreau's two great interests in life—the individual's relationship to society and humanity's relationship with Nature—converged. His lifelong effort to answer the question "How should I live?" became a celebration of wildness. Katahdin challenged him to search for the laws, the limits, and the rhythms of Nature. In a letter written in 1848, he exalted: "What Nature is to the mind, she is also to the body. As she feeds my imagination, she will feed my body."[2]

The laws of Nature govern humans as well. Thoreau noted in his journal: "This world is not a place for him who does not discover its laws."[3] In his first book, *A Week on the Concord and Merrimack Rivers*, composed during his sojourn at Walden, he wrote: "...though Nature's laws are more immutable than any despot's yet to our daily life they rarely seem rigid, but permit us to relax with license in summer weather."[4] Nature's laws teach us limits that liberate us from the folly of self-absorption and materialism.

If we seek to understand Nature's laws, learn her limits, and let our imaginations run wild within those confines, we achieve a freedom unattainable through merely political channels. To Thoreau, "wild" meant "self-willed"—or free. "The most alive," he sang in his essay "The Wild," "is the wildest....[A]ll good things are wild and free."[5]

But Thoreau could not be truly free while others were enslaved. The quest for inner freedom led him into the natural world. The quest for personal freedom made him an abolitionist, a conductor on the Underground Railroad, and an ardent defender of John Brown.

Thoreau recognized that slavery and Nature abuse grew out of the same "ethical myopia"[6] that has characterized much of American history. The economic ethic that countenanced slavery turned our forests, rivers, and wildlife into commodities. In America's quest for material prosperity, black humans and wild ecosystems were simply resources to be appropriated for economic advantage.

Affluence in America has been underwritten by the degradation of people and wild Nature.[7] Puritans sold Native Americans into slavery during and after King Philip's War in 1675–1676. Slave labor cleared away the wilderness of the South. Southern affluence—at least for the plantation owners—was made possible by the use of slaves.

To Thoreau and the abolitionists, slavery was not an economic issue: it was a moral crisis. Institutionalized slavery denied the moral standing of black humans. Southern apologists for slavery as well as some of its critics, including Thomas Jefferson, denied that blacks were fully human, entitled to the inalienable rights Jefferson celebrated in the Declaration of Independence. Slaves were property; slavery was a system of force that protected the "property rights" of slave owners. If we listen carefully today, we will hear very similar arguments from timberland owners, polluting industries, and land developers regarding the moral standing of non-human Nature. In both instances, economic self-interest defines the limits of moral standing; slavery and ecological degradation have been defended as necessary for economic survival.

IN 1830, THE ISSUE OF SLAVERY WAS VIEWED AS A MATTER for individual states to address, much the way forest management practices are today. Massachusetts had abolished slavery in the 1780s, and most northern states had done so during the early years of the new republic. In the South, slavery was a source of great anguish among many slave owners. Jefferson wanted to liberate his slaves, but could not afford to. Others viewed it as a necessary evil. Most opponents to slavery sup-

2. Robert D. Richardson, Jr., *Henry David Thoreau: A Life of the Mind*, 1986, Berkeley: University of California Press, p. 188.
3. *Ibid.*, p. 184.
4. *Ibid.*, p. 158.
5. Charles R. Anderson, ed., *Thoreau's Vision: The Major Essays*, 1973, Englewood Cliffs: Prentice Hall, Inc., pp. 145,149. The essay is alternately called "The Wild" and "Walking" and sometimes a combination of both. Sometimes the essay is split in half; the first half is "The Wild," the second section is "Walking." The edition I cite treats the essay as a single piece.
6. Roderick Nash, *The Rights of Nature: A History of Environmental Ethics*, 1989, Madison: The University of Wisconsin Press, p. 211.
7. *Ibid.*, p. 201.

ported schemes for the gradual emancipation of slaves or the recolonization of freed blacks to Africa. These reformers were unwilling to confront the slave owners, or to assert the right of the federal government to abolish slavery, fearful the South would secede from the Union.

But, the economics of slavery, like the economics of industrial forestry, transcended regional boundaries; the market forces in play were global. The Colonial-era slave trade sent English calico and linen, wrought iron, brass, and gunpowder to West Africa in exchange for slaves who were transported to the Indies and Americas. Cotton, sugar, and tobacco from the colonies were sent to England. The 19th century New England textile industry relied on slave-grown cotton transported in Yankee ships.

In 1830, only one-third of southern households owned slaves, but three-quarters of the slaves were on plantations that owned more than 20 slaves. By 1860, only a quarter of southern households owned slaves, and the wealthiest plantations owned the large majority. The South's economic elite controlled a vast accumulation of human "capital," and exercised great power over the non-slave-owning whites through economic domination and by fostering a culture of xenophobia and racism.

In 1831, William Lloyd Garrison, an obscure 25-year-old printer, began publication of *The Liberator*, an anti-slavery paper that he would publish for 35 years. He had recently served time in a Baltimore jail for publishing an attack on a Massachusetts shipowner for engaging in the illegal slave trade. He threw down the gauntlet in his inaugural editorial on January 1, 1831: "I am in earnest—I will not equivocate—I will not excuse—I will not retreat a single inch—AND I WILL BE HEARD."

Slave owners had long lived in dread of an insurrection. A bloody revolt had occurred in Haiti three decades earlier. Late in 1831, Nat Turner led a slave revolt in Virginia. Although Turner was betrayed before he could mount the full-scale revolt he had planned, his rebellion mortified the South. In the aftermath, the South suppressed further debate over slavery. Without such debate, southerners lived in a fantasy world that caused them to believe they could win the Civil War and survive on a one-crop economy based on slavery.

Garrison understood the role of free and open debate in exposing untruth and injustice. In 1830, he realized that the greatest obstacle to the eradication of slavery was the conspiracy of silence on the subject. Southerners naturally did not want to examine it too carefully, and northerners were unwilling to risk the Union by encouraging divisive debate. Garrison believed that people in free states had a "righteous duty" to break that silence, to articulate the cause of the slaves. "Let us begin to talk," he wrote, "and depend upon it, something noble will be done—and not till then."[8] In breaking the genteel silence on slavery, Garrison and the other radical abolitionists were able to frame the terms of the debate. It was a moral issue, not merely an economic or political question, or a matter of charity. It was simply *wrong* to deny political rights to other human beings.

Garrison's editorials were intentionally confrontational. He baited the slavers. He used the slavers' rhetoric against them, liberally quoting southern hotheads in the pages of *The Liberator*. He attacked the gradualists and colonizers as appeasers of evil. He quoted an English Quaker, Elizabeth Heyrich, who said gradualism was the "very masterpiece of satanic policy." When critics charged that immediate emancipation was inexpedient, Garrison shot back: "The question of expedience has nothing to do with that of right."[9] Many reformers desired to abolish the evils of slavery without challenging the legitimacy of the institution itself. Garrison scorned such accommodationism.

The agitation of the early radical abolitionists in the 1830s contributed to the South's slide deeper into tyranny. South Carolina Senator John Calhoun moved to silence debate over slavery in Congress. By 1836 Congress had imposed a gag rule on anti-slavery petitions. The political parties—the Jacksonian Democrats and the Whigs (led by slave-owner Henry Clay)—had no interest in debating slavery because it would antagonize their southern supporters and undermine their efforts to build a national coalition to win the presidency. The problem of slavery would be solved by denial. Critics of industrial forestry and preservationists unable to get a friendly word for wilderness out of today's politicians understand this head-in-the-sand approach.

In response to Garrisonian abolitionism, the South began to assert that slavery was morally right, even humane. As the years wore on, the South grew more demanding on the national political front, pushing for the annexation of Texas, the War with Mexico, the Fugitive Slave Law, and the expansion of slavery into Kansas, Nebraska, and other territories. As the abolitionists intensified their attacks upon the slavers, the southern defense of slavery and states' rights became increasingly irrational and violent, culminating in the assault of a Massachusetts senator by a South Carolina congressman on the floor of the US Senate in 1856.

8. Henry Mayer, *All on Fire: William Lloyd Garrison and the Abolition of Slavery*, 1998, New York: St. Martin's Press, pp. 64, 75. Garrison was but one of many dedicated abolitionists who persisted in the cause for decades. He is singled out here because he is an archetype of the uncompromising activist. I do not wish in any way to ignore or diminish the contributions of the thousands of other abolitionists—black and white, male and female—whose work was essential to ending human slavery in the United States.
9. *Ibid.*, pp. 70, 72.

Anti-slavery interests lost the vote to admit Texas to statehood in 1845; despite the defeat, Garrison celebrated the power of open debate to advance a moral revolution when authority and comfortable elites suppressed independent thought. "We have too little, instead of too much dissent among us," he concluded.[10]

While the South turned to censorship (and placed a bounty on Garrison's head), well-to-do northern whites, who fancied themselves potential abolition supporters, advised him to soften his pronouncements before they would contribute to *The Liberator*. Accommodationists worried that Garrison's attacks would make the fate of slaves worse and undermine their efforts to engage the South in meaningful dialogue. Garrison turned a deaf ear. Efforts to censor him provoked this retort: "Tell me not that an evil is cured by covering it up...that if nothing be said, more will be done."[11]

Agitation was the great political counterweight to the national conspiracy of silence on slavery from 1836 through the presidential election of 1856. Wendell Phillips declared in 1852: "Only by unintermitted agitation can a people be kept sufficiently awake not to let liberty be smothered in material prosperity....Republics exist only on the tenure of being constantly agitated." Joshua Giddings, another anti-slavery leader, declared: "Agitation is necessary to purify the political atmosphere of this nation."[12] Former slave Frederick Douglass stated bluntly: "Power concedes nothing without a demand."

Open debate within the abolitionist movement generated constant friction about fundamental goals and tactics. In the late 1830s, the movement split over the issue of returning liberated slaves to Africa. America was deeply racist, and many abolitionists viewed blacks as inferiors who could never live in harmony with whites in America. They proposed gradual emancipation and deportation to Africa. Moderate abolitionists, who viewed themselves as much more politically realistic than the Garrisonians, supported this plan. Garrison snorted that these people supported the "gradual abolition of wickedness."[13]

Around 1840, another split developed in the ranks of the abolitionists. As support of the abolitionists had grown and the power of the American Anti-Slavery Society had increased, some of its more wealthy and politically well-connected members decided it was time to make abolitionism an electoral issue. They formed the Liberty Party and ran presidential candidates every four years, garnering a miniscule percentage of the popular vote, not unlike today's Green Party.

Garrison argued that moral education, not political activity, remained the most urgent job. While the radicals sought to raise the ante with their attacks on the institutions—including the US Constitution—that supported slavery, the political wing sought to soften the message to appeal to more moderate voters and to muzzle Garrison and other loose cannons in the radical wing.

The underlying conflict, common to all social change movements, was a matter of expediency versus principle—reform at the margins versus fundamental change. Mainstream reformers traditionally have believed in a political solution to a specific problem. They believe we can lobby Congress and effect an end to slavery, or clearcutting, or inappropriate land development. Political outsiders, grassroots activists, and the Garrisonian wing of the abolitionist movement reject the status quo. They believe that the system itself is the problem. Merely abolishing slavery would not change other exploitative political and economic institutions. Radical abolitionists also supported the rights of women; many were pacifists; and most recognized that merely freeing the slaves, without accompanying educational, economic, and land reforms, would perpetuate the injustice suffered by black Americans.

Garrison's opposition to the Liberty Party was also pragmatic, even though the party's woolly-headed promoters viewed themselves as the truly practical abolitionists. They believed they could abolish slavery through congressional action without provoking secession.

Garrison believed it was essential for a small social change group to work on the people—not the politicians—first. He agreed with his friend George Thompson, the English abolitionist: "The people must emancipate the slaves for the government never will." Political change would only happen after moral change had transformed the political landscape. The job of the abolitionists was to effect that moral transformation.[14]

History has shown that Garrison's radical, moral stance was more pragmatic than the positions of moderate opponents of slavery. He rejected compromise: "...if we demand anything short of justice...if we ask for a part, we shall get nothing." In 1854, he declared: "Freedom is of God, and Slavery is of the Devil....I will not try to make as good a bargain for the Lord as the Devil will let me...and be thankful that I can do so much."[15]

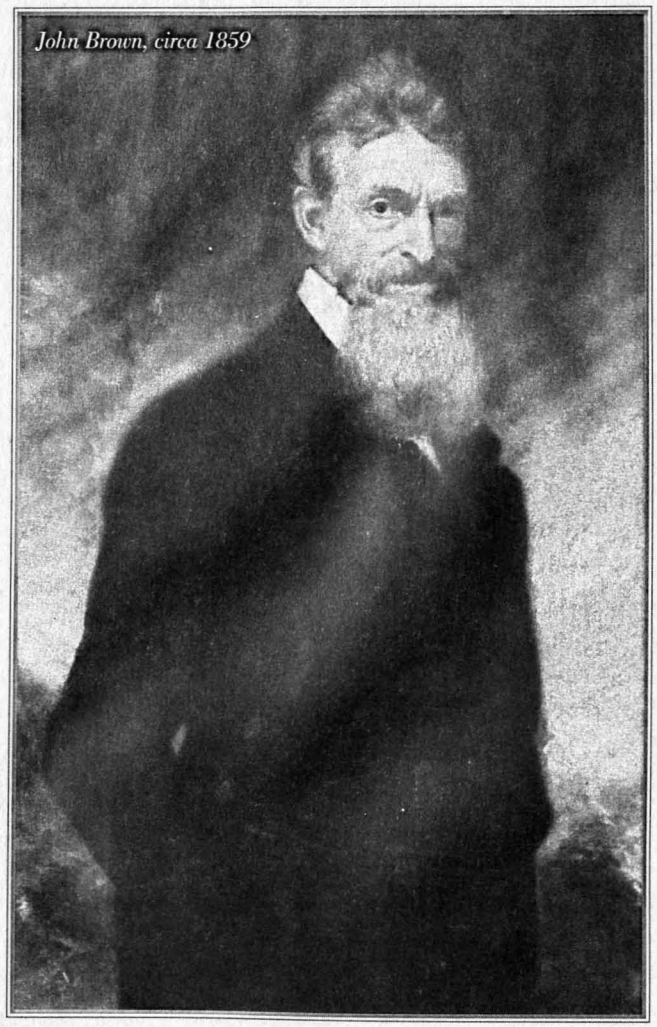
He had unwavering faith that a small minority can effect revolutionary change if it remains true to its ideals. When told

10. *Ibid.*, p. 345.
11. *Ibid.*, pp. 119, 122.
12. David S. Reynolds, *Walt Whitman's America: A Cultural Biography*, 1995, New York: Vintage Books (Random House), pp. 138-139.
13. Mayer, *All on Fire*, p. 118.
14. *Ibid.*, pp. 159, 263–264.
15. *Ibid.*, pp. 316, 439.

Curiously, where industrial foresters strip an area of all trees, plant a monoculture, and follow with intensive herbicide spraying, they call the land— ***plantations.***

A plantation on Edisto Island, South Carolina (left). Clearcut east of Moosehead Lake, Maine.

photo by Jym St. Pierre



John Brown, circa 1859

in 1844 that the abolitionist movement was too small to make a revolution, Garrison retorted: "We are enough to begin one, and once begun it can never be turned back." In fact, he believed that the American Anti-Slavery Society was most effective as a small, not a mass, organization. Large powerful groups had never championed great reforms. Small groups could act as catalysts for moral revolutions.[16]

Half a century later, the great Russian novelist Leo Tolstoy wrote admiringly of Garrison's insistence on a moral campaign: "...Garrison understood...that the only irrefutable argument against slavery is the denial of the right of any man over the liberty of another under any conditions whatsoever." Most proponents and opponents of slavery argued over the evils of slavery and the dangers of emancipation, Tolstoy wrote, but Garrison understood that slavery was "only a particular instance of universal coercion...." Accordingly, he articulated a "general principle with which it is impossible not to agree—the principle that under no pretext has any man the right to dominate, i.e., to use coercion over his fellows."[17]

The slavery crisis came to a head when California applied for statehood in 1849 after the Gold Rush. If admitted as a non-slave state, California would tip the balance of power in the US Senate away from the slave states. The hard-liners of the South, as usual, threatened secession. An aged Henry Clay and a youthful Illinois senator, Stephen Douglas, cobbled together the notorious Compromise of 1850 that admitted California as a non-slave state. The South received a series of concessions: slavery would remain in the District of Columbia; Congress would deny that it had power to regulate interstate slave trade; the remainder of the territory taken from Mexico would be open to slavery; and the federal government would forcefully return fugitive slaves to their southern "owners." The Fugitive Slave Act swelled the ranks of abolitionists and split the North and South. Architects of the 1850 compromise deluded themselves into thinking that they had saved the Union. Garrison accused Henry Clay of moral cowardice for striking a position "halfway between right and wrong."[18]

In 1857, the Supreme Court ruled in the Dred Scott case that Congress had no right to exclude slavery from the territories, that blacks had no constitutional rights of citizenship, and that the property rights of slave owners must be respected at all costs.

In 1859 John Brown raided a federal arsenal in Harper's Ferry, Virginia, in a doomed attempt to launch a slave insurrection. Although captured and condemned to death, his raid electrified the nation. Most northerners initially condemned his violence, but Thoreau, who had met Brown earlier that year, immediately rose to his defense in a public lecture, "A Plea for John Brown." "The government puts forth its strength on the side of injustice," he charged. The day after Brown was hanged, Thoreau helped one of Brown's soldiers escape to Canada. Brown's raid and the reaction of the North unified the South on the issue of secession.

Southern elites, grown more and more extremist in defense of slavery, the cotton economy, and the southern way of life, had gained control over the federal government after the 1850 election, in part due to the collapse of the Whig Party. At the same time, the economic power of northern elites was eclipsing the one-crop economy of the South. Northern economic interests that wanted economic growth and expansion, free land, free labor, free markets, and high tariffs collided with a southern elite that opposed all these programs. The slavery issue eventually united northern economic elites with abolitionists to defeat the accommodationist Democrats and elect Lincoln.

16. *Ibid.*, pp. 343, 457, 490.
17. *Tolstoy on Civil Disobedience and Non-Violence*, 1967, New York: Mentor, pp. 282–283.
18. Mayer, *All on Fire*, 391.

LINCOLN WAS OBSESSED WITH THE PRESERVATION OF SELF-government, not emancipation. He viewed the Civil War as an "insurrection," not a war. He did not recognize the right of states to secede. The states had made an indissoluble compact when their representatives had signed the Declaration of Independence. Secession in response to a national crisis was not an option.

The southern leadership asserted its right to revolution, claiming the South was the great defender of liberty, the true heir of the Revolution. Nonsense replied Lincoln. Secession was no revolution; it was a counterrevolution—a repudiation of the ideals of the Declaration of Independence. "It may seem strange," Lincoln said, "that any men should dare to ask a just God's assistance in wringing their bread from the sweat of other men's faces." The politician Lincoln understood the moral dimension of the crisis. In the summer of 1861 he declared: "The right of revolution is never a legal right....At most, it is but a moral right, when exercised for a morally justifiable cause. When exercised without such a cause, revolution is no right, but simply a wicked exercise of physical power."[19]

Lincoln was slow to free the slaves, fearing that emancipation would cause the border states of Kentucky and Maryland to secede. He initially believed that the Constitution, enacted by a vote of the whole people, prevented him from liberating the slaves, just as it forbade unilateral secession by the South. An act by the whole people—amending the Constitution—was required.[20]

When he finally freed the slaves, he justified his action by citing the Constitutional requirement that the president maintain the government. Emancipation had become a military necessity to crush the insurrection, restore the union, and save the nation. Abolitionist pressure on Lincoln had pushed him toward that decision. Wendell Phillips remarked that if Lincoln had grown in moral stature, "it is because we watered him."[21]

When Lincoln issued the Emancipation Proclamation in 1863, he stated: "In giving freedom to the slave we assure freedom to the free." The South had forgotten that our freedom depends upon the freedom of others. In 1856 a Richmond, Virginia, paper had declared: "Freedom is not possible without slavery."

Lincoln and the abolitionists based their case for a moral politics on the Declaration of Independence. Garry Wills writes that, to Lincoln, the Declaration was "the statement of a permanent ideal" whereas the Constitution, with its accommodation of slavery, was "an early and provisional embodiment of that ideal, to be tested against it, kept in motion toward it." The framers of the Constitution, Lincoln believed, rejected slavery in principle, but tolerated it "*only by necessity*." It was the task of succeeding generations to complete the unfinished business of the founders.[22]

In November 1863, Lincoln used his brief Gettysburg Address to redefine the meaning of the Declaration of Independence. He demonstrated that the Declaration has different meanings to different generations. The founders had professed equality; they had not achieved it because, at the time, they could not. To Lincoln, the Civil War had been necessary to complete the unfinished business of the American Revolution—a second American Revolution. No longer could America countenance the disparity between the noble sentiments of the Declaration and the ugly reality of slavery. Henceforth, all men would, at least in theory, be equal before the law. Lincoln's reinterpretation of the Declaration challenges succeeding generations to examine it afresh. Today we must study it in the context of global ecological limits.

LINCOLN MADE STILL MORE EXPLICIT THE CONNECTION between morals and politics in his Second Inaugural Address in March 1865. The Civil War was a great punishment inflicted upon the whole nation for the sin of slavery and must become, in Garry Wills words, a "repenting war."[23] Healing the nation required reconciliation, not vindictiveness; however, healing first required purging the nation of the sin of slavery.

War introduces new forms of corruption into society. Four years of Civil War hardened the naive soldiers, most of whom had left home for the first time in their lives. It also wrought ecological destruction. Forests were cleared near battle sites and army camps for fuel, shelter, and rail transportation. Following the war the final push to subdue the wilderness of the West began.

Because America and its political leaders had not been mature enough to resolve the slavery crisis peaceably, resolution of the crisis was violent and incomplete. Following the war and Lincoln's assassination, America ignored its moral obligations to the emancipated slaves. It refused to institute necessary political and economic reforms. Instead America fell into one of the most corrupt and disgraceful periods of its history.

Land reform, in particular, was critical; the freed slaves could not adequately exercise their political freedom without land. Failure to redistribute the vast land holdings of the planter

19. James M. McPherson, *Abraham Lincoln and the Second American Revolution*, 1991, New York: Oxford University Press, p. 28.
20. Garry Wills, *Lincoln at Gettysburg: The Words that Remade America*, New York: Simon and Schuster, p. 137.
21. Wills, *Lincoln at Gettysburg*, pp. 140-145; Howard Zinn, *A People's History of the United States*, 1990, New York: Harper and Row, pp. 184–185.
22. Wills, *Lincoln at Gettysburg*, p. 101.
23. Wills, *Lincoln at Gettysburg*, p. 185.

aristocracy to the freed slaves condemned southern blacks to generations of poverty. Slavery had been abolished, but the inequality of the ante-bellum order remained.

The Reconstruction era, like the final decades of the 20th century, concentrated economic and political power in the hands of the elites as never before. The modern corporate economy emerged from this period, which Mark Twain branded the "Gilded Age."

One of the bitterest ironies of that era involves the 14th Amendment. Historian Pauline Maier writes that the 14th Amendment was part of an effort "to read into the Constitution principles in the Declaration of Independence...."[24] Section 1 of the 14th Amendment protected the "life, liberty and property" of all citizens. It assured all persons "equal protection of the laws."

However, in the hands of the Supreme Court of the 1880s, it became a vehicle for extending the rights (but not responsibilities) of corporations. Corporate lawyers argued successfully that the "persons" protected by the 14th Amendment included corporations and that the Amendment was actually designed to prohibit governmental regulation of private enterprise—the ultimate fantasy of laissez-faire economics.[25] The Court reasoned that contracts and many other economic activities were forms of property protected by the Amendment. In 1886, the Court concluded that corporations were persons whose rights must be protected by the government.

The Court was a good deal less enthusiastic about extending those rights to freed slaves. Instead, the Court generally used the property clause against efforts to improve working conditions, labor organizing, or the extension of civil rights. In 1896, in *Plessy v. Ferguson*, the Court cited the 14th Amendment's equal protection clause to uphold southern segregation as long as it was "separate but equal." Between 1890 and 1910, the Court cited the 14th Amendment 19 times to uphold the rights of black Americans. In these two decades, it applied the Amendment 288 times in defense of corporate rights. The 14th Amendment had granted political rights to citizens, but had not assured the economic rights of all.[26]

FUNDAMENTAL REFORM OF SOCIETY IS AS NECESSARY TO the survival of a healthy culture as natural disturbance is to the health of ecosystems. Circumstances change, and the healthy society will adapt. The unhealthy one will resist until it is too late to effect peaceful change.

Proponents of fundamental reforms are invariably vilified by mainstream society. Entrenched elites who benefit from inequities will resist change. Most humans desire security and peace, not social tension. Reformers, such as 19th century abolitionists and today's preservationists, are outsiders whose message must be radical, shrill, and antagonistic in order to be heard. The reformer must act as an Archimedian counterweight to mass apathy on moral issues utilizing a very long—radical—lever to move the apathetic mass. Our political system has never willingly considered moral questions. Once the reforms have been adopted and future generations look back, horrified that there ever could have been slavery—or industrial forestry—the reforms, if not the reformers, are lionized.

Nevertheless, the marginalized cadre of radical abolitionists succeeded where their more accommodating, appeasing, politically oriented contemporaries failed. *Complete emancipation* resolved the slavery crisis—not the Missouri Compromise, the Compromise of 1850, recolonization schemes, efforts at electoral politics of the Liberty Party, or strategies to contain the spread of slavery while leaving that institution untouched where it already existed.

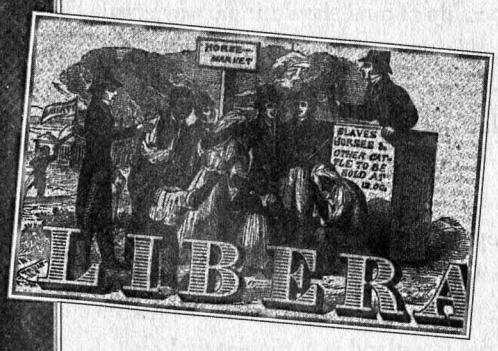
Political compromise cannot resolve a moral crisis. Only a moral approach can effect needed change. There can be no middle ground between good and evil. At best, political incrementalism can delay the day of reckoning, but always at a cost. Appropriate political change occurs only after an uncompromising moral campaign has brought the issue to a head.

Garrison and his allies also succeeded because of personal qualities. Henry Mayer suggests Garrison possessed "an absolute unswerving confidence in his principles, a belief in the power of ideas advocated with the relentless urgency of an independent press, and a faith in the moral and religious transformation of both a people and its politics." By speaking the truth, Garrison reflected late in life, "there is no need for despair."[27]

His charm, his gentleness, his playful sense of humor, and his tender devotion to family and friends disarmed those who expected that the public firebrand was consumed by hatred and anger. His biographer writes: "It is clear to me now that he became an agitator as much out of love as hate...."[28]

Today's conservation movement may learn several valuable lessons from Garrison and the abolitionists. If we hope to protect

24. Pauline Maier, *American Scripture: Making the Declaration of Independence*, 1997, New York: Alfred A. Knopf, , p. 214.
25. James MacGregor Burns, *The Workshop of Democracy: From the Emancipation Proclamation to the Era of the New Deal*, 1985, New York: Vintage Books (Random House), pp. 203–204.
26. James MacGregor Burns and Stewart Burns, *A People's Charter: The Pursuit of Rights in America*, 1991, New York: Vintage Books (Random House), pp. 133, 136, 172-173, 229–231.
27. Mayer, *All on Fire*, pp. 582, 624.
28. *Ibid.*, xix.



Left: Garrison (center) with fellow abolitionists Wendell Phillips (left) and George Thompson. Masthead used for The Liberator *from 1831 to 1850.*

evolutionary integrity and avoid violence, we must agitate and educate. We must have a clear moral vision and convey it to the public clearly. We must refuse to enter into political compromise when the issues are moral and ecological. And, as Garrison's 35-year career as editor of *The Liberator* teaches, we must persist.

THERE ARE EERIE SIMILARITIES BETWEEN THE ANTEbellum South and the Northern Forest region today. Most slaves and land were then owned by a small number of wealthy, frequently absentee, white planters; absentee corporations or speculators own most of the timberland in the Northern Appalachians today. The backbone of both economies was a single crop—cotton then, timber today. The cotton-growing states exported 95% of the crop for manufacture into cloth in Europe and New England. The South imported two-thirds of its clothing. Residents of northern New England communities are familiar with the sight of raw log trucks heading into Canada, and trucks carrying milled lumber returning to New England. In the 1850s, the slaveocracy put its energy into expanding slavery to the tropics and territories, not diversifying the home economy. In the Northern Appalachians, the paper companies have invested in modern mills in the southeastern United States and in the Third World, preferring to allow the aged mills of the northeastern states to deteriorate, now that the industry has largely completed the liquidation of the forests that supply these mills.

The 19th century South was a demoralized society characterized by great poverty among the poor whites as well as the slaves. For decades, southern politics defended slavery and constructed legal protections for it, instead of addressing issues of economic backwardness and political inequality.

The South's political immaturity prevented discussion, debate, or negotiation over the issue. Slavery destroyed democracy in the South. Those of us who have fought against the ecological slavery imposed on the forests of northern New England by the large timber corporations have encountered a similar situation—a stunted economy and a warped politics that cannot forgive criticism and dissent.

Defenders of both economies use similar language: slavery was necessary for economic survival; so are clearcuts, herbicides, raw log exports, and cheap Canadian logging labor today. For decades southern politicians blackmailed the North with threats of secession. The demagogues of the timber industry rely on job blackmail to fight any progress toward forest-practices reform and creation of publicly owned wildlands. Curiously, where industrial foresters strip an area of all trees, plant a monoculture, and follow with intensive herbicide spraying, they call the land—plantations.

There are a number of other similarities between 19th century slavery and 20th century industrial forestry. In both cases, the conflict is over the control and exploitation of other living beings. Arguments over property rights are central. Timberlands are viewed as property today, just as slaves were then. Slavers and clearcutters alike assert states' rights and denounce efforts to involve the federal government in resolving the crisis. Reform efforts are thwarted by dividing the opposition, and by duping the moderate reformers into marginalizing radicals and supporting compromises that fail to address the problem. A focus on tangential issues, such as slavery in the territories then (instead of abolition of slavery everywhere), and conservation easements and green certification today (instead of wilderness protection and the abolition of industrial forestry practices) serves to distract energy from the core moral and ecological issues.

Abolitionism was then and preservationism is now a moral—not merely political—concern. Radical land reform is essential to solving both problems. Here, Reconstruction offers a depressing historical lesson. Reconstruction failed the emancipated slaves because it refused to emancipate the land from the wealthy landowners. Without land, the freed slaves were forced into sharecropping. To protect ecological integrity today, we must also institute sweeping, but reasonable, land reforms.

Ownership of land should in no way entitle the landowner to degrade the ecological integrity of the land. This is an absolute—not a relative—ethic. Absentee land ownership is a form of land slavery that must be abolished. No individual ought to own more land than her family can responsibly manage, and the family must reside on or nearby that land. The only exception to this should be for landowners who place a forever wild covenant on the land and manage it strictly for ecological and evolutionary values. The disgraceful condition of industrial forestland is sufficient to disqualify corporations from owning land.

The land does not belong to us; we belong to it. Public ownership of lands currently enslaved by absentee masters is an essential step to preserving ecological and evolutionary integrity across the landscape.

GARRISON'S GENIUS LAY IN HIS UNDERSTANDING THAT HE and his colleagues could never defeat the political power of the slave owners and their allies and accomplices in the political arena. He never considered playing by their rules: fighting the slavers' game by their rules could never succeed. He based his moral campaign on the New Testament and the Declaration of Independence. He believed in the power of democracy and free speech to incite a moral revolution that would sweep away the political opposition the abolitionists could never have defeated head-on.

He understood that politics is all about compromise, and that moral issues are not susceptible to compromise. If slavery is wrong, it cannot be improved by reforms; it must be abolished. Liberty, Jefferson wrote, is an inalienable right.

I once asked Lois Marie Gibbs, the leader of the Love Canal community fight against dioxins the 1970s and 1980s how her grassroots anti-toxics allies got on with the large mainstream environmental groups in Washington, DC. She replied that relations were not good: "They're into control; we're into prevention." While the politically savvy insiders were negotiating with the EPA, Congress, and the polluting industries to limit the discharge of toxins into the environment, mothers, workers, and other victims of that pollution were fighting to prevent *any* discharge of toxic substances into their communities. Setting controls on the amount of pollution industries are permitted to spew forth sustains business as usual; prohibiting toxic discharges requires global corporations to reinvent themselves.

In the Northern Appalachians, this rift in the conservation community also exists. The large environmental groups work together under the umbrella of the Northern Forest Alliance. They promote small political reforms, studies, and collaborative initiatives with the timber industry. They have distanced themselves from the grassroots groups that call for an end to clearcutting and the creation of large wilderness reserves. Maine Audubon Society informed the region's conservation groups in July 1998 that it would oppose calls for designating a significant chunk of wilderness out of the three million acres of paper industry lands that were then on the market in Maine. Thereafter, the Alliance avoided public defense of wilderness.

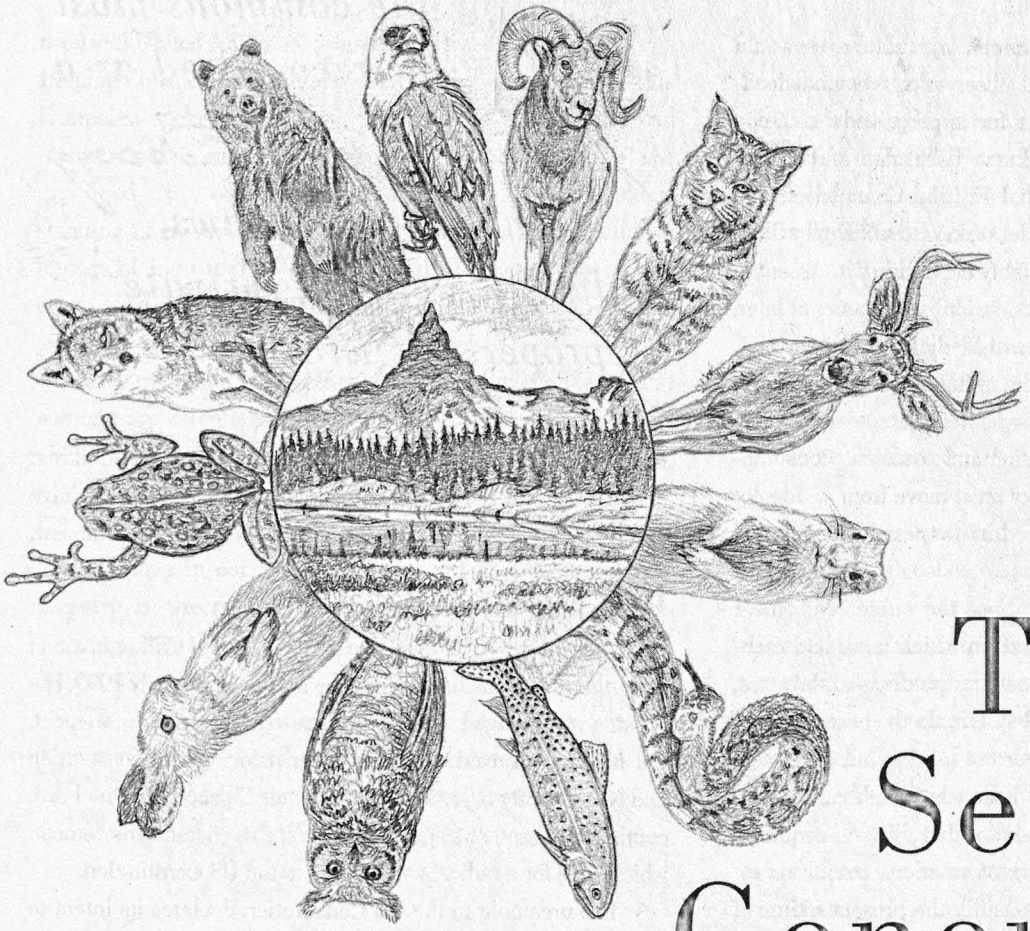
Only a campaign of moral suasion can rescue the natural and human communities of the Northern Appalachians, or of any region, from the clutches of the industrial global economy. If exploitation of humans is wrong, as the abolitionists argued, then the continued exploitation of humans *and* wild Nature must be even more wrong. Moreover, preservationists who would extend the realm of ethical concern to the land have not just moral law—but natural law—on our side. We live in a world of real limits that the global economy ignores. Why should an absentee multinational corporation care if the forests of Maine are degraded for the next 50 or 100 or 500 years? It can turn its attention to the southeastern United States and the tropics. What does it care if it leaves behind a shattered economy that has lost its options for decades to come because the region's citizens, politicians, and environmental advocates acquiesced to the tyranny of the ecological slavers?

The argument for wilderness preservation and environmental protection, ultimately, is over the limits of physical and ecological reality. Those who willfully ignore limits are ecologically wicked. Accommodating wickedness is sinful. Sustaining a campaign of moral and ecological education cannot fail. Failure to act now condemns future generations to a bleak existence.

Imagining a future of healthy natural and human communities is the first step to their realization. "If you have built castles in the air," Thoreau exhorts us, "your work will not be lost; that is where they should be. Now put the foundations under them."

We need more radical abolitionists in the preservationist movement. Their work will make the world of politics safe enough to bring forth an ecological Lincoln or two. ☾

Long-time conservation activist Jamie Sayen is the founder of the Northern Appalachian Restoration Project, publisher of its invaluable publication The Northern Forest Forum *(PO Box 6, Lancaster, NH 03584), and author of* Einstein in America. *This essay is adapted from his book-in-progress on the once-and-future ecological and cultural history of the Northern Forest.*



The Seventh Generation

Rethinking the Constitution

by Winona LaDuke

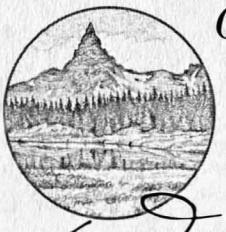
Somewhere between the teachings of western science and those of the Native community there is some agreement on the state of the world. Ecosystems are collapsing, species are going extinct, the polar icecaps are melting, and nuclear bombings and accidents have contaminated the land.

According to Harvard biologist Edward O. Wilson, 50,000 species are lost every year. Three-quarters of the world's species of birds are declining, and one-quarter of all mammalian species are endangered. Tropical rainforests, freshwater lakes, and coral reefs are at immediate risk, and global warming and climate change will accelerate the rate of biological decline dramatically.[1]

The writing is on the wall, in bold letters. There is no easy answer, and even scientists themselves seem to recognize the necessity of finding new strategies and understandings. In an unusual gathering in late 1998, for instance, NASA scientists met with Indigenous elders to discuss global warming and to hear the elders' suggestions on possible solutions. The response the scientists received may have been only part of what they had hoped for. As one observer summarized, the elders pretty much responded, "You did it, you fix it."[2]

This essay is excerpted from Winona LaDuke's All Our Relations: Native Struggles for Land and Life *(1999) and is reprinted with permission of South End Press (Cambridge, MA; 800-533-8478; www.lbbs.org/sep/sep.htm).*

illustration by Martin Ring



Contaminating the commons must be recognized as a fundamental wrong in our system of laws, just as defacing private property is wrong.

In the final analysis, we humans can *say* whatever we would like—rationalize, revise statistical observations, extend deadlines, and make accommodations for a perceived "common good." But "natural law," as Yakama fisherman and former director of the Columbia Intertribal Fishing Commission Ted Strong explains, "is a hard and strict taskmaster."[3] Dump dioxin into the river, and you will inevitably eat or drink it. Assent to "acceptable levels" of radioactive emissions, and sooner or later, sensitive cells in the human body will likely respond.

The challenge at the cusp of the millennium is to transform human laws to match natural laws—not vice versa—and to correspondingly end wasteful production and voracious consumption. America and industrial society must move from an ideology based on conquest to one steeped in the practice of survival and grounded in ecological limits.

In order to do that, we must close the circle. The linear nature of industrial production itself, in which labor and technology turn natural wealth into consumer products and wastes, must be transformed into a cyclical system. In the best scenario, natural resources must be reused or not used at all, and waste production cut to a mere trickle. Those who watch carefully—*onaanaagadawaabandanaawaa*—know that this will require a technological, cultural, and legal transformation.

Many Indigenous teachings consider the present a time of change. Anishinaabeg teachings recognize this time of transition as both a reality and an opportunity. According to these prophecies, Anishinaabeg people retrace their steps to find what was left by the trail. There are two separate roads from which to choose, for both the Anishinaabeg and those called the "light-skinned people."

Anishinaabeg elder Eddie Benton Benai, from the Lac Courte Orielles reservation in Wisconsin, is a teacher of the Anishinaabeg Midewiwin society. He discusses the two roads as

> *the road to technology and the other road to Spiritualism. They [elders] feel that the road of technology represents a continuation of headlong rush to technological development. This is the road...that has led to modern society, to a damaged and seared earth....The [other] road represents the slower path that Traditional Native people have traveled and are now seeking again. The Earth is not scorched on this trail. The grass is still growing there.*[4]

A similar teaching of the Six Nations Iroquois Confederacy recognizes the importance of future generations. "In each deliberation, we must consider the impact on the seventh generation from now," they say; that is, undertake conservative thinking, and use careful deliberation. Such consideration would have preempted thousands of decisions made by the US government.

Rethinking the Constitution

Walt Bresette, an Anishinaabe man from the Red Cliff reservation in northern Wisconsin, passed to the next world in early 1999. His passing was a huge loss to the Native environmental movement, but his groundbreaking work on reenvisioning the Constitution and Native treaty rights for the benefit of all people and the Earth continues. Bresette was part of the Seventh Generation movement, which calls for a radical amendment to the US Constitution.

The preamble to the US Constitution declares its intent to "secure the blessings of liberty, to ourselves, and our posterity." In reality, US laws have been co-opted by corporate interests to cater to the elite in society. While the US Constitution makes no mention of corporations, according to anti-corporate analysts Richard Grossman and Frank Adams, "the history of Constitutional law is, as former Supreme Court Justice Felix Frankfurter said, 'the history of the impact of the modern corporation on the American scene.'" Over the course of two centuries of jurisprudence, corporate contracts and their rates of return have been redefined as property that should be protected under the Constitution. In this way the "common good" has been redefined as "maximum corporate production and profit."[5]

Appointed judges have handed down decision after decision increasing the privileges of corporations. Corporations have been granted the power of "eminent domain" and the right to inflict "private injury and personal damage" when pursuing "progressive improvements." Most significantly, in 1886, the Supreme Court treated private corporations as "natural person[s]" protected by the Constitution and "sheltered by the Bill of Rights and the Fourteenth Amendment."[6]

Consequently, American public policy and the legal system have largely come to reflect short-term views despite the intergenerational perspective foundational to the US Constitution. At

the 1995 United Nations Conference on the Status of Women in Beijing, Corrine Kumar from the Asian Women's Human Rights Campaign spoke of the legal challenges in the national and international arena of this era. "The violence of the times," she explained, "has outstripped the law."[7] We have little understanding of or protection from the combined and cumulative impact of industrialism's complicated chemical soup on our ecosystems, bodies, or future generations. Public policy is lagging far behind our ability to destroy ourselves.

The rights of the people to use and enjoy air, water, and sunlight are essential to life, liberty, and the pursuit of happiness. These basic human rights have been impaired by those who discharge toxic substances into the air, water, and land. Contaminating the commons must be recognized as a fundamental wrong in our system of laws, just as defacing private property is wrong. On that basis, the Seventh Generation Amendment to the Constitution of the United States declares,

> *The right of citizens of the US to enjoy and use air, water, sunlight, and other renewable resources determined by the Congress to be common property shall not be impaired, nor shall such use impair their availability for use by the future generations.*[8]

Bresette's other work included legal challenges concerning treaty rights that would help make northern Wisconsin a sustainable, protected region. The Supreme Court's 1983 *Voigt* decision affirmed Anishinaabeg hunting, fishing, and gathering rights in ceded land in northern Wisconsin and was initially greeted with widespread outrage by non-Indians. Since then, the broader community has come to accept these rights, and Bresette and others want to expand them in ways that would benefit Indians and non-Indians alike. "A close reading of the court ruling suggests that these harvesting rights actually set extremely high environmental standards, certainly the highest in any region of the state," Bresette argued. In other words, the *Voigt* decision can be interpreted to mean not only that Indians have the right to fish and hunt in the ceded territory, but also the right to be able to "eat those fish and deer." That means that the state "should be prohibited from allowing damage to the fish by loose environmental regulation."[9]

We must follow Bresette's example and charge ourselves with curbing the rights of corporations and special interests, transforming the legal institutions of the United States back toward the preservation of the commons, and preserving everyone's rights, not just those of the economically privileged. On a community level, we must support local self-reliance and the recovery of Indigenous systems of knowledge, jurisdiction, practice, and governance.

Native people in our own reservation communities must continue a dialogue about change, the path ahead, and how we will make a better future for our children. As the conveners of the Indigenous Environmental Statement of Principles note,

> *Our traditional laws lead us to understand that economic development cannot subsist on a deteriorating resource base. The environment cannot be maintained and protected when "growth" does not account for the cost of environmental and cultural destruction.*[10]

The choice between the technological and the spiritual will be based on both collective and individual decisions, both simple and complex. For just as life itself is a complex web of relationships and organisms, so is the fabric of a community and a culture that chooses its future. Either way, according to Indigenous worldviews, there is no easy fix, no technological miracle.

The challenge of transformation requires the diligence and patient work of activists for ecological and social change across the continent. From the Everglades to the subarctic, their voices are increasing in volume.

There is, in many Indigenous teachings, a great optimism for the potential to make positive change. Change *will* come. As always, it is just a matter of who determines what that change will be. ☾

Native rights and environmental activist Winona LaDuke lives on the White Earth Reservation in Minnesota. She is the program director of the Honor the Earth Fund and founding director of the White Earth Land Recovery Project.

ENDNOTES

1. Lester R. Brown, Christopher Flavin, and Hilary French, *State of the World 1997: A Worldwatch Institute Report on Progress Toward a Sustainable Society*, New York: W.W. Norton and Co., 1997, p. 13.
2. Interview with Bob Gough, November 15, 1998.
3. Ted Strong, Panel Presentation, Lewis and Clark University, October 23, 1998.
4. Eddie Benton Benai, "Seven Fires," cited in Terrance Nelson, ed., *Okiijida: The Warrior Society*, Okiijida, Letellier, Manitoba, Canada: ROGCO, 1998, p. 4.
5. Richard Grossman and Frank Adams, in Jerry Mander and Edward Goldsmith, eds., *The Case Against the Global Economy, and For a Turn Toward the Local*, San Francisco: Sierra Club Books, 1996, p. 376.
6. Grossman and Adams, p. 384.
7. Corrine Kumar, United Nations Conference on the Status of Women, Beijing, China, September 7, 1995.
8. Walt Bresette et al., "Seventh Generation Amendment," Anishinaabe Niijii flyer, Bayfield, WI, March 1996.
9. Interview with Walt Bresette, July 9, 1997.
10. "Indigenous Environmental Statement of Principles," Albuquerque, NM, Native Law Institute, 1995, p. 28.

by Donella H. Meadows

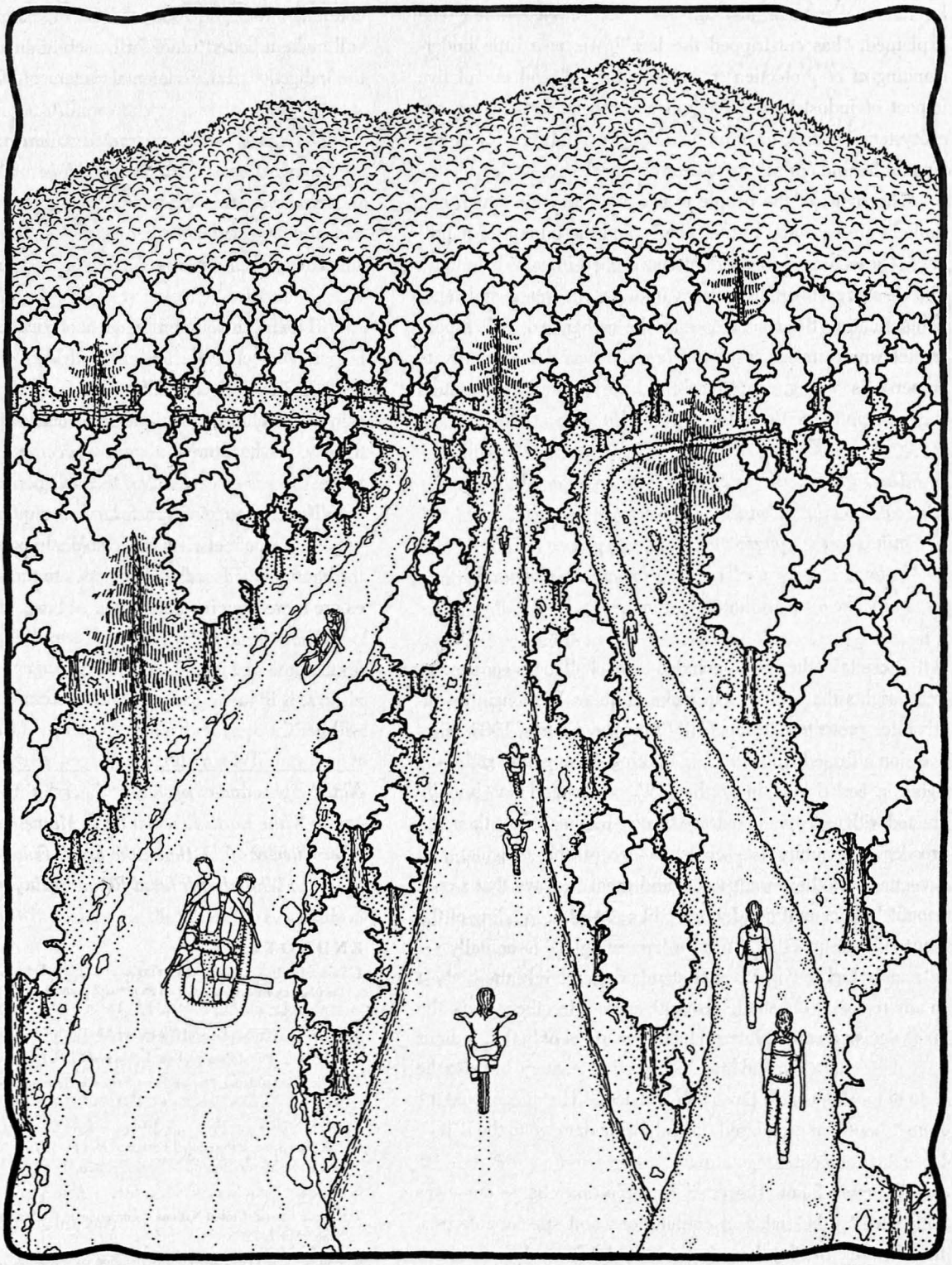


illustration by Rob Messick

Chicken Little, Cassandra, and the Real Wolf

So Many Ways to Think about the Future

Somewhere during the fracas that followed the publication of our book, *The Limits to Growth*, in 1972, I remember finding one of my co-authors, Jørgen Randers, pacing the office in frustration. In his lilting Norwegian-English, he lamented, "People just don't know how to think about the future!"

His complaint was that our book, which contained 12 computer graphs that charted out 12 different possible paths for the human economy up to the year 2100, was being received as an absolute prediction. A prediction of doom at that, though at least one of the graphs showed a future in which eight billion people all live at a European standard of living in a way that does not undermine the earth's resource base—probably one of the most optimistic forecasts anyone has ever made. We were trying to say that the future is a matter of *choice*, and that sustainable, equitable, wonderful choices were possible. But we were heard through a cultural filter that apparently saw the future as *predetermined*, to be predicted, but not changed, certainly not chosen. That culture also clearly expected—or at least found thrills and excitement, headlines and newspaper sales in the thought—that the predetermined future will be a disaster.

Disaster—what could be more fascinating? Think of the content of the nightly news. The undying story of the Titanic. The movies about volcanic eruptions and asteroid crashes. The slight edge of glee in some of the more extreme Y2K fanatics. There is something utterly delicious about the thought of the End Of The World As We Know It.

Back when Jørgen was pacing the floor, we were honestly shocked by the reaction to our scenarios. We had not thought much about the culture into which we were speaking, though we ourselves were part of that culture. But we were at MIT; we had been trained in science. The way we thought about the future was utterly logical: if you tell people there's a disaster ahead, they will change course. If you give them a choice between a good future and a bad one, they will pick the good. They might even be grateful.

Naive, weren't we?

We ignored thousands of years of crystal balls, Delphic oracles, tea leaves, astrology, prophets, all of which are still remarkably alive and well in the subconscious of the computer age. Mythology gives us few examples of the *conditional* forecast: if you do A, the result will be B, if you do X the result will be Y, now you choose. Even when the ancient forecasts did happen to be conditional, somehow the hero (never, that I can remember, a heroine) inevitably made the disastrous choice. Orpheus can lead Eurydice out of the underworld as long as he doesn't turn around to look at her—which he does. Lord Krishna tells Yudhishtra that if he goes on gambling, there will be terrible consequences—and he goes on gambling. Siegfried can return the Ring to the Rhine maidens and bring peace to heaven and earth or keep it and bring down himself, his bride Brunnhilde, and all Valhalla—guess which he does?

I love that last scene of *Götterdammerung*, where Brunnhilde charges into the funeral pyre and Valhalla crumbles

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and the Rhine rises to swallow up everything. Let's admit an inborn irresistable attraction to catastrophe and move on, because we are also formed by other myths.

There's Chicken Little, the sincere but silly forecaster of hysterical nonsense. Decades later some of our critics still put us in that box. I would prefer to be associated with the tale of the boy who cried "wolf"; at least there was a real wolf.

But the legendary prophet with whom I most feel a connection is Cassandra, to whom the god Apollo gave the ability to foresee the future, and then, after she displeased him, the terrible curse that no one would ever believe her. That story gives me shudders.

It also shows the ancient Greeks' sophistication about the perverse logic of prognostication. If people had believed her, then she *wouldn't* have been able to foretell the future, because action would have been taken to avoid foreseen disasters. The Cassandra legend must be one of the earliest recorded human recognitions that there is a basic contradiction between prediction and choice. A predictable world has no room for choice; a choosable world is not predictable.

Of course the world must be made up of a complicated mixture of *both* predictability *and* choice; otherwise we wouldn't have been able to maintain for millennia such a rich legendry of predictions and inevitable tragedies and yet a belief in free will. In a brilliant essay on foretelling the future, E.F. Schumacher wrote:

> *When the Lord created the world and people to live in it...I could well imagine that He reasoned with Himself as follows: "If I make everything predictable, these human beings, whom I have endowed with pretty good brains, will undoubtedly learn to predict everything, and they will thereupon have no motive to do anything at all, because they will recognise that the future is totally determined and cannot be influenced by any human action. On the other hand, if I make everything unpredictable, they will gradually discover that there is no rational basis for any decision whatsoever and, as in the first case, they will...have no motive to do anything at all. Neither scheme would make sense. I must therefore create a mixture of the two. Let some things be predictable and let others be unpredictable. They will then, amongst many other things, have the very important task of finding out which is which."*
> (E.F. Schumacher, *Small is Beautiful,* London, Blond & Briggs, 1973, p. 187)

It isn't all that difficult to begin, at least, to get a handle on what kinds of things are predetermined and what can be chosen.

System dynamics—for instance, the sort of computer modeling we used in *The Limits to Growth*—keeps careful separate track of physical things, which have to obey physical laws (e.g., material objects age and take time to construct; they cannot appear from or disappear to nowhere; they cannot be in two places at the same time), and goals and decisions. Goals and decisions fall into the realm of information, which can appear or disappear instantly, can come from or go to nowhere, can be in many places simultaneously. Physical things are, most of the time, predictable. Information is often subject to choice, change, rearrangement, improvement, deterioration, bias, utter derangement, or total transformation.

That distinction between physical stuff and mental stuff sounds simple and obvious, until you put the two realms together and have human choice interacting with, influenced by, and trying to influence physical things. Then can come surprises, for many reasons. Something in the physical realm may take a lot longer to move or change or unfold than anyone expects—or something may blow up. Something in the information realm (such as a concerted response to reduce greenhouse gas emissions) may stay stuck far longer than it needs to, because of denial, paradigm blindness, lack of imagination, or entrenched opposition. Or something in the information realm that has been stuck for a long time (such as the legitimacy of the Soviet Union) may suddenly shift overnight.

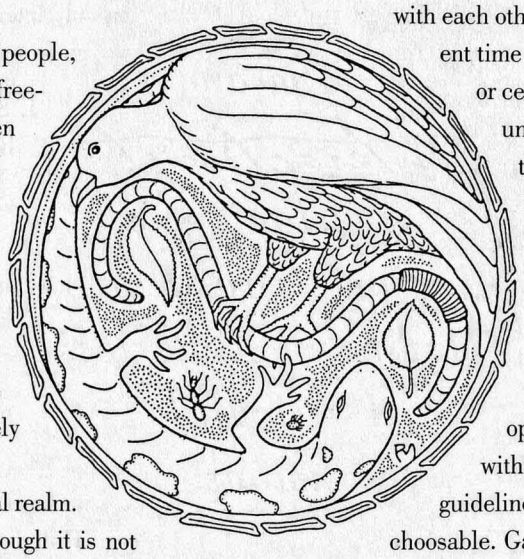
A nuclear power plant, once built, generally operates predictably for 15–30 years, but now and again human error produces a Three Mile Island or Chernobyl. Or human choice produces a Shoreham and Zwentendorf, fully built plants in Long Island and Austria respectively, which by political choice were never started up.

President Nixon's "Project Independence," dreamed up after the 1973 oil embargo, promised that the United States would be free of imported oil by 1980. System dynamicists saw immediately (and later demonstrated with a computer model) that, given the expected lifetime of installed oil-burning furnaces and cars and inevitable delays in finding and gearing up domestic oil wells, that goal was physically impossible. (An amazing amount of political discussion is directed toward goals that are physically impossible.)

Mix physical beings with mental models, and choice becomes—maddeningly—a matter of risk. The 15-year-olds in a population will fairly predictably start to vote in three years, have children over the next five to 25 years, retire in 50 years, and die in 65 years. The exact numbers are mushy, of course, because now we are talking human behavior and genetics. Some of those 15-year-olds, exercising "choice," will already have had children;

some, mostly male, will have children when they're 60. Some will never vote. Some will retire at 35, some will never retire, some will die next year. Nevertheless, put enough of us together, and our collective behavior is predictable enough for insurance companies to make a lot of money betting on it.

As Schumacher also said, "...most people, most of the time, make no use of their freedom and act purely mechanically....When we are dealing with large numbers of people many aspects of their behaviour are indeed predictable; for out of a large number, at any one time only a tiny minority are using their power of freedom, and they often do not significantly affect the total outcome." And the tickings of the biological clock ultimately make choices for us all.



There is predictability in the physical realm. There is choice in the human realm, though it is not always exercised. System dynamicists boil down the difference between predictability and choice to some simple rules of thumb:

- The larger the aggregation (of people, nuclear power plants, trees, whatever), the more predictability.
- In the short term, while infrastructure facilities remain in place, while pipelines under construction or materials in transit discharge their contents, while people age, while trees grow, while existing pollutants work their way out of the groundwater or the bottom mud, a great deal (but not everything) cannot be changed and therefore *can* be predicted.
- In the long term, almost everything can change. Infrastructure facilities may have been replaced (solar-powered? informed by whole-systems thinking?). There may be a new generation of people (with new mindsets and cultures?) and trees (tightly controlled plantations? a slow ecological return to whatever Nature chooses?). Therefore, not much can be *predicted*, but a great deal can be chosen.
- In the middle term, there is a messy combination of predictability and choice.

The actual duration of the "short," "middle," and "long" term depends on the average turnover rates of materials in the system under discussion. Turnover rates are orders of magnitude different between mayflies and mountains, between computers and cathedrals, between easily degraded and recycled pollutants such as human sewage and nearly immortal pollutants such as PCBs, CFCs, and plutonium. It is often, but not always, true that entities that operate with similar constants-in-time (such as lifetimes in years or decades) interact more strongly with each other than with entities having wildly different time constants (lifetimes in nanoseconds, say, or centuries or millennia). Some of the biggest unpredictabilities come, however, when that rule is broken. A new virus hits a hitherto-unexposed human population. Emissions from the industrial economy start turning the ponderous flywheels of the global climate. All hell breaks loose.

The information realm is usually more fluid than the physical realm, more open to choice, less predictable. But even within this realm, there are some useful guidelines for sorting out the predictable from the choosable. Garrett Hardin laid out some of them once in a clever essay about three kinds of Truth.

Always-True Truth. *This truth remains true no matter what anyone thinks or says about it.* For example, burning fossil fuels creates carbon dioxide; the carbon dioxide concentration in the atmosphere has increased by more than 30% in the last century; global surface temperatures in 1998 were the warmest in recorded history.

Truth-by-Repetition Truth. *This truth is more likely to become true the more you say it.* I can run a marathon; every child wants a Furby for Christmas; the stock market is about to crash; the government can't do anything right; Social Security will go bankrupt. This kind of truth is the stock-in-trade of the public relations people and the politicians. Say it often enough, however absurd it is, and you might be able to gin up enough shared belief to create it as reality. (Unless it violates an Always-True Truth.)

Doubt-by-Repetition Truth. *This truth may become less true the more you say it.* I'm about to sneeze; there will be a surprise attack on Baghdad tomorrow; the stock market is not overextended; I am not an alcoholic; the economy can grow forever. These truths distract attention or reveal secrets or stoke up false confidence or divert action by denying and demoting the kind of thinking that can lead to problem solving. They are often purposeful thought stoppers.

Always-True Truths deal with the physical realm; Truth-by-Repetition and Doubt-by-Repetition Truths deal with the information realm, where what we say can influence the beliefs and behaviors of ourselves and others—these are slithery truths, to

illustration by Rob Messick

be used with great care. Confusing one type with another (for example, trying to make global warming go away by emphatically denying its existence) can be fatal.

I tend to get especially infuriated by the Truth-by-Repetition Truth when it is articulated with absolute certainty, as if it were an Always-True Truth, especially when it purports to tell me what is feasible in human affairs—or, more often, what is infeasible. The US political system will never permit a carbon tax. Or campaign reform. The global population will reach 14 billion. Half the species on Earth will go extinct in the coming century. There will be runaway climate change.

I'm an inactivist, a visionary, a learner, a radical. I don't run scenarios; I articulate visions.

These are not only predictions, they border on self-fulfilling prophecies. They sweep away the possibility of choice, though there is in fact plenty of latitude for choice. They aren't based on physical *im*possibilities, they are based on the speaker's limited imagination about political or social possibilities. And of course they are a direct invitation to inaction. Well, if it's hopeless, why try? Let's just sit around and wait for disaster.

When I hear statements like these, I'm tempted to ask whether that's the future the speaker *wants*. That question is usually brushed away. The future isn't about wanting. It's about battening down the hatches, preparing for the worst, not getting your hopes up. The surest way to disaster is to declare it inevitable, do nothing to prevent it, and mock and demoralize anyone who tries.

Vision

Which brings me to my favorite approach to the future: vision. Joseph Smith declaring "this is the place." Babe Ruth pointing to the outfield stands and plunking a home run just there. John Kennedy asserting that there will be a man on the moon within a decade. Martin Luther King's dream of a future in which his four children would be judged not by the color of their skin, but by the content of their characters. Mikhail Gorbachev ripping away the straitjacket of Soviet thinking and announcing *perestroika*.

Visionary statements and actions come from a completely different place in the human psyche from predictions, forecasts, scenarios, or cynical, downer assertions of political impossibility. They come from commitment, responsibility, confidence, values, longing, love, treasured dreams, our innate sense of what is right and good. A vision articulates a future that someone deeply wants, and does it so clearly and compellingly that it summons up the energy, agreement, sympathy, political will, creativity, resources, or whatever to make that future happen. It is a Truth-by-Repetition Truth of a special, powerful kind.

I know that the very topic of vision instantly pushes a warning button in most of us, so I need to stop here for a definition. I am only interested in *responsible* visions, by which I mean statements about the future that:

1. State how someone actually wants it to be—no mushy concessions to assumed political feasibility, no settling for something less;

2. Violate no Always-True Truths (break no physical laws); and

3. Express desires and values that are widely shared (break no moral laws).

We tend to distrust visionaries, because we have such bad experience with irresponsible ones. Hitler's vision was morally irresponsible. Nixon's vision of energy independence was physically irresponsible. Bill Clinton's vision of a future health care system was half-assed, laced through with concessions to political infighters—not really what he or anyone else wanted, just what he was willing to settle for, so uninspiring it was not worth fighting for.

Another reason we are uncomfortable in the realm of vision is that, if it's a vision that truly moves us, one we deeply share, we're afraid of disappointment. The visionary automatically puts himself or herself on the line; commits to something that hasn't happened yet; takes a visible stand. That kind of action brings up fear. What if it doesn't come off? Then not only will that vision look foolish, *all* visions will look foolish.

It's much safer to mire ourselves in cynicism. We'll never look foolish.

If you can stand one more categorization of ways of thinking about the future, here's one from Russell Ackoff (*Redesigning the Future: A Systems Approach to Societal Problems*, Wiley-Interscience, 1974) that has stuck in my brain ever since I first read it:

> *Inactivists are satisfied with the way things are. They believe that any intervention in the course of events is unlikely to improve things and is very likely to make them worse. Inactivists work hard to keep changes from being made. Inactivists have a greater fear of doing something that does not have to be done (errors of commission) than of not doing something that should be done (errors of omission).*

Reactivists prefer a previous state to the one they are in. They believe things are going from bad to worse. Hence they not only resist change; they try to unmake previous changes and return to where they once were. Reactivists dislike complexity and try to avoid dealing with it. They reduce complex messes to simple problems that have simple solutions—solutions that are "tried and true." They are panacea-prone problem solvers, not planners looking into the future. They try to recreate the past by undoing the mess they believe the planning of others has wrought.

Preactivists believe that the future will be better than the present or the past, how much better depending on how well they get ready for it. Thus they attempt to predict and prepare. They want more than survival—they want to grow, excel, become better, bigger, more affluent, more powerful, more many things. Preactivists are preoccupied with forecasts, projections, and every other way of obtaining glimpses into the future. They believe the future is essentially uncontrollable, but they can control its effects on them. They plan for *the future; they do not* plan the future. *They seek neither to ride with the tide nor to turn it backward, but to ride in front of it and get to where it is going before it does. That way they can take advantage of new opportunities before others get to them.*

Interactivists are not willing to settle for the current state or to return to the past or to get to the future ahead of everyone else. They want to design a desirable future and invent ways of bringing it about. They try to prevent, *not merely prepare for, threats and to* create, *not merely exploit, opportunities. Interactivists seek self-development, self-realization, self-control; an increased ability to design their own destinies. They are not satisfiers, not optimizers, but idealizers. To them the formulation of ideals and visions are not empty exercises in utopianism, but necessary steps in setting the direction for development. Interactivists are radicals; they try to change the foundations as well as the superstructure of society, institutions, and organizations. They desire not to resist, ride with, nor ride ahead of the tide; they try to redirect it.*

Well, it's obvious that both Ackoff and I are biased in the interactive direction, but Ackoff was actually making the point that all four of these approaches to the future can be appropriate in different situations, and that all of us can and do play all these roles from time to time. When it comes to seeds for my garden, I'm an inactivist—I already have great varieties and know how to grow them; I resist purple beans and supersweet corn and bioengineered potatoes. When it comes to nuclear power or the global economy, I'm a reactivist—I wish I could roll back the clock. Like many farmers, I'm preactive about the weather, tuning into the forecasts many times a day, always peering at the western sky from which the weather comes, trying to transplant just before the rain and harvest just before the frost.

But for most activities in my life, and all my efforts to help bring about a sustainable society, I'm an interactivist, a visionary, a learner, a radical. I don't run scenarios; I articulate visions. I see no reason why there can't be a carbon tax—or even better a strong, inviolable carbon emission quota—if it will stave off climate disaster. I'm not willing to believe that we can't reclaim our democracy from the moneyed special interests. What's to stop us, other than our own timidity? We don't have to bring 14 billion people into the world unless we choose to; we could switch to solar power just as fast as the turnover times of our existing capital plant allow; we could return half the planet to Nature and create good, sufficient, joyful lives for ourselves from the other half. Why not? Really, why not?

What a huge difference it makes in worldview, in empowerment, in responsibility, in self-identity, in the qualities of imagination and courage we draw forth from ourselves, if we think of the future as something not to be predicted, but to be chosen! If we throw off that ancient remorseless myth that we will always choose foolishly!

There are real wolves out there. I happen to believe my computer model when it says that the End Of The World As We Know It is not only a possibility, but a high probability. As the Chinese proverb says, "If you don't change direction, you will end up where you are headed." I think we are headed for disaster. But that thought does not thrill me. And it does not panic me into trying to fashion a world so controlled that it is actually predictable. Rather it energizes me to work toward a vision of a World That Works For Everyone, including all the nonhuman Everyones, a world in which eight billion people (or preferably fewer) maintain a European standard of living in a way that does not undermine the resource base, a world that evolves and learns and dances and operates from generosity and joy.

The worst wolves, really, are the imaginary ones inside our own heads. ☾

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The Buffalo Commons

Using Regional Metaphor to Envision the Future

by Deborah E. and Frank J. Popper

Regional metaphor offers an effective means to understand and create alternative futures for regions. Regional metaphor provides a way to make thinking about regions and the probable changes in them accessible to wide, often opposed portions of the public whom academics and conservation professionals may not otherwise reach. Many contemporary social-science techniques—for instance, GIS, deconstruction, or statistical inference—frequently distance their discipline from important regional lay audiences. Thus we urge social scientists, planners, ecologists, and conservationists to make more use of regional metaphor—to help construct a sense of a region's future, engage the public in the task, and influence public policy. The metaphor must connect with the region, but also be open-ended, multifaceted, ambiguous. To show how regional metaphor can work, we draw on our participant-observer experience in devising the Buffalo Commons metaphor for the Great Plains.

A longer version of this paper directed at an audience of professional geographers will appear in Geographical Review.

bison by Lezle Williams

The Great Plains as a Regional Story

In 1987 we published an article in *Planning*, a magazine for urban planners, in which we reviewed the past and prospects of one of the nation's major regions, the Great Plains (Popper and Popper 1987). We recorded the Plains' boom-and-bust history and suggested that a new path lay about a generation ahead: a large-scale land restoration project that we called the Buffalo Commons. We envisioned a regional rebirth as an economic and cultural order based on ecological degradation and subsidies gave way to one of restoration and ecological sustainability.

Lying between the Rockies and the tallgrass prairies of the Midwest and South, the Great Plains extend over large parts of ten states, from Texas and New Mexico in the south to Montana and North Dakota in the north, and into Manitoba, Saskatchewan, and Alberta in Canada. The Plains produce significant quantities of cattle, wheat, cotton, sheep, coal, oil, natural gas, and metals. They are America's steppes—windswept, nearly treeless, and largely semiarid. Their expanse is mostly rural; the region's total 1990 population of 6.5 million—barely that of Georgia—scatters across an area roughly one-sixth of the Lower 48.

The Plains have inspired extraordinary literature and art evocative of their physical distinctiveness and the difficulties human settlement encounters there. Walt Whitman wrote in 1879, "One wants new words in writing about these plains, and all the inland American West—the terms, *far, large, vast*, &c., are insufficient" (Stovall 1963, 218, emphasis in original). The painter Thomas Hart Benton wrote in 1937, "Cozy-minded people hate the brute magnitude of the plains country. For me the great plains have a releasing effect. I like the way they make human beings appear as the little bugs they really are. Human effort is seen there in all its painful futility. The universe is stripped to dirt and air, to wind, dust, clouds, and the white sun" (quoted in Raban 1996, 60). Kathleen Norris's book *Dakota: A Spiritual Geography* begins: "The High Plains, the beginning of the desert West, often act as a crucible for those who inhabit them. Like Jacob's angel, the region requires that you wrestle with it before it bestows a blessing" (Norris 1993, 1).

Americans' perception of the Plains has varied over time. Early 19th century textbooks called them a desert; late 19th century promoters and settlers regarded them as a potential garden, a regional component of the nation's manifest destiny. With the 1930s Dust Bowl, they became a national problem; then they faded from the national consciousness. According to Cronon (1992), historians have treated the region's past as a narrative of inexorable progress or inevitable decline.

In 1987 we interpreted the region's history as showing a basic cyclical pattern that in effect combines growth and decline: population ebbs and flows into and out of the region. Periods of high rainfall and federally subsidized settlement initially induce a boom, next overgrazing and overplowing erode the soil and lower the water table; a bust ensues, with heavy depopulation, especially in the region's most rural areas. Two such economic/environmental cycles have already occurred.

The first began with the 1862 Homestead Act that gave a pioneer family 160 acres of free federal land if they could farm it for five years. The cycle reached its zenith in the atypical heavy-rain years of the 1870s. Its nadir hit in the 1890s with widespread starvation and large convoys of fully loaded wagon trains headed east, out of the Plains.

The second upswing began in the early 1900s with new homesteading laws that allowed settlers up to 640 acres of free federal land. It reached its height during World War I when American wheat replaced European production lost to the battlefields. It bottomed in the 1930s with the Great Depression, drought, the Dust Bowl, the abolition of homesteading, and John Steinbeck's *Grapes of Wrath* Okies driving, hitchhiking, or rail-hopping west to California. As a cumulative result of the two cycles, many deep-rural Plains towns and counties had their largest populations in 1930 or 1920 or even 1890 and have declined steadily ever since.

We also suggested in 1987 that a third great cycle was well into its bust phase. The top of the cycle, from the 1940s to 1970s, had featured the introduction of large-scale federal subsidies, first for agriculture and then for energy-development. But the mid-1980s found large parts of the Plains' farm, ranch, energy, and mining economies in near-depression as the national economy, federal policies, and global markets shifted. Population losses had accelerated; young people in particular had left. Soil erosion approached Dust Bowl-era rates. The Ogallala Aquifer, the source of agricultural and urban groundwater for much of the southern two-thirds of the Plains, was dropping fast. The Interior Department's Bureau of Reclamation no longer built the big dam and irrigation projects that underwrote large chunks of Plains economic development. We imagined that public policy for the Plains would eventually have to respond to all these third-cycle pressures by creating a huge reserve, the Buffalo Commons.

The Buffalo Commons as a Possible Future

We conceived the Buffalo Commons in part as a literary device, a metaphor that would resolve the narrative conflicts—past, present, and most important, future—of the Plains. In land-use terms, the Buffalo Commons was an umbrella phrase for a large-

scale, long-term restoration project to counter the effects of the three cycles. We wrote that in about a generation, after the far end of the third cycle had depopulated much more of the Plains, the federal government would step in as the vacated land's owner of last resort—much as it had in the 1930s to create the region's distinctive category of public lands, the National Grasslands. The percentage of land in the public domain—the commons—would greatly increase.

The Buffalo Commons would not mean buffalo on every acre; but where Plains land uses were not working well either ecologically or economically, replacement land uses that treated the land more lightly would become inevitable. The federal government would oversee the replacement, and the new land uses would fall between intensive cultivation/extraction and pure wilderness. The Buffalo Commons used metaphor as a way to give form and words to the unknowable future.

Plains media picked up the Buffalo Commons metaphor and made it part of a discussion on the region's prospects (for the first media report, see Olson 1988). This appropriation at first surprised us, but also taught us metaphor's power as a method to describe and navigate regional change. The media interest brought us invitations. We spoke to chautauquas, college colloquia, meetings of broadcasters and publishers, good-government groups, farmers, ranchers, clergy, landscape architects, planners, range managers, environmentalists, agricultural economists, and businesspeople. We spoke in college classrooms, high school auditoriums, civic centers, cafés, parks, and barns. We received and answered piles of mail.

As we traveled the Plains, it became clear that we did not control the meaning of our metaphor, nor did anyone else. For some the Buffalo Commons was only about bison; for others about raising cattle to more closely mimic bison behavior; for others about the recovery of native wildlife generally, and the return of natural ecological conditions across the landscape. The metaphor might mean getting the people out of the region, or encouraging their coexistence with wild Nature, or promoting economic development based on wildlife, especially bison. People variously interpreted the metaphor as a general assault on their way of life, an evocation of a fabled past, a vision of a feasible future, or a distillation of what they were already doing. Many Plains people intensely disliked the commons portion of the metaphor, associating it with collectivism and lack of choice, but even so the strength of their reaction helped achieve some community-building.

As the Buffalo Commons term came into widespread use (for recent examples, see Graham 1997, O'Driscoll 1997, Robbins 1997, and Olson 1998), it provoked exploration by many people and organizations, each with their own interpretations, their own heroes and villains. In effect, they discussed what underlay the term and developed their own narrative line to give the metaphor its meaning. Such discussions built on the ambiguity of the metaphor and helped foster accord between groups or individuals who were otherwise deeply divided.

For example, Native Americans and white ranchers and farmers could agree that people should not be uprooted involuntarily from their homes and way of life. Energy interests and cattle ranchers knew in their bones that most Plains problems sprang from farm subsidies. Many Plains people believed that federal intervention harmed their region and kept it in a semi-colonized state; the Buffalo Commons represented simply the latest example of federal hubris. Sometimes the one point a group could agree on was that they did not like the Buffalo Commons, but at least that gave them a starting point. From there, they took up the metaphor and pushed it into the future by elaborating on the values and choices they wished to attain and avoid.

We have called this overall approach soft-edged planning, to distinguish it from hard-edged—more rule-bound—planning (Popper and Popper 1996). Story and metaphor work as process, engendering new layers of understanding as they get diffused. They loop back as discussion grows and meaning gets amplified and modified. In this process, the Buffalo Commons has grown to have concreteness and specificity. The question is no longer why or whether the Buffalo Commons will occur, but how.

The Emergence of the Buffalo Commons

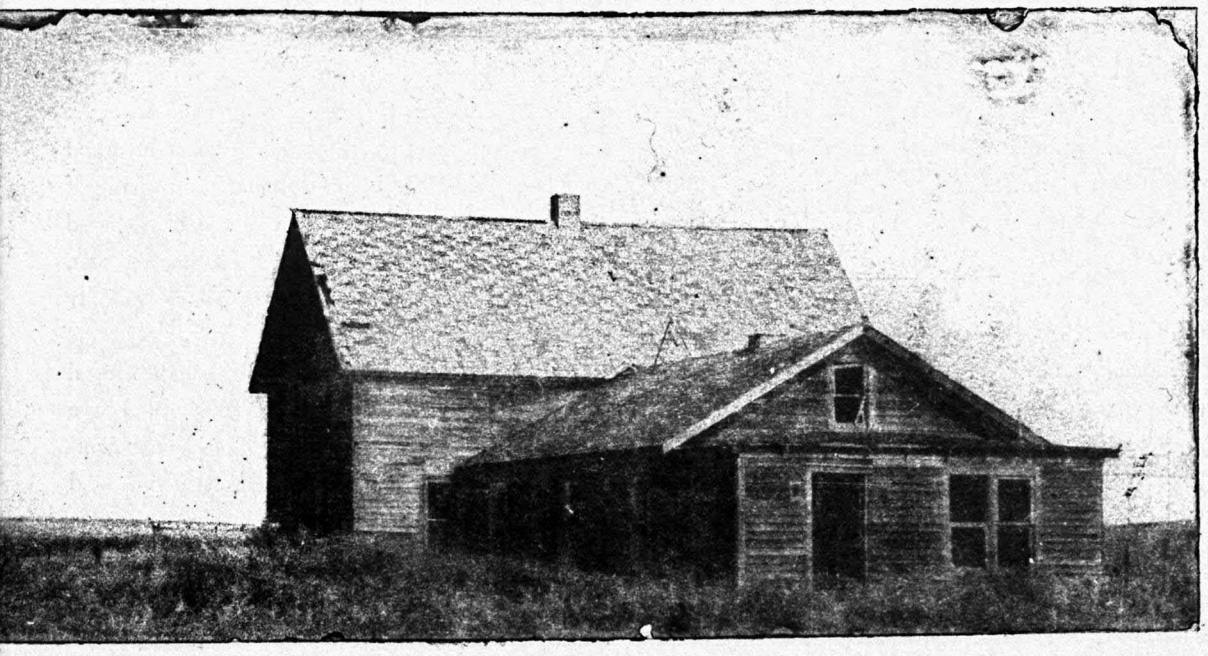
Since 1987, we have elaborated the Buffalo Commons metaphor to incorporate the emerging land uses consistent with it (Popper and Popper 1994, 1998). It now appears that the Buffalo Commons is materializing more quickly and with less federal intervention than we had anticipated; the formation is particularly rapid in the northern Plains. In the last decade, public-land bison herds increased markedly. On private lands a noticeable number of ranchers switched to buffalo and prospered financially and ecologically. Membership in the National Bison Association, a membership group for buffalo professionals, has risen steadily; so has membership in the organization's state and regional chapters, especially in the Plains.

Plains Indians have formed the InterTribal Bison Cooperative, a consortium of fifty Native American governments that trains Indian buffalo producers and tribal land managers, promotes Indian buffalo art and artifacts, and takes other steps to reinvigorate the buffalo's historically central place in the tribes' cultures. Other Native American buffalo cooperatives have begun to appear (Gardner 1998), as have further Native American buffalo restoration efforts (LaDuke 1998). The buffalo count on Indian land has multiplied by at least six since 1992 (Popper and Popper 1998).

North Dakota's governor, Edward Schafer, sees buffalo production and buffalo tourism as vital to the state's growth; reversing long-standing practice, the state's bank and other Plains banks now lend to buffalo ranchers. North Dakota's agricultural extension service offers them technical assistance and has established a marketing cooperative and a slaughtering-processing facility especially for buffalo and plans another, which the state is encouraging. In 1996 its agriculture commissioner, Sarah Vogel, told the *New York Times* that North Dakota will someday have more buffalo than cattle (Brooke 1996). According to the North Dakota Buffalo Association, buffalo have become the state's second-leading agricultural commodity in revenue (Conley 1999a). South Dakota's agriculture department lends for buffalo as well.

Alberta and Saskatchewan offer their buffalo ranchers technical help. Montana State University has created a Center for Bison Studies to do research on buffalo and aid buffalo enterprises. Ten tribal colleges in Nebraska and the Dakotas offer Native American students foundation-supported bison curricula (Conley 1999b and Cournoyer 1999).

Federal agencies have begun taking Buffalo Commons steps. The Forest Service is considering management changes that would allow more buffalo to graze on National Grasslands in the Dakotas, Montana, and Wyoming (Robbins 1997). Saskatchewan has created Grasslands National Park, which will eventually encompass 350 square miles but is already open to visitors. In 1992 the US Interior Department began the Great Plains Partnership, a wildlife protection effort by federal agencies, state governments, and their Canadian and Mexican counterparts. The Clinton Administration expanded the program and assigned the Environmental Protection Agency to lead it. Beginning in the early 1990s, The Nature Conservancy greatly



abandoned homestead by Lezle Williams

expanded its land purchases on the Plains, often restoring native plants and sometimes animal species on them.

Our metaphor stimulated other work on the Plains' Buffalo Commons future. For example, Anne Matthews's *Where the Buffalo Roam*, which focuses on our work and the reaction to it (Matthews 1992), was one of four finalists for the 1993 Pulitzer Prize for nonfiction. The late rancher Lawrence Brown, who lived in Buffalo, South Dakota, wrote a book about his youth entitled *Buffalo Commons Memoirs* (Brown 1995) and between 1993 and 1999 published a bimonthly newsletter, *From the Deep Plains* (another phrase borrowed from our work) that attempted to find alternatives to the Buffalo Commons (Brown 1993–1999). Ernest Callenbach's *Bring Back the Buffalo! A Sustainable Future for America's Great Plains* and Daniel Licht's *Ecology and Economics of the Great Plains* support the Buffalo Commons and suggest new ways to achieve it (Callenbach 1996 and forthcoming, Licht 1997). Local conservation groups promote buffalo—for instance, the Sierra Club chapter in South Dakota (Rebbeck 1997), Bring Back the Bison in Evanston, Wyoming (www.evanstonwy.com/bbbison), and the Great Plains Restoration Council in Denver, which explicitly intends to create the Buffalo Commons (www.gprc.org; FJP serves on its board). "A community's greatest gift is the evolving history of its people, their stories, their symbols, their enduring sagas..." reads the cover for the Buffalo Commons Storytelling Festival held in May 1997 in McCook, Nebraska. *The Buffalo Commons*, a novel by western writer Richard Wheeler, has appeared, and by the end of the book the idea wins out a few years into the 21st century (Wheeler 1998). The Buffalo Commons metaphor has had practical effects.

Metaphor as a Tool of Regional Imagination

Many fields find that metaphor provides a means to connect with and understand a messy world. As a literary device, it is at least as allusive as programmatic. It interprets and enlarges meanings. It creates—in a literary fashion—a place apart, space for reflection. It works especially well in times of great change, disorder, or disjunction.

Geographer Anne Buttimer writes, "A treasure of insight can be unlocked via metaphorical rather than literal or rational thinking...because metaphor performs a poetic as well as conservative function in ordinary language, preserving as well as creating knowledge about actual and potential connections between different realms of reality" (Buttimer 1993, 78). She finds that choices of metaphors reveal values and show how one sees the world. Metaphors are thus useful both to create and explain meaning. Similarly, the late anthropologist Victor Turner argued that metaphors engender an alternative space for the society where what was previously enforced and expected can transmute into something new (Turner 1985). Metaphors operate "as a species of liminal monster...whose combination of familiar and unfamiliar features or unfamiliar combinations of familiar features provokes us into thought, provides us with new perspectives...the implications, suggestions, and supporting values entwined with their literal use enable us to see a new subject matter in a new way" (Turner 1974, 31).

David Abram, ecologist, philosopher, and magician, details human alienation from Nature and place, tracing it back to the substitution of a symbolic alphabet for direct experience as a first step in homogenizing space. The magical quality that once resided in the world moved into language. The only hope of reconnecting to place lies in using stories and vibrant language: "Our task, rather, is that of *taking up* the written word, with all its potency, and patiently, carefully, writing language back into the land. Our craft is that of releasing the budded, earthly intelligence of our words, freeing them to respond to the speech of the things themselves....It is the practice of spinning stories that have the rhythm and lilt of the local landscape, tales for the tongue that want to be told, again and again, sliding off the digital screen and slipping off the lettered page to inhabit these coastal forests, those desert canyons, those whispering grasslands and valleys and swamps" (Abram 1996, 273–274, emphasis in original). Contemporary industrial society is inundated by writing and information; metaphor helps order and evaluate them quickly and efficiently because it requires the reader/listener to rapidly confer meaning on the words. The choices belong to both the deviser of the metaphor and its interpreters.

Torsten Hagerstrand (1995) writes that the geographer's task in understanding the experience of place requires a language that is largely missing. He sees place as composed of a practical reality so well known that it is taken for granted and thus not articulated—so individualized that communicating it becomes problematic. Metaphor aids in elucidating shared experience of place or region if it does what Buttimer, Turner, and Abram describe, giving insight to diverse realms of reality and new interpretations of experience.

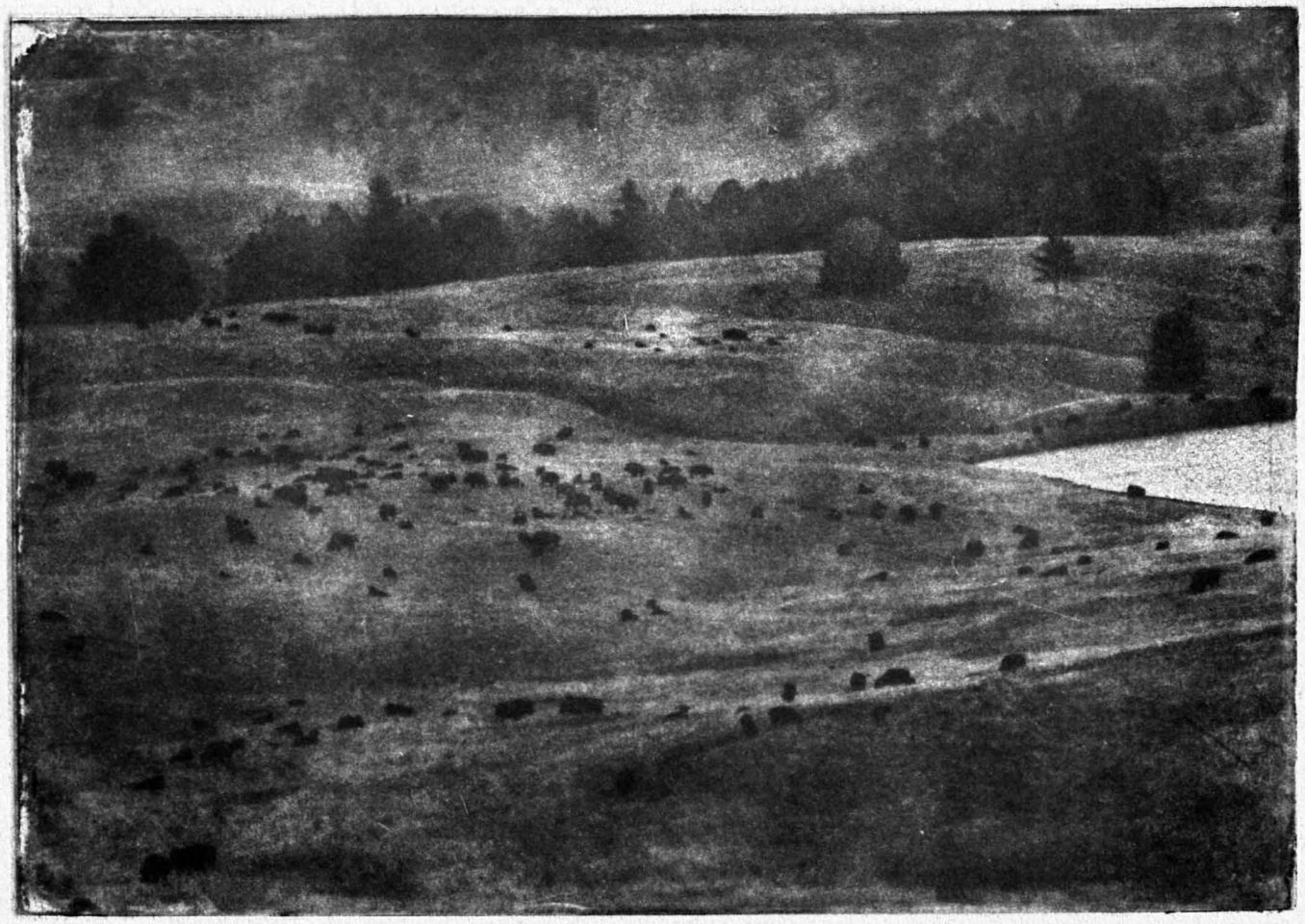
When we first wrote of the Buffalo Commons in 1987, rural Great Plains people were negotiating a change they would have preferred not to face. They could see and feel the personal, family, and community pressures, but these raised sensitivities and fears of loss. Writing from South Dakota, Kathleen Norris asks, "How do we tell the truth in a small town? Is it possible to write it?...We don't tend to see truth as something that could set us free because it means embracing pain, acknowledging our differences

and conflicts, taking our real situation into account" (Norris 1993, 79). Emily Dickinson suggests a way around the problem: "Tell all the Truth but tell it slant—Success in Circuit lies" (Johnson 1961, 248). Metaphor provides both Truth and Circuit, indirection and distance, reality and alterations of it. At the same time, metaphor offers resolution of the conflicts between them. Robert Frost described metaphor as "saying one thing and meaning another, saying one thing in terms of another" (Cox and Lathem 1966, 24).

The Buffalo Commons as a Regional Metaphor

Our work drew on several forms of Circuit in addition to metaphor itself: our own geographic distance, our long-term perspective, our interdisciplinary approach, our social distance as academics. We could afford to imagine and ponder possible futures that might only gradually take shape. We did not have to find someone to take over the local grain elevator or café. We did not have to produce policies to deal with falling cattle prices or shifting government incentives. Instead we had the intellectual luxury of disinterestedly weighing the pressures on land, soil, water, and community—and envisioning where they might eventually lead. Thus we wrote of the Buffalo Commons as emerging after another generation if certain trends continued. Some critics and supporters saw the Buffalo Commons as a formal plan that purposefully laid out the location of particular land uses, but it was inevitably never much more than a metaphor.

The metaphor's two words are deliberately simple and emotive, yet challenging. Buffalo have served as symbol and sustenance for both Native American and Euroamerican populations in the Plains. Buffalo were a keystone species: they shaped the landscape with their migrations, trampling and rolling, loosening and fertilizing soil, bringing along other wildlife. Migrating across the Plains, they presented a visual point on the horizon that broke up the meeting of earth and sky. They signified the landscape and culture of the Plains. Their fate served as a warning. Because they were nearly eliminated in the late 19th century, they raise questions of durability and desire: do we as a society want to maintain the past? How much do we need to change the present? To what extent can we influence the ongoing changes? What are the limits of cultural and ecological restoration?



bison in field by Lezle Williams

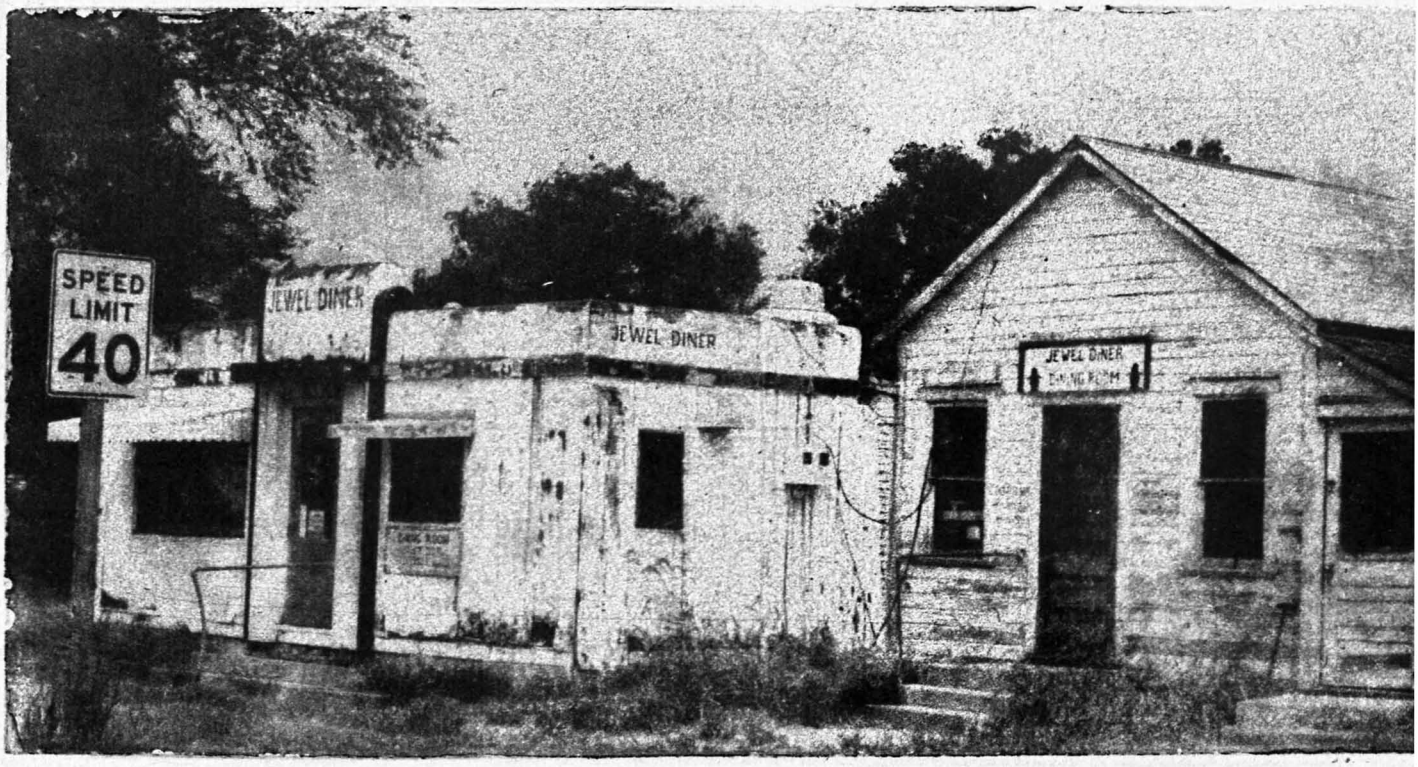
The buffalo also evoke questions of our responsibilities to other species: On what terms is it possible or desirable to increase the number of buffalo? Is the return of free-ranging bison herds across the landscape fundamental to the Great Plains recovering their ecological integrity? Or will the creation of a buffalo ranching "industry" that supplants cattle with newly domesticated bison suffice?

The metaphor uses the word "buffalo" rather than the more accurate "bison" because it is more familiar to the public and taps more allusions—buffalo as wildlife, myth, and merchandise. The complexity of Plains experience with bison lends life to the metaphor and increases its suggestiveness for the Plains' future.

The word "commons" connotes the need to treat land as a common property resource, much as we do air or water. It simultaneously refers to ecological issues and social ones—for example, how do we prevent soil erosion not only on our own land, but also on neighboring holdings? What are the responsibilities and relationships across generations and species? Americans are assumed to believe that small-town and agrarian society is better, more neighborly, and more communal than life elsewhere. Yet the rural Plains have endured long-running population loss and decline of services. Cutbacks and consolidations in schools, other government operations, professional services, and churches undermine traditional beliefs. How does one remake such places to ensure or reinvigorate communities? How can the places get past the silence and denial Kathleen Norris describes to tackle the real problems? The solution has to emphasize shared problems and prospects—that is, commonality.

The Buffalo Commons provided a metaphor for reenvisioning settlement practices on the Plains. As a metaphor it was meant to evoke the characteristic and the intrinsic so as to clarify what to preserve and build upon. We drew the metaphor from a narrative about how the region was shaped. The metaphor crystallized a regional story and became usable for the future; metaphor helped move story past nostalgia to make understanding of place a forward-thinking means for adaptation. The adaptation grew out of the challenge inherent in a metaphor that simultaneously suggested change, alluded to a history in revision, and had several possible interpretations that themselves had an uneasy relationship with each other.

Moreover, the Buffalo Commons does not preclude other potential regional developments such as better irrigation methods, alternative crops, or more telecommuting; instead it coexists with them. In fact it can coexist with other metaphors, including ones that will emerge in the future. But it has been exciting to watch our metaphor spring to life and leave our control. We see a growing recognition that the idea makes ecological, economic, and perhaps most important, imaginative sense—that a restorative and preservationist ideal embedded in regional metaphor may suggest plausible options for many places, choices other



abandoned diner by Lezle Williams

than casinos, prisons, hazardous waste dumps, agribusiness, or continued long-term decline. We confidently expect the Buffalo Commons to keep acquiring the muscle of reality. ☾

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The Healing of Open Spaces

Out here on this prairie
soul wanders
to edge of the land
becoming dust cloud and
finally dream.

There is room enough for spirit
to pass through air
like small birds do
flying from hummock to hummock
or eagles from
mountain to sky.
Spirit dustdevils like
crazily spiraling ravens;
there is plenty of room here
to soar.

This huge valley laid
between these mountains
is big enough to hold
the swatch of sorrow
that cuts a buffalo path
miles wide through heart-high
grass and runs the
length of a life.
There is so much space here
that shadows of mountains
don't mute this hugeness
of feeling even as
a day dies.

From mountain to sky to cloud to
dream to tiny spot
on this prairie where
feathers blow tangled
in rabbit fur
there is just enough empty space
for joy
enough to shake the open ground
and antelope-dance.

—Grace Deer

An Unflinching Vision

This article is a revised version of a book chapter by M.E. Soulé entitled "An unflinching vision: networks of people defending networks of lands," originally published in Nature Conservation 4: The Role of Networks, *edited by Denis Saunders, J.L. Craig, and E.M. Mattiske (Surrey Beatty & Sons, 1995).*

illustration by Rod MacIver

Networks of People for Networks of Wildlands

by Michael E. Soulé

ABSTRACT

Population growth and technological, global commercialization are the common causes of habitat fragmentation and social fragmentation. The loss of species from habitat remnants obeys certain rules. As growth and technology eat away at Nature, they also cause social disintegration. Moreover, each of these planet-wide pathologies exacerbates the other in an accelerating downward spiral of human alienation, suffering, and species loss. Though the consequences of social disintegration may be transient, the consequences of biotic attrition will linger for eons. In North America, a new conservation initiative—The Wildlands Project—seeks to reverse fragmentation and to arrest extinction by establishing a network of protected natural areas comprised of core wildlands, buffer zones, and zones of connectivity. Such a system would allow sensitive and wide-ranging species including wolves, cougars, jaguars, wolverines, grizzly bears, woodland caribou, and pronghorn antelope to reestablish themselves in much of their original ranges. Organizationally, The Wildlands Project is bottom-up; local and regional groups do the planning and implementation. The Wildlands Project assists communication between the groups and helps to ensure objectivity by putting groups in touch with conservation biologists, community planners, and other professionals. An emerging theme of this vision is the imperative of reaching a healthier balance between Nature and human society—one that grounds people in Nature as much as it sustains the actual ground of the natural world.

Introduction

We live in two worlds and both are under siege. One, the oldest, is the biological world; its remaining wild places are rapidly being fragmented, invaded, and destroyed by alien species (Terborgh 1999). As the human volume is turned up, wildlands fall silent, and the vital links that connect them—wildlife corridors—are being nibbled to death like babies attacked by rats.

The other world, the social world, is also under siege. Intimacy and community are being replaced by electronic surrogates. As the volume of digital and visual devices grows louder, people fall silent, their voices and their literature replaced by a cacophony of beeps and images of commercialized violence. Thus as Nature unravels, so does society; and as alien species invade and degrade habitats, alienation negates civil human congress.

Perhaps it is no coincidence that technology is undermining both the integrity of life in the biosphere and the dignity of human life in the social sphere, and that the loss of physical connectivity and intimacy is not only an object of concern among conservation biologists, but is also eliciting alarm among social critics. Here, both kinds of fragmentation, biotic and social, are considered from the perspective of conservation. The goal is not so much analytical as it is prescriptive: the treatment of these dissipative environmental and social trends.

Habitat Fragmentation

The consequences of habitat fragmentation have been studied across the world, and the results of fragmentation are predictable, regardless of hemisphere, latitude, or clime (Soulé and Terborgh 1999). Metaphorically, if untrammeled Nature was a singular, global container of species, then isolated remnants of wildlands are a myriad of leaky vessels. Species disappear from isolated habitat remnants, and the smaller the remnant, the leakier they are.

The disappearance of species from remnants obeys certain rules. While there is some disagreement around the edges of these rules (Simberloff and Martin 1991, Cutler 1994), most ecologists and biogeographers agree on the following important, broad principles.

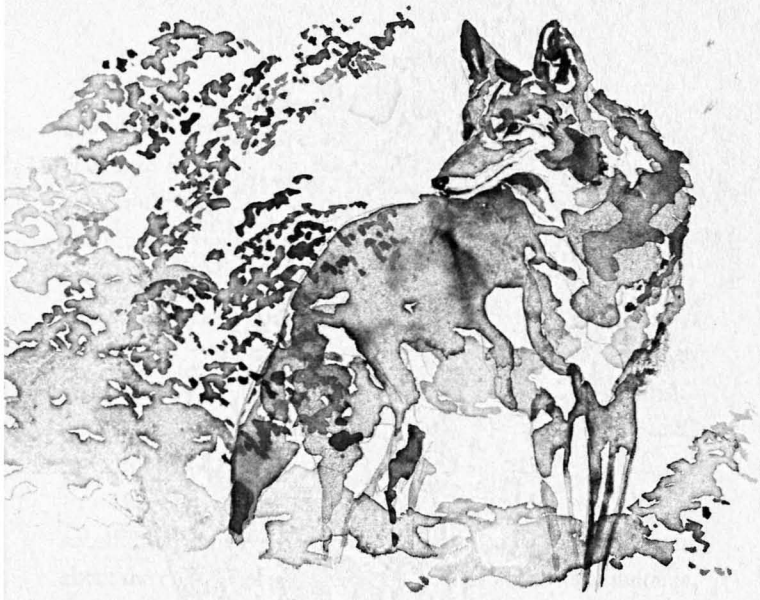
The Area Effect. One of the principles of modern ecology is that the number of species that an area can support is directly proportional to its size. A corollary is that if area is reduced, the number of species shrinks. Moreover, the rate of this decline in diversity is inversely proportional to the area of the isolated remnant. Even quite large habitat islands have observable rates of extinction. For instance, it is now recognized that most National Parks—whether in the western United States or in Tanzania—are too small to prevent the extinction of many medium-sized and large mammals on a time scale of a century or less (Newmark 1987, Newmark 1996). On a local scale, isolated patches of vulnerable habitat less than about one hundred hectares are too small to prevent catastrophic rates of habitat disturbance and the loss of many species of vertebrate animals and plants on a time scale of decades (Soulé et al. 1988, Crooks and Soulé 1999). Similar observations (Diamond 1975, Terborgh 1975) led to one of the first guiding principles of conservation biology: *"bigger is better."* Related arguments for bigness are presented below.

Edge Effects. Because the ratio of edge or circumference to habitat area increases geometrically as fragment size decreases, it is important to understand how boundaries affect wildlife in remnants. Edges occur where a habitat such as a forest meets a road, a clearcut, or some other habitat. Artificial edges, particularly recently created ones, benefit certain species such as deer. But edges in general are harmful to the maintenance of native species diversity. Some of the major categories of deleterious edge effects are (1) higher rates of habitat desiccation and tree death; (2) higher frequency and increased severity of fire; (3) higher rates of predation by native and exotic predators (e.g., foxes, cats, crows, and their relatives), and by human hunters; (4) higher probability of nest parasitism; (5) greater windfall damage; and (7) higher intensities of browsing, grazing, and other forms of disturbance which favor the growth and spread of weedy and exotic species (Wilcove et al. 1986, Noss 1987, Noss and Cooperrider 1994). Roads, the most frequent source of new edges, also facilitate the movement of weeds and pests that are associated with disturbance or that spread along rights of way; roads also cause erosion, stream sedimentation, pollution, and increases in mortality rates of wildlife from collisions and hunting (Noss 1992). Thus, a second guiding principle is to *minimize roads and seek road closures* including "ripping" up the road bed and restoring native vegetation (Foreman and Wolke 1992).

Isolation and the Distance Effect. The inverse relation between isolation and immigration is known as the distance effect. As habitat destruction spreads and the distance between remnant patches increases, plants and animals are less likely to disperse or migrate between remnants. Dispersal of individuals helps protect against demographic "accidents," such as when an episode of unusually high mortality perturbs age structure and sex ratio. Immigrants can also "rescue" a population that is in genetic jeopardy because of inbreeding. Therefore, lower dispersal or migration rates increase the chances that species will "blink out" in isolated habitat patches. Thus, a third guiding principle is to *minimize the distance between habitat islands.* One caveat, though, is that some species (including many in tropical forests and Mediterranean scrub ecosystems) will not cross any barrier or gap between habitat islands, regardless of how trivial it may appear to human beings. For land-hugging species like wolverines and bears, on-the-ground connectivity is essential for long-term survival where the remnants are too small for the viability of species within them (Dobson et al. 1999).

The Regulatory Role of Keystone Species. The notion that the activities of certain species have a profound influence on the numbers and distribution of other species is widely accepted. Such "keystone species" have, by definition, effects disproportionate to their numbers in ecosystems. Keystones include rare but effective pollinators such as bats, certain plants that provide resources during times of critical food shortages, animals like beavers that create structures that provide habitat for entire communities, and large carnivores that regulate the composition and physical structure of communities through their predation on herbivores and smaller carnivores.

One example must suffice. In many cases it appears that large predators help to maintain the diversity of small-sized species within an ecosystem. This paradoxical effect occurs



because large predators often suppress the numbers of middle-size (meso) predators. In the absence of large predators, the smaller ones can be "released" ecologically, becoming both more abundant and more bold, a phenomenon called mesopredator release. In a series of studies on the local disappearances of native birds in isolated Mediterranean coastal sage scrub or chaparral remnants in San Diego (Soulé et al. 1988, Bolger et al. 1991, Soulé et al. 1992, Crooks and Soulé 1999), we found that those remnants frequented by coyotes retain more species of the scrub-dependent birds than canyons without coyotes. We discovered that coyotes have an inhibitory effect on house cats, gray foxes, and opossums, thereby restricting these mesopredators to the edges of the remnants. Moreover, the birds benefited from the coyote-caused ecological confinement of the smaller carnivores—the birds' major predators. Thus, a fourth guiding principle is to *ensure the persistence of large predators and other keystone species in remnants*. This may require the *reconnection* of fragments with linkages (such as under-road culverts) and habitat corridors.

The Rarity Effect. Not only is extinction predictable on the macro level of numbers and rates, but with a little knowledge about the species that are present, the order of disappearances also can be predicted. In general, vulnerability of species is inversely correlated with population density. Thus, large predators are likely to disappear first from remnants, unless they are capable of moving between the remnants. The most abundant species (usually the smallest) tend to persist the longest. The extinction process is complex, and the specific causes of such extinctions in a given situation are often unclear. The relevant factors include predation, random demographic events, inbreeding, random environmental change, disease, catastrophes, and the interactions between these factors (Frankel and Soulé 1981, Shaffer 1981, Gilpin and Soulé 1986, Soulé 1987, Mills and Smouse 1994, Crooks and Soulé 1999).

In spite of this complexity, there is substantial agreement on the minimum areas and population sizes needed to sustain species viability. Hundreds of square kilometers may be necessary for tropical trees (Hubbell and Foster 1986), and the minimum population size for long-term viability of medium-to-large animals is a few thousand square kilometers or more, depending on population variability (Belovsky 1987). Hence, a fifth guiding principle is to *prevent rarity and isolation (maintain connectivity)*.

Disturbance Dynamics and the Scale Effect. Disturbance at certain intensities, frequencies, and geographic scales is natural and restorative. The micro-scale perturbations caused by such organisms as elephants (*Loxodonta, Elephas*), tapirs (Tapiridae), alligators (*Alligator*), beavers (*Castor*), termites, and burrowing rodents such as pocket gophers (*Thomomys, Geomys*) provide other species with light gaps, water holes, cover, breeding habitats, and temporary gaps for seed germination. Events such as fires, storms, floods, and epidemics, when they occur in a relatively natural, unfragmented landscape, help to maintain a mosaic of biotic associations without the necessity and high cost of human intervention.

Intermediate levels of disturbance appear to be optimal, but this only works to maintain biodiversity when the size of the average disturbance is 50 to 100 times smaller than the habitat area (Shugart and West 1981). Where stand-replacing fires are a factor, the minimum habitat area necessary to achieve some kind of steady state of ecosystem types may be as large as a million hectares (Romme and Despain 1989, Pickett and Thompson 1978). In small, isolated habitat remnants, therefore, disturbance is likely to entrain a downward spiral of landscape simplification and species loss. Thus, a sixth guiding principle is that *small reserves will require the careful management of disturbance (such as fire)*.

The Cumulative (or Age) Effect. Species disappear slowly from isolated fragments. Exacerbating the rate of local extinction, however, is the gradual but inevitable deterioration of habitat in remnant patches. Edge effects nibble away, decreasing the effective size of individual patches and increasing the distance between patches. Disturbances such as fire, windfall, and diseases can easily overwhelm a small reserve. For such reasons, the older the isolated patch, the more altered it will be and the fewer species it will contain (Soulé 1991, Bolger et al. 1997, Crooks and Soulé 1999). Thus, a seventh guiding principle is to

illustration by Rod MacIver

prevent the incremental deterioration of habitat within patches. This requires restorative, compensatory management, including the prevention of *internal fragmentation* and habitat disturbance. Because smaller remnants are more difficult to defend against edge or boundary effects, and are more costly to maintain per unit area (White and Bratton 1980, Noss 1983, Soulé 1984), bigger is economically better as well.

In summary, conservation biologists have identified certain principles and guidelines for the maintenance of species diversity. Among the most important of these are (1) bigger is better; (2) edge effects (e.g., roads) should be minimized; (3) the distance between remnant islands should be minimized; (4) the persistence of large predators and other keystone species in remnants slows biotic attrition; (5) connectivity should be maintained or restored; (6) management must be intensified in inverse relation to the size of the remnant; and (7) the cost of maintaining the mosaic of habitats increases as remnant size decreases.

IT IS CLEAR THAT THE CURRENT MAJOR EPISODE OF HABITAT fragmentation will result in a major, planet-wide extinction event (Myers 1984, Ehrlich and Ehrlich 1981, Wilson 1992, Terborgh 1999). Some anti-Nature critics refuse to accept these gloomy extrapolations, taking refuge in "the fallacy of equivalent rates" (Soulé 1995). They argue that (1) extinction is a natural process; (2) nearly all species that have ever lived are extinct; therefore (3) extinction will not significantly affect biodiversity. The flaw in this rebuttal is the implicit premise that the rate of extinction in the current extinction spasm is not exceptional. In fact, the current rate of anthropogenic extinction is about a thousand times greater than the background rate (Wilson 1992). Since Asian and European exploration and colonization began (ca. 50,000 and 600 years ago respectively), thousands of vertebrate species have become extinct; all but one or two of these extinctions were caused by human activities (Wilson 1992).

Another false refuge from reality is the "fallacy of homeostasis." This is the belief among some paleontologists and microbial systematists that the current extinction crisis is irrelevant because Gaia (a term for the planet's hypothetical capacity to buffer major climatic change) will facilitate the replenishment of the planet with large plants and animals in ten or twenty million years. The argument is that the Earth has recovered its megafauna following several previous mass extinctions, so "no worries." In my opinion, this "worldly" view reflects a psychological distancing from Nature that is characteristic of the urban, intellectual, postmodern consciousness (Soulé and Lease 1995).

In any case, faith in the recuperative capacities of life is unwarranted because the current extinction event is "sterilizing" the survivors. This is occurring in two ways. The first is by precluding the birth of new species (speciation); the second is by inhibiting adaptive evolutionary change in many of the survivors (Soulé 1980). In the geological past, recovery of species richness (never the same species) all occurred before the era of human domination of the most productive lands and waters.

Nowadays, and for the foreseeable millennia, a rebound of species diversity is impossible because *Homo sapiens* monopolizes the essential ingredient of speciation for large animals—space. Speciation of large animals requires large areas—spaces that are significantly bigger than National Parks (Soulé 1980). These areas of uninterrupted habitat must be large enough to allow the viability of populations for millennia and the maintenance of geographic variation imposed by mountains, rivers, and other barriers to gene flow. But nowadays, geographic variation (i.e., subspecies) is being erased by habitat destruction.

In addition to eliminating the possibility of speciation, habitat destruction and fragmentation are also preventing the isolated populations of large animals from adapting to change by natural selection (Soulé 1980). The reason the survivors cannot adapt is because natural selection is neutralized in small popu-

illustration by Rod MacIver

lations; it doesn't work because it is resisted by the randomizing effects of genetic drift. In other words, the role of chance in determining who reproduces increases markedly when population size is small, and the populations of species in remnants are necessarily small. In such circumstances, natural selection is almost powerless. For the first time in the last 65 million years, the megafauna cannot adapt; humanity has posted a large sign that says: "No Evolution of Large Animals is Permitted." Consequently, Nature remains essentially in suspension until the land and waters are reinhabited and numbers rebound.

There has been no shortage of proposals for technological substitutes for native species. These include vague predictions about the creation of genetically engineered plants and animals. Coming sooner to your locality than these probable monstrosities will be electronic substitutes for wild Nature housed in arcades. The likely commercial success of these virtual creatures, and the adrenaline-pumping eco-adventures in which they interact, will mute rational criticism.

An Alternative—Reconnecting the Pieces

The disappearance of the natural landscape over the next forty years cannot be prevented unless the political landscape is also transformed. The latter will require an alternative vision of the "good life." The Wildlands Project (TWP) is such a vision. The organization is based on the observation that current campaigns to protect biodiversity and wilderness in North America are too timid. Moreover, we believe that landscape renewal and social renewal are inseparable and suggest serious examination of this hypothesis.

The stated mission of The Wildlands Project is to restore the ecological richness and native biodiversity of North America.

> *We live for the day when Grizzlies in Chihuahua have an unbroken connection to Grizzlies in Alaska; when Gray Wolf populations are continuous from New Mexico to Greenland; when vast unbroken forests and flowing plains again thrive and support pre-Columbian populations of plants and animals....We are committed to a proposal based on the requirements of all native species....Core reserves would be linked by biological corridors to allow for the natural dispersal of wide-ranging species.* (Foreman et al. 1992)

Nothing less than an extensive network of wildlands will ensure the survival of full and robust wildlands and ecosystems. The rewilding argument (Soulé and Noss 1998) provides the ethical and scientific justification for the restoration of large networks of self-willed Nature, including large carnivores.

Restoration projects on the scale contemplated by TWP are not yet possible everywhere. But the potential exists in many places to reconnect the lands and waters in a network of core areas, buffer zones, and wildlife corridors. This network would eventually allow the free exchange of species, genetic material, and the restoration of ecological processes in unbroken habitat connections from Central America to the Arctic, from Florida to Newfoundland, and from Baja California to Alaska.

Core wilderness areas are the organs of a regional wildlands network. The arteries of such a system of wild lands and waters are its habitat linkages—which ensure connectivity between protected areas for spatially extensive processes and wide-ranging species including large carnivores and herbivores. These animals are the beleaguered survivors of the North American extinction (about 10,000 years ago) of larger animals—the megafauna. Today, many of the survivors, including the wolf, grizzly bear, jaguar, moose, woodland caribou, and bison, are vulnerable because the remnant wildlands in which they survive are too small to support viable populations. These species generally are either keystone carnivores—and therefore essential for ecosystem diversity and resilience—or popular "flagship" species. As these larger animals are repatriated to appropriate parts of their original ranges, including remnant and restored wildlands within the core-corridor network, many vulnerable ecosystems and the habitats of restricted, endemic species will be saved as well. In addition, the majesty of the megafauna is one of the attributes that distinguishes mere habitat remnants from wilderness.

Notwithstanding the bold scope of this campaign, it is inevitable that some species and ecosystems will not be adequately protected by the network, particularly in topographically and geologically diverse states like California where there are hundreds of local endemic species in areas that are already highly modified by development. To ensure that all of the outlier species and ecosystems are identified, mapped, and protected, many states have undertaken Gap Analyses (Scott et al. 1993), and organizations like The Nature Conservancy are attempting to protect representative examples of all ecosystems in their regional constellations of preserves.

The Wildlands Project proposal is unique in its temporal as well as its spatial scale; a century or more may pass before the project is fully implemented (Soulé 1992). In part this is because of the delays inherent in planning, in gaining local support, and in transferring essential lands to the system. Some lands that are publicly owned will need their designation and

management regime changed. Where private lands are needed, tools such as conservation easements or outright purchase from willing sellers will be employed.

"A hundred years is too long," say some, but time both creates and forecloses opportunities. Land in many of the marginal farming regions of the Great Plains and the arid, intermountain West will be cheaper in the future when aquifers are pumped dry, soils give out or become too salty or waterlogged, grazing subsidies on federal lands are phased out, and markets change. In addition, many owners of large farms and ranches would rather see their land remain undeveloped than be turned into suburbs and shopping malls. Laws are currently being written or changed to reward good conservation stewardship and to provide incentives to those citizens who wish to donate land to trusts, nonprofit conservation groups, or government agencies. And land that has been ecologically crippled by grazing, farming, clearcutting, or draining, and lacks ecological and wilderness values today, can in a span of fifty to one hundred years become excellent habitat. Opportunities, like tomatoes, do not ripen simultaneously.

Human Fragmentation and Networks of People

The way to change land-use policy is to change public values. And the way to change values is to inspire people with a positive vision. There are two keys to creating an alternative vision for protecting living Nature. The first is hope, a trust that the current spasm of extinction will soon end and that a balance can be restored. Hopelessness about the future is shaken off when people find out that Nature can be saved—that we have the science and resources to do it.

The other key is to cultivate a sense of participation and ownership in Nature protection through personal involvement in the development of regional wildlands networks. Participation is also educational, and the process can elevate the land-use debate and help everyone achieve deeper levels of understanding about ecological issues. People dislike the imposition of policies from above, but they will often support progressive change if they have some role in its formulation.

An emphasis on participatory, grassroots processes is not a gimmick to win popular support for the project's objectives. It is essential because much land-use planning is formulated and regulated at the local level, for both private and public lands. Not only will the project fail in the face of adamant opposition to its local objectives, but the restoration of Nature's legacy is enhanced by the knowledge of local people who are intimate with the backcountry, the bush, the outback, the prairie, the woods.

The real business of science-based conservation planning occurs at the level of dozens of local or regional, independent conservation organizations, and in the communities in which they work. The local groups do most of the research and planning; The Wildlands Project may help coordinate but does not direct or administer these local cooperators. One of its principal functions, though, is facilitating the exchange of information between heretofore isolated activists, using regional workshops, national meetings, and publications. The Wildlands Project also serves a consulting role, acting as a clearinghouse for information and expertise. It offers technical support in geographic information systems, conservation biology, and soon in community economic viability analysis and conflict resolution.

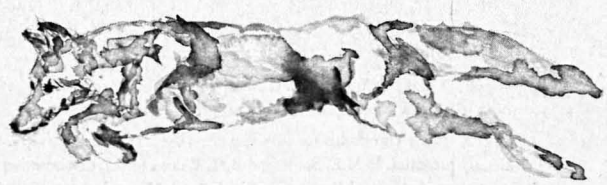
Table 1 contrasts The Wildlands Project's periphery-dominated approach with two other established patterns of conservation activity. Column A lists the steps employed by government and quasi-government organizations in conservation planning; it is a top-down approach that relies heavily on organizational stability, technological expertise, and political support.

Column B illustrates the typical reaction scenario of local advocacy groups: a developer submits a proposal to a government agency; a loose-knit group of conservationists reacts defensively. Eventually, the development proceeds, but in a somewhat mitigated form. The process is repeated seriatim until none of the biodiversity/wilderness value remains.

illustrations by Rod MacIver

Table 1. *Three forms of conservation advocacy.*

A. Contemporary, Center-dominated Conservation Planning	***B. Local Conservation Advocacy***	***C. The Wildlands Project Approach***
1. Classify ecosystems.	*1. React to development threat such as application for logging, mining, or housing development.*	*1. Identify local citizens and grassroots groups interested in conservation.*
2. Identify species at risk.	*2. Initiate defense actions through media, hearings, politicians, courts.*	*2. Assist them in identifying and listing areas and species of special value, interest, and concern (steps 1 and 2 in Column A).*
3. Perform gap analysis to identify unprotected elements.	*3. Develop alternatives plan.*	*3. Provide them with technical resources (steps 3–5 in Column A).*
4. Apply principles of conservation biology to design.	*4. Reach a compromise, defeat, or fail to stop development proposal.*	*4. Help local groups initiate town meetings and communication with citizens, land owners, and land management agencies.*
5. Design a system of isolated protected areas that represents all species and ecosystems.	*5. Repeat steps 1–4 above upon submission of the next development application.*	*5. Design a regional network of wildlands in cooperation with agencies and private owners/users.*
6. Enact enabling legislation.		*6. Assist groups from adjacent regions in co-operation of plans.*
7. Obtain rights to land.		*7. Expose proposal to public input and expert review.*
8. Manage system.		*8. Develop campaign to implement plan.*



Column C shows the sequence of steps used by The Wildlands Project in planning and implementation. It differs from the centralized approach in being nongovernmental and bottom-up, though coordination with government agencies is desirable. It differs from much local conservation advocacy in being proactive instead of reactive. It generates plans to which citizens, politicians, and developers will certainly respond.

In achieving conservation goals, much will depend on the effectiveness of citizen conservationists in conveying their love for the land. Moreover, their diligence in educating and involving the community in wildlands planning is critical. It will avail Nature less if Nature protection is imposed from outside. It will profit Nature much if self-willed lands are embraced by self-willed people.

That said, there is danger here too. For example, the outcomes of community-based consensus processes, however seductive, are not always good for Nature. Without the sticks of federal laws—such as the Endangered Species Act and federal actions such as presidential decrees creating National Monuments and bans on logging in roadless areas—it is to be expected that decisions reached by rural, consensus-based entities and other decision-making bodies will favor private, local economic interests. We should not underestimate the difficult challenges of working in communities, and we should not be tranquilized by the siren song of consensus. Both sides of the land use-abuse debate carry big sticks; it is not prudent to pretend otherwise.

The Wildlands Project's vision of reconnected Nature and flourishing biodiversity is being planned and implemented by a network of citizens. This human network is decentralized; its nodes are in Nipigon, Edmonton, Boulder, Missoula, Oshkosh, Charlotte, Davis, Guaymas, and Tortuguero, less in Washington, Ottawa, Mexico City, or Canberra. Whereas conservation planning is typically short term, centralized, and politician implemented, the new approach is long term, geographically dispersed, and citizen implemented. Whereas the practice of conservation is most often a ritualized battle between corporate lobbyists and activists in centers of governmental power, this new program is geographically dispersed. It will require thousands of meetings, workshops, conversations, and cups of coffee in thousands of cities, towns, and farm houses. To the degree that the project invigorates bioregional consciousness and a sense of community, it is one trail back from social alienation.

The Wildlands Project asserts that the banishment of wild Nature to a few isolated, withering reserves is an unconscionable act of betrayal and desertion. The paradigm suggested here—nurturing networks of people to nurture networks of wildlands—is borne of society's failure to stop, let alone reverse, the global annihilation of life (Terborgh 1999). New experiments, new visions, new coalitions are essential. Something grander must arrive. ☾

ACKNOWLEDGMENTS I thank Reed Noss, David Johns, and Dave Foreman for their helpful, animated comments. Denis Saunders and The Australian Nature Conservation Agency kindly provided financial support for the preparation and presentation of an earlier version (Soulé 1995).

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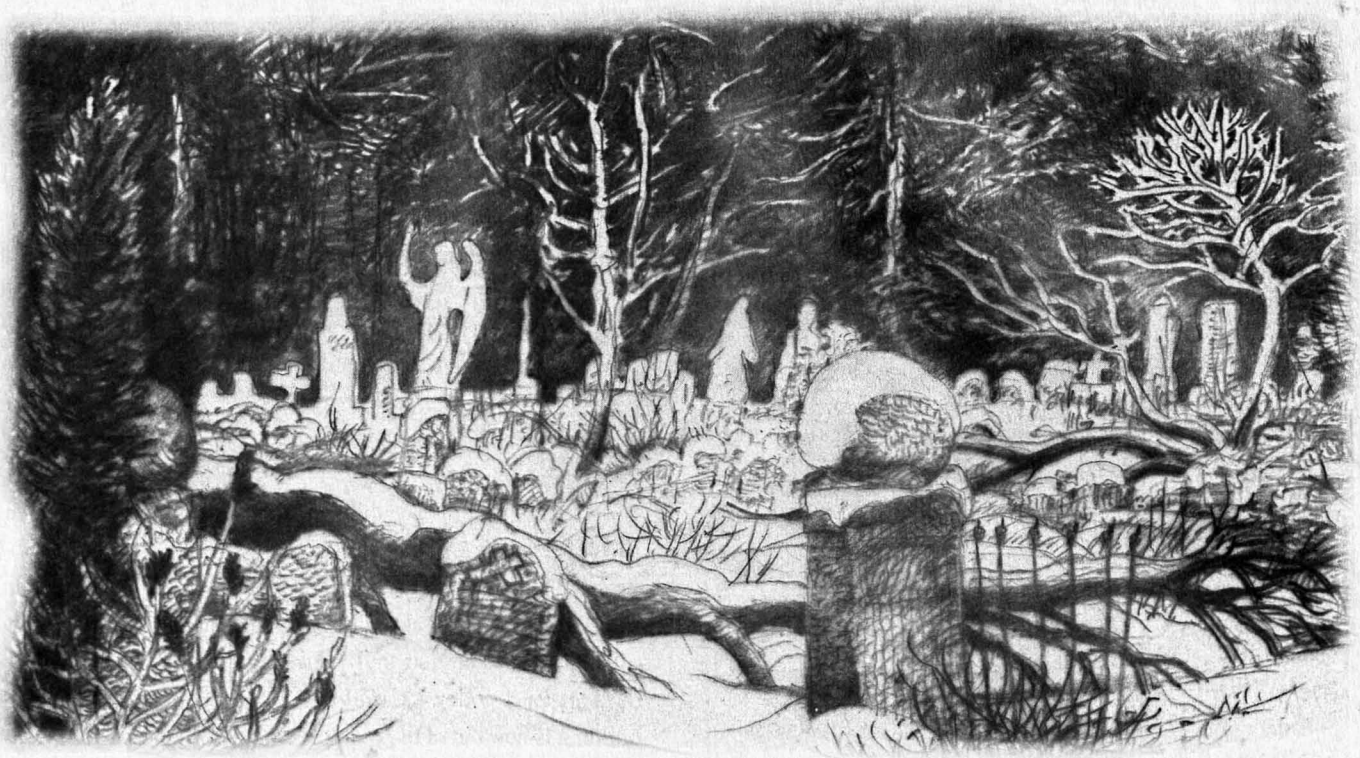
The Nature Preserve as Family Memorial



by Bill Willers

In contemporary Western society, people of wealth often choose to memorialize family members with a tangible display, such as an obelisk or a mausoleum, according to tradition and cultural values rooted in the headstone concept. At today's prices, a small mausoleum for three caskets starts at $30,000; one for six caskets, with a bronze door and stained glass windows, will approach six figures. Consider the dozens of these little buildings that dot most urban cemeteries, then begin to extrapolate to the entire country, and you're quickly looking at tens or hundreds of millions of dollars that—in a more enlightened value system—could be applied to the restoration of the landscape.

Whereas in western states, vast expanses of land are in largely unbroken federal ownership, the northern forests of the Midwest are a piecemeal assemblage of relatively small segments of federal, state, county, tribal, and private lands (see Fig. 1). Much of the public land is riddled with private "inholdings"—wood lots, second homes, hunting camps, and the like, which often bring attendant development. Such inholdings frequently come up for sale.

Given the abundance of private inholdings in public lands, it is inevitable that many will be in areas identified as crucial cores, buffers, and corridors in regional wilderness reserve systems, such as the GIS-mapped proposal that the Superior Wilderness Action Network is constructing for the Midwest north woods. If society were to adopt a value system that considered such land appropriate for memorializing a family name, and if legislation were to make it possible to purchase such land and turn it over to the appropriate governmental management agency, a considerable amount of acreage could be spared industrial development and returned to natural conditions. A problem arises in the fact that land management agencies don't want to have to deal with such nature preserves and are presently under no legal obligation to do so.

illustration by Davis Te Selle

Rules governing the conveyance of land to the US Forest Service are covered in the 26-page Land Acquisition Handbook. Although written as though lands were being purchased, these guidelines would apply to lands being given as well. On page 5 one reads that:

> *Landowners may try to impose conditions (which) may be legally or administratively unacceptable. Reject offers containing legally unacceptable conditions. Consider offers subject to administratively undesirable conditions, only if overriding public advantages may be gained. Reject proposals containing administratively unacceptable conditions.*
>
> *Examples of legally or administratively unacceptable conditions are those that (1) obligate future appropriations, (2) require payment by specific dates, (3) require preferential treatment of applications to use National Forest Land,... (4) reserve rights that might unduly interfere with property land management....*

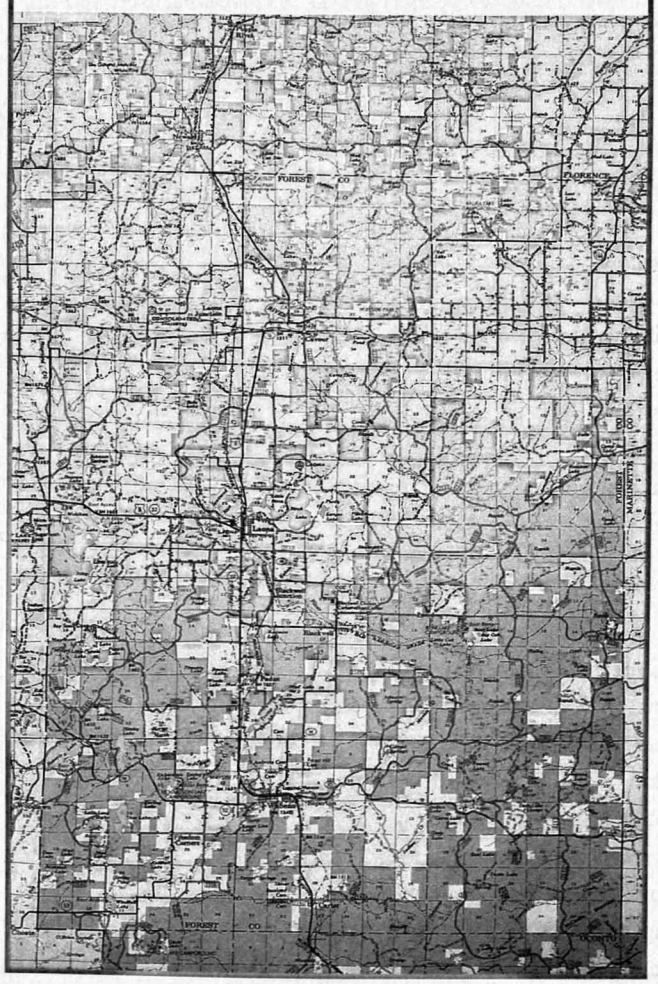
Again, on page 7, one reads: "Reject proposals if...the conditions of purchase would interfere with management of the land...." The crux of these regulations is that nothing should interfere with management policies and plans, which have historically been almost exclusively silvicultural, but which are beginning to show increasing favor to industrial recreation. It's easy, therefore, to understand bureaucratic aversion to having to accept responsibility for inholdings that are to be maintained as untouched nature preserves, since these would obviously interfere with overall, industry-oriented management plans.

Federal land management bureaus have always been quick to feel out prevailing public sentiments and to adjust their rhetoric accordingly. Masterful language manipulation and public relations programs have transmitted an image of balance in management, but the agencies have been steadfast in their hostility to the restoration and preservation of wilderness. Their decades-long policy of wilderness prevention through road-building is now out of the closet, as are their internal workshops on how to "handle" environmentalists. Yet there is a growing realization in society about how much has been lost at the hands of industrialized and politicized governmental land managers, and with this has come a coinciding rise in demand for restored wild landscapes. This growing demand is unstoppable.

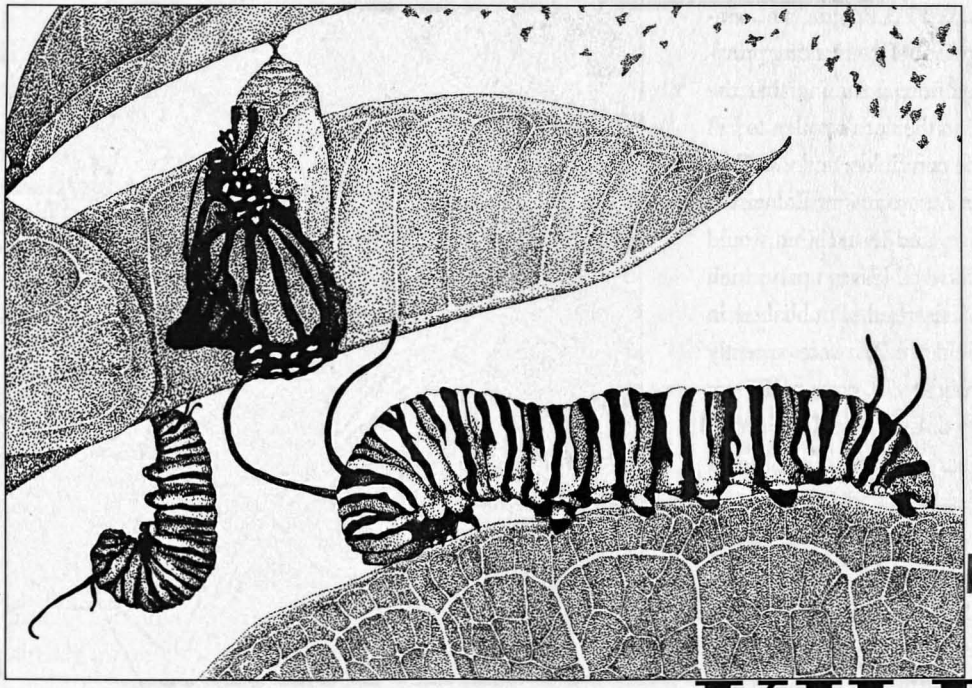
If federal agencies are now likely to decline inholdings which are established as nature preserves, then I propose that legislation is needed to make acceptance mandatory. If it were widely known that land could be purchased as a nature preserve, identified by name as a memorial, incorporated into wilderness within the public domain, and maintained as such in perpetuity, a new world of opportunity would open up to those wishing to commemorate a family name, to organizations wanting to be identified with wild land, to anyone wishing to memorialize anything. At the same time, it would oblige agencies overseeing public lands to incorporate, at last, wildland restoration into their management plans.

Make this possible, and they will come. ☾

Fig. 1. In this map of the southern half of Wisconsin's Nicolet National Forest, inholdings are shown as light gray against the dark gray of public domain.



Bill Willers is emeritus professor of biology at the University of Wisconsin at Oshkosh and the founder and board president of Superior Wilderness Action Network (www.superiorwild.org). He edited the anthologies Learning to Listen to the Land *(Island Press, 1991) and* Unmanaged Landscapes *(Island Press, 1999).*



THE KILLING FIELDS

Monarchs & Transgenic Corn

by Gary Paul Nabhan

Whether our visions for continental conservation are ambitious or modest, we are unlikely to achieve them if we ignore what is happening on the arable lands that American agriculture claims it uses "to feed the world." Of course, much of this feeding of the world is shunted into just one species, *Homo consumus*, which now sequesters over 40% of the planet's annual plant growth for our direct dietary use, at the expense of many other species' nutritional needs. To feed that one species today, American farmers have planted over one-fourth of all their fields to genetically modified crops, few of which have been adequately assessed for their potential ecological effects on the flora and fauna inhabiting agro-ecosystems and adjacent wildlands.

The latest threat to biodiversity in farm country comes in a cryptic form, since it has the genes of a bacteria toxic to moths and butterflies inserted into a grain crop by genetic engineers. "Bt corn" is indistinguishable from other varieties; a person driving through the Corn Belt would not be able to tell which green and golden fields are toxic to butterflies and which are "normal" (if we can use that word for any domesticated crop with grains as monstrous as maize). Bt corn was planted on over 22 million acres in North America this year, but certain of these genetically engineered hybrids are more toxic to moths and butterflies than others. Those hybrids formed with a genetic trick known as Event 176 (a means of transgenic manipulation which embeds *Bacillus thuringiensis* toxin-producing genes in the corn genome) have the potential to cause substantive negative effects on non-target Lepidoptera, that is, the moths and butterflies whose caterpillars crawl around our gardens and fields, and whose flying adults visit corn tassels as well as flowers in nearby wildlands.

monarch caterpillars and butterfly by D.D. Tyler

The Environmental Protection Agency (EPA) did not consult with the US Fish and Wildlife Service before granting provisional permits for various Bt corn hybrids, assuming that the *Bacillus thuringiensis* toxins produced in the corn's pollen to kill larval pests would not reach beyond the cornfields, and would be harmless to non-target organisms. John Losey, an entomologist at Cornell University, suspected otherwise, and tested what would happen if Bt corn pollen landed on milkweed leaves upon which monarch butterfly caterpillars forage. His results, published in *Nature* last spring,[1] suggested that field studies were urgently needed, as half the caterpillars exposed to Bt corn pollen on milkweed leaves died within four days of exposure. Concurrent with the journal publication, preliminary studies discussed at scientific meetings indicated that milkweeds and monarchs do grow on the edges of cornfields, and are exposed to wind-dispersed Bt corn pollen. These studies set off a maelstrom of protest by biotechnology firms, which claimed that they were being unfairly accused of killing butterflies when their real intent was to produce crops that require less pesticides toxic to birds and other wildlife (as if butterflies and moths are not wildlife that any American should care about). These agricultural industries argued that all they were really trying to do was "feed the world," and they weren't gettin' no respect for their humane efforts.

Under this smokescreen of agricultural do-goodism is an ugly scene—attacks on researcher John Losey by a Cornell University dean with leanings toward the biotech industry, and the EPA choosing to use industry-funded ecological impact studies rather than initiating their own, and failing, until much later, to consult with the government's own endangered species biologists. Recently, an industry-funded "biotechnology stewardship" group invited independent evaluators to join their scientists to discuss the results of their first season of impact studies, but before the evaluation session began, the industry released a press package claiming that "experts found no threat to butterflies from genetically engineered corn." Fortunately, Carol Yoon of the *New York Times* reported the next day that the studies actually presented at the meeting were "inconclusive" regarding Bt corn's effects on monarchs (and failed to address potential impacts on federally listed butterflies and moths). A consensus statement since signed by many scientists involved in the issue finds that substantial negative effects on butterflies are probable around plantings of corn hybrids using Event 176 genes, and urges voluntary discontinuance of these hybrids by farmers.

The following ten myths about Bt corn and butterflies have been bandied about by defenders of biotechnology, including Interior Secretary Babbitt's own Science Advisor, Bill Brown. Read them carefully, for you will see their illlogic in other defenses of biotechnology as well.

monarch butterfly (laying eggs on milkweed) by D.D. Tyler

MYTH 1: *The initial report on Bt corn killing monarchs was sloppy work.* What was sloppy was the Environmental Protection Agency assessment of the ecological risks posed by Bt corn prior to providing agribusiness heavyweights Monsanto and Novartis with provisional permits for their commercial release. The EPA did not test Bt corn's larva-killing toxins on monarchs or consult with the US Fish and Wildlife Service regarding the risk to any of the six species of federally protected butterflies in Corn Belt states. Then, when prominent researchers independently investigated possible lethality to monarchs and reported it in the peer-reviewed scientific literature, the industry attacked minute details of their documentation. Hypocritically, the industry later invited monarch researchers at Cornell and other universities who blew the whistle on the unregulated risks to participate in similar studies for them; some of these scientists declined on ethical grounds.

1. Losey, John E., Linda S. Rayor, and Maureen E. Carter. 1999. Transgenic pollen harms monarch larvae. *Nature* 399 (6733):214.
2. The short-hand name for the toxins produced by Bt.

The biotechnology industry's presumption that its new products are all "biodiversity enhancements" which help "feed the world" is unproven, and frankly, ludicrous.

MYTH 2: ***Reports on Bt corn killing monarch caterpillars are only lab experiments that are not relevant to monarch caterpillars in the wild.*** By the time John Losey's article appeared in *Nature*, most monarch biologists were already aware of a field experiment by Iowa State University researchers that demonstrated monarch caterpillar mortality on fieldside milkweeds. Europeans researchers have also demonstrated that contrary to the industry's claim that the toxin breaks down rapidly in the field, it may be bound in clays in cornfield soils, persisting longer than initially anticipated. A December 1, 1999 report in *Nature* by New York University scientists confirms that the toxins leak out of corn roots into soils in quantities sufficient to kill soil organisms.

MYTH 3: ***Bt corn pollen does not fall very far beyond the edges of cornfields and therefore will not expose milkweeds or monarchs to "cry toxins."***[2] In some midwestern localities, 20% of the milkweed plants in and near fields receive high enough doses of Bt corn pollen to present risks to monarchs. Most corn pollen produced by flowering maize plants falls within ten feet of a cornfield, but a significant amount can be swept by wind to a considerable distance beyond fields. The corn industry recommends that two distinct corn varieties should not be planted within several hundred feet of each other if contamination of one by the pollen of another is to be avoided. Several scientific organizations recommend that Bt corn be planted with a buffer planting of 40 to 80 feet around it; nevertheless, it is well known that milkweeds also emerge within cornfields, not just on their edges. Butterflies and caterpillars of many species enter cornfields, despite the fact that corn is wind—not butterfly—pollinated.

MYTH 4: ***It is unlikely that very many milkweed host plants for monarch caterpillars occur in or near cornfields.*** In certain midwestern counties, 40% of all milkweeds grow in or near cornfields. Surprisingly high densities of native milkweeds occur within 15 feet of the edges of midwestern cornfields, perhaps because their flowering branches increase in density with early-season mowing at the field edge. On a 150-mile transect through Illinois, researchers observed milkweeds within 15 feet of cornfields in 45 of the mile-long transect segments, and within ten feet in 35 of the mile-long segments. Since most of the transect was in soybean fields, woods, and urban landscaping, a large portion of the milkweed populations were associated with cornfield edges. There are similar preliminary data being reported from other Corn Belt states.

MYTH 5: ***It is unlikely that monarch caterpillars are active when Bt corn is shedding pollen.*** During the summer, monarchs undergo three to five generations of reproduction, beginning as early as April in the Corn Belt states, but caterpillars can be seen for several more months. Because corn is planted at different times in different microhabitats, monarch biologists such as Lincoln Brower predict that there is inevitable overlap of late generation caterpillars with Bt corn pollen.

MYTH 6: ***The use of Bt corn has reduced the use of chemical pesticides that damage a wider variety of wildlife than do "cry toxins."*** To date, there is no evidence that Bt field corn has reduced total pesticide use per acre compared to other field corn varieties, although Bt sweet corn growers have used less conventional pesticides for corn borers in the last two years. However, sweet corn acreage amounts to less than a million acres, so overall pesticide reduction on corn has not been remarkable.

MYTH 7: ***Bt corn helps enhance beneficial insect populations that would be otherwise threatened by the use of insecticidal sprays.*** As Cornell University entomologist David Pimentel and Missouri Botanical Garden administrator Peter Raven have recently written, "Obviously, Bt anti-insect protein is harmful to moths and butterflies. That is why it is sprayed over crops for pest control and over forests to control gypsy moths and other pests, killing at the same time all other feeding larval moths and butterflies in the area." While Pimentel and Raven then judge the environmental impact of widespread application to be minimal, Swiss researchers have found an indirect but deadly effect of Bt corn on the very beneficial insects that feed on European corn borers. Studies of spraying Bt on spruce budworm-infested forests have demonstrated a drop in both the diversity and density of moths and butterflies.

MYTH 8: ***Bt corn toxins are relatively specific to corn pests and are the only economic solution for controlling crop losses to European corn borer.*** Bt corn toxins kill a broad spectrum of moths and butterflies, but do not affect vertebrates except through diminished food supplies. They are not corn borer specific. In addition, the use of Bt corn may be marginally economical for most farmers battling the European corn borer, since this pest does not cause significant yield losses every year. The extra cost of Bt corn "cry toxin" protection, by some calculations, must be compensated by a four bushel per acre increase in corn yields, a difficult yield boost to achieve year after year.

MYTH 9: ***Because the loss of wintering habitat is the principal threat facing monarch butterflies, Bt corn should not be regulated in the Corn Belt area where roughly half of the monarchs departing from Mexico feed in the summer.*** The US Department of Interior recently released the proceedings of a monarch conservation conference held in Morelia, Mexico; the document emphatically states that better protection for monarch wintering sites will not alone be sufficient to stave off population declines and that conservation efforts along migratory corridors and in summering grounds are urgently needed. A December 1998 report in the *Proceedings of the National Academy of Sciences* found that a disproportional percentage of all monarchs arriving in Mexico come from the heart of the Corn Belt, where, scientists warn, the use of insecticides and milkweed-killing herbicides has intensified. The US has signed an agreement with Mexico establishing means to protect monarchs throughout their range, not just in their wintering grounds.

MYTH 10: ***The release of genetically modified organisms like Bt corn actually enhance biodiversity while helping to feed the world's burgeoning population.*** Bt corn pollen may be harmful to 18 federally listed moths and butterflies and to hundreds of other species of Lepidoptera that occur in North America. Butterfly species richness, according to the Stanford University Center for Conservation Biology, is a valuable indicator for overall biodiversity, especially in Latin America, where corn is a major staple, but Bt corn has yet to be introduced. The European Union has already decided to withhold permits for new releases of Bt corn, and Greece has proposed that the Union place a general moratorium on all Bt corns because of their potential effects on the dozens of endangered butterflies in Europe. Some countries are refusing to purchase corn from the US because our government does not require that food products from genetically modified varieties be labeled as such.

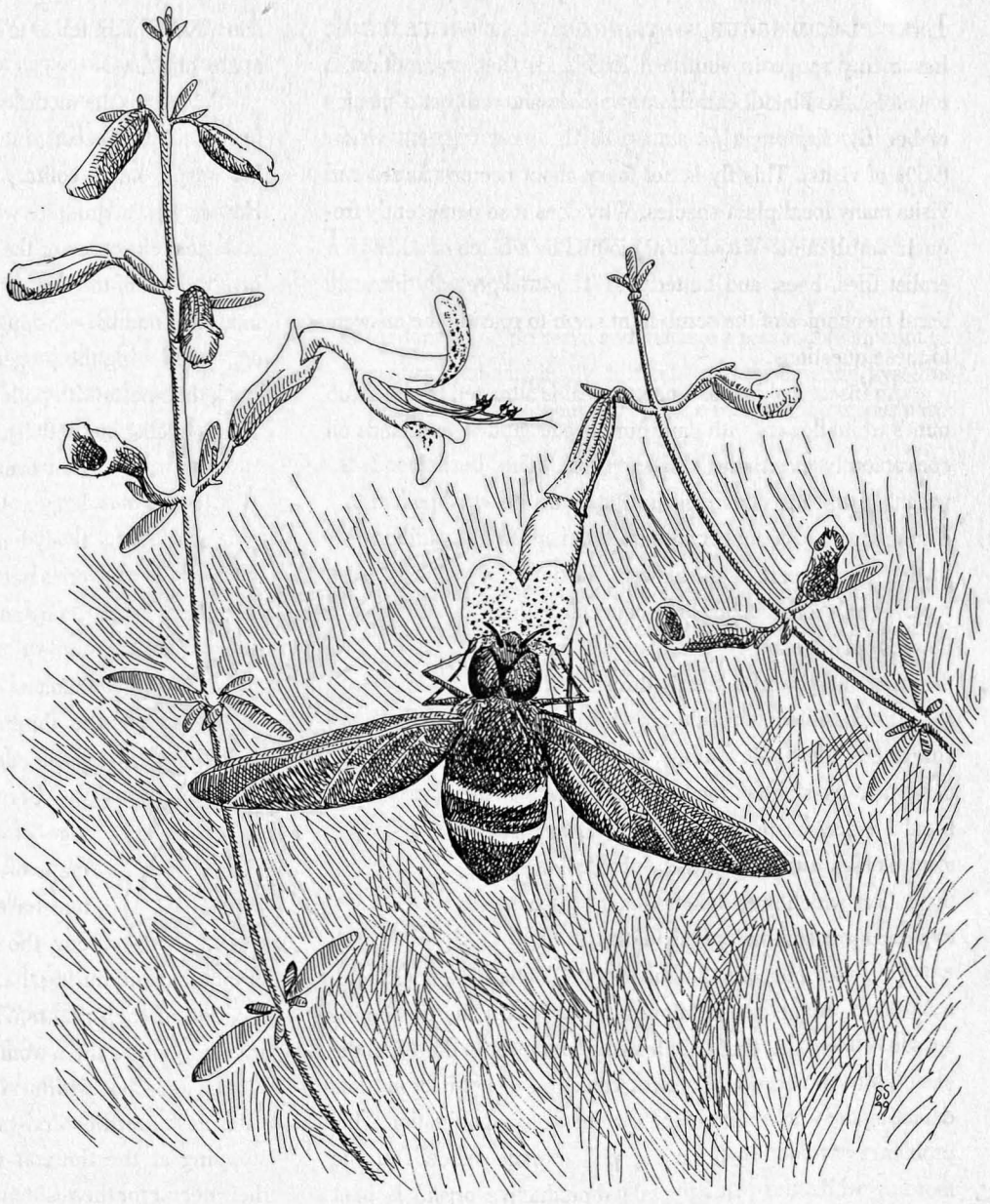
To date, there is no evidence that Bt corn's yields are greatly superior to other corn varieties, thus providing new surpluses for distribution to famine-stricken nations to alleviate starvation. There is ample evidence to suggest that planting just a few varieties of Bt corn on more than 20 million acres in the US and 10,000 acres in Europe is decreasing the base of genetic diversity of field corn, making this monoculture increasingly vulnerable to epidemics. In addition, recent reports suggest that insects are rapidly developing resistance to Bt toxins because they are exposed to the toxins over such large areas. If Bt toxins are rendered ineffective by overuse by the biotechnology industry, in a matter of a few years ecologically minded gardeners and farmers will permanently lose a bio-control tool that they have used prudently for the last fifty years.

The biotechnology industry's presumption that its new products are all "biodiversity enhancements" which help "feed the world" is unproven, and frankly, ludicrous. If the industry truly valued "land stewardship," it would have rigorously tested for Bt corn's ecological risks *before* releasing it for planting on a quarter of the country's corn acreage. A genetically engineered biotoxin deserves no less scrutiny and regulation than a chemically engineered toxin—especially when butterflies protected by the Endangered Species Act may be vulnerable to further declines as a result of its unrestricted use. ☾

WHAT YOU CAN DO Write Carol Browner, EPA Administrator (401 M St. NW, Washington, DC 20460) asking her to suspend EPA permits for Bt corns until it is clear that they pose no threat to monarchs or federally listed butterflies. Refrain from eating all yellow and white sweet corns and field corns in the US until the Secretary of Agriculture mandates labeling genetically modified hybrids. Ask food co-ops and restaurants to offer only non-engineered corns until labeling and impact assessments are done. Get involved in monitoring butterfly and caterpillar populations near cornfields, or in creating buffers to protect wildlands from their impacts. Follow this issue through the Union of Concerned Scientists, via jrissler@ususa.org.

Ethnobotanist Gary Paul Nabhan is science director of the Arizona-Sonora Desert Museum and author of many books, including The Desert Smells Like Rain *and (with Stephen Buchman)* The Forgotten Pollinators. *He grows only non-genetically engineered crops in his garden and wild forages for four out of every five of his meals within a 250-mile radius of his desert home, insisting that it if he can do it, anyone can.*

Learning *the* Language *of* Insects *and* Flowers



by Mark Deyrup

The language of life is in the relationships between organisms; each species appears in many contexts, where it can take on different meanings. The catalog of species is only the dictionary of life. Pollination ecology gives us a chance to observe the diversity of biological relationships: since it involves communication between plants and animals, we can, with a little patience and ingenuity, listen in on the conversations.

Here at the Archbold Biological Station in central Florida we have been studying the pollination mechanisms of three species of endangered plants that occur in the remnants of a once extensive ecosystem called Florida Scrub. We knew of nothing especially interesting about the pollination of these plants; we just wanted to make sure that there was not some vulnerable pollinator relationship that might jeopardize their persistence in the small patches of habitat where they still occur. This is what we have discovered so far.

This essay originally appeared in the spring 1997 issue of Wings, *the biannual membership magazine of the Xerces Society, and is reprinted with permission.*

Exprosopa fasciata pollinating Lake Placid scrub mint by Susan Sawyer

LAKE PLACID SCRUB MINT, *DICERANDRA FRUTESCENS*, has a tiny range in southern Highlands County, around the town of Lake Placid. Our flower watches showed that a species of bee fly, *Exprosopa fasciata*, was the most frequent visitor (95% of visits). This fly is not fussy about nectar sources and visits many local plant species. Why does it so persistently frequent scrub mint? Why is it not joined by a batch of other generalist flies, bees, and butterflies? The unexpectedly intricate floral mechanics of the scrub mint seem to provide the answers to these questions.

An insect looking for a nectar meal is attracted by the scrub mint's white flowers with dark pink nectar guides, and lands on conveniently positioned lower petals. The weight of the insect bends the flower at the elbow, shutting off access to the nectar supply in the tubular part of the flower. The insect receives only a tantalizing taste of nectar in the flower's open section. In pursuit of more nectar, the large and powerful bee fly thrusts its head as far as possible into the flower. This partially straightens the flower's elbow, so that the fly can stick its slender tongue down into the basal bonanza of nectar. The pushing action also releases a trigger on the anther, allowing the pollen, which is contained under pressure, to pop out onto the hairy belly of the fly.

To attract and train a number of pollinator flies, each scrub mint plant produces many flowers a day over a short blooming season. This means that the flies go from flower to flower on the same plant, which would seem to ensure self-pollination, thus defeating the whole point of the system—cross-pollination. This problem is avoided by producing pollen (male sex cells) in the morning while the pistil (female reproductive organ) is bent down out of the way. In the afternoon the pistil curves up, where it will come into contact with flies that return to the mint patch for an afternoon snack, with pollen still adhering to their bellies.

The Lake Placid scrub mint achieves cross-pollination by teaching a common, generalist bee fly to act as a specialist, in return for exclusive nectaring rights. This kind of specialization does not make plants particularly vulnerable.

FLORIDA SCRUB BUCKWHEAT, *ERIOGONUM FLORIDANUM*, lives on scrub and sandhill ridges in a few places in Florida. This plant often occurs as a small population of blooming plants scattered throughout an acre or so of woodland. The flowers have an easily accessible, generous drop of nectar, but are small, green, odorless (at least to us), and generally inconspicuous. Each plant tends to have only one or a few flowers open at any one time.

In spite of its modesty, scrub buckwheat is eagerly visited by a variety of insects, including solitary digger and twig-nesting wasps, small, solitary bees, and occasional social wasps. How do you get groupies without any PR? The answer lies in the biological character of the visiting insects. Most of the insects involved are of the thrifty, provisioning type that invest heavily in a small number of young, instead of laying large quantities of eggs and letting the progeny fend for themselves. The females stock their nests with pollen or prey for their developing larvae. This is a laborious activity, requiring many trips to and from the nest over a period of several weeks, or even longer. All these insects, therefore, have relatively long lives, and the superb spatial memories needed to forage widely for food for their young and get back to the nest by the shortest route through a complex environment. Most humans could not do this, and it is humbling to think that you could arrange several of these bugs' brains on the head of a pin.

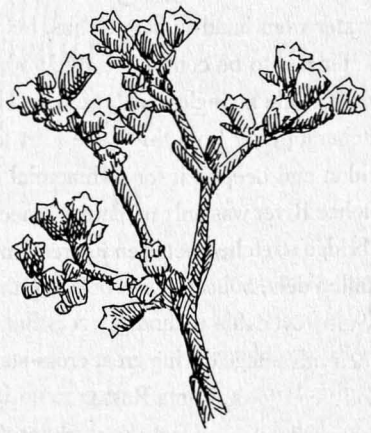
Scrub buckwheat seems to take advantage of the long lives and accurate road maps of these insects. Even though a plant may have only a few open flowers on any one day, the flowers are produced over a period of months, and during that time the resident insects learn the location of each plant. When we marked individual insects, we could follow them from plant to plant, although most of the plants were not within sight of each other. Tourist insects, such as butterflies and tachinid flies, pass through without stopping at the flowers, whose inconspicuousness reserves their nectar for the resident habitués. Scrub buckwheat has an almost ideal system for ensuring cross-pollination, since the small number of flowers per plant induces the insects to visit several plants. As in the scrub mint, there is a mechanism for avoiding self-pollination by individual flowers: the anthers open and shed their pollen first, then the pistils, which have kept their stigmas tucked into a tuft of hairs at the base of the flower, straighten up and offer their receptive surfaces to incoming insects.

Scrub buckwheat has evolved an unusual version of induced traplining in which animals visit a series of resources over a long time—just as an old-time hunter would check his line of traps set out through the forest. There is a form of specialization here, but as in the case of the scrub mint, generalists are trained as specialists.

Florida scrub buckwheat by Susan Sawyer

PAPERY WHITLOW-WORT, *PARONYCHIA CHARTACEA*, IS another Florida scrub species; most of its populations are on the Lake Wales Ridge, which runs down the center of the peninsula. We still do not quite understand the pollination ecology of this plant, in part because its flowers are so minuscule that they cannot be individually marked and observed. One strange feature of papery whitlow-wort is that it is "gynodioecious," which means that some plants are female, while others have "perfect flowers" (containing both male and female parts). The latter type of flower seldom seems to produce a seed; this fact, combined with the finding that there are equal numbers of each type of plant in all the populations we have studied, suggests that the papery whitlow-wort should be considered effectively dioecious (having male and female flowers borne on separate plants).

The pollination ecology of a dioecious plant should be simpler to study, since the plants don't need to engage in any complicated tricks to avoid self-pollination. In the case of the papery whitlow-wort, however, there is a peculiar feature of the possible pollinators. At first I thought that small bees of the genus *Dialictus* were the most important pollinators, since they were common visitors, and many plant species are adapted for bee pollination. Then I noticed that they were only visiting the plants with perfect flowers, so they were gathering pollen, but not visiting the female plants or performing as pollinators—all these busy bees were really what are called in the trade "pollen robbers."



The insects that visit both types of plant are small sarcophagid flies, primarily species of *Gymnoprosopa*, of the subfamily Miltogramminae, the satellite flies. These flies follow closely behind digger wasps (hence the term "satellite") that are carrying prey, or burrowing bees with a load of pollen. When the host stops to open its nest, the little fly deftly deposits its own larva on the provisions or at the nest entrance. Satellite flies are common in open sandy areas where the papery whitlow-wort grows, and can be seen moving quickly over the plants, occasionally stopping to insert a tongue into one of the pin-head sized flowers. We have no idea what the flies are gathering. According to chemical tests, there is no nectar in the flowers. There is no pollen in the gut of the flies. There are no other known pollination systems depending on satellite flies, so we cannot look at parallel situations. Whatever the flies are after, it is of no interest to ants, which run all around the plants, and all over those plants that have aphid infestations.

While the behavior of the flies is mysterious, their role as pollinators is quite clear: as they move rapidly from plant to plant, there is plenty of pollen in amongst the stout bristles that cover their entire bodies. This, again, does not appear to be a system that relies on mutual dependencies that can cause a spiral toward extinction if either member of the relationship goes into a decline.

THERE ARE A FEW LESSONS TO BE LEARNED FROM THESE three stories of pollination:

- As long as we preserve and manage a reasonable amount of natural habitat, many intricate and fascinating systems should persist without any specific intervention on our part.
- Specialized pollination relationships do not necessarily make plants more vulnerable to extinction, especially if the pollinator is not completely dependent on the plant.
- We actually know very little about the function of pollination systems, largely due to the fact that there is a fantastic diversity in the details of pollination.

Pollination systems that rely on animals (rather than wind) have an absolute requirement for "brand faithfulness" on the part of the consumer animal. The potency of this force for diversity can be seen in any alpine meadow, or, for most of us, in any supermarket. Distinctive advertising and flashy packaging set a search image in the brain of the shopper; thus, after millions of years and billions of dollars, we humans begin to approach the level of consumer commitment exhibited by flowers and little flies.

If the relationships between organisms is the language of life, and the catalog of species merely a dictionary, then many scientists are grammarians, preoccupied with the rules that govern the biological world. Now is a good time to get out of the lab or library, to walk down the steps past the dooryard dayflowers, along the path where the pigeon peas and milkweeds grow, through the hedge where the violets bloom, and into the field. Find a stump to sit on, and tell stories to the next generation. If we do that, fewer words will vanish, and much more will remain of the epic of life. ☾

Mark Deyrup is a research biologist at Archbold Biological Station in central Florida, where the rich arthropod fauna has persuaded him to undertake many more projects than he can possibly complete. His special interests include arthropods of the Florida scrub habitat, arthropod conservation, and ants of the southeastern United States and West Indies.

papery whitlow-wort by Susan Sawyer

Large Carnivores

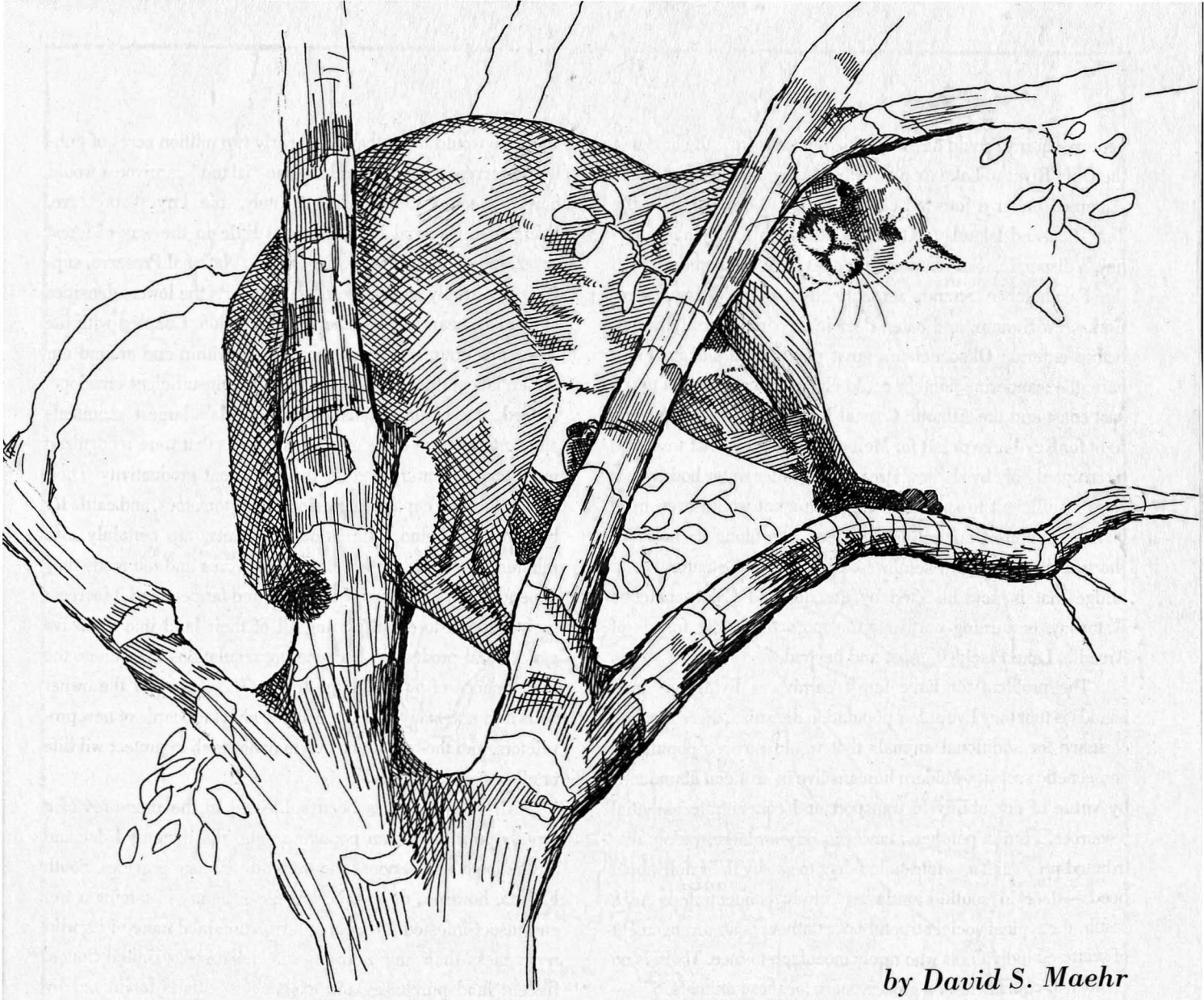
South Florida is an island—it's surrounded by water on all sides. True, this palm-studded portion of the peninsula is still connected to the mainland by highways, bridges, and power lines, but for many native wildlife species it is as isolated as if it were afloat in the Gulf of Mexico. This is especially true for wide-ranging mammals that have become trapped in the forests and prairies of the Big Cypress Swamp and the Everglades. Animals that once had unrestricted access to almost anywhere in the southeastern United States now live out their lives in an inelastic envelope bounded on three sides by saltwater and on the fourth by a huge lake (Okeechobee), human-made water courses, residential developments, and agriculture. These recent changes are readily accepted by most of us as integral parts of this highly developed state, but they are all relatively new features in a region that was virtually untouched by Europeans until about a century ago. The changes happened gradually from a human perspective, but they were as abrupt in a natural history sense as if south Florida had indeed floated out to sea.

The modern south Florida landscape is as much a product of human efforts to produce food and provide housing as it is the result of eons of geological processes and climate change. At the turn of the century, warm temperatures and abundant water provided a fertile milieu not only for winter recreation and farming, but also for insect pests and regular but unwelcome flooding. The bugs and water went hand in hand. Thus, before fields could be tilled and resorts built, south Florida's water had to be controlled. By 1930, five canals stretched from Lake Okeechobee to the east coast, while a single canal, built by Hamilton Disston in the late 1880s, extended the Caloosahatchee upriver from tiny Lake Flirt to the great lake. Then, the river was dredged in order to widen and deepen it for commercial boat traffic. It is uncommon knowledge that the Caloosahatchee River was only recently connected to Lake Okeechobee—before this, a 20-mile-wide land bridge stretched between its western shore and present-day LaBelle. Wildlife including white-tailed deer, bobcat, black bear, panther, and the extirpated red wolf undoubtedly lived on and traveled over this upland forest isthmus. Even Florida's early cowboys used this land bridge to their advantage during great cross-state cattle drives to deliver their hoofed charges to the Gulf Coast cow town, Punta Rassa.

If these new landscape features were insufficient to stymie the north-south travels of forest wildlife, the clearing of the great pond apple slough was the final blow. Historically, this wetland forest draped the south rim of Lake Okeechobee, but was cleared to create room for the Everglades Agricultural Area. An impenetrable swamp festooned with the colorful moonvine, it once provided protection for refugee Seminole Indians during their wars with the Union army, and it most certainly acted as the conduit for east-west travels of forest wildlife. For black bears it was not only a travelway, but also a food-rich habitat that likely enticed hundreds of these largest of Florida's land mammals during the fall when pond apple trees drooped with their heavy, pulp-filled fruits.

Before it was cleared and drained, the great pond apple slough provided a corridor for a west coast bear to get to the east coast. There, a forest—like no other on the continent—supported spreading live oaks, palms, and other tropical plants that sustained a diverse wildlife community. The sprawl of Miami and other Atlantic Coast cities ensured the elimination of North

illustrations by the author



... in an Island Paradise?

by David S. Maehr

America's lushest tropical forest—a natural feature that once stretched from Homestead to Melbourne. Without it, a bear is unlikely to ever make this journey again.

Black bears, Florida panthers, bobcats, and other space-hungry wildlife now appear to live in a landscape cul-de-sac, restricted to the remnant forests that exist mainly in southwest Florida. This does not bode well for species that depend on an occasional exchange of individuals between distant subpopulations in order to maintain genetic vigor and long-term survival prospects—especially because human growth and forest-clearing continue in the face of slowly rising sea levels. Before the intervention of industrialized humans, it was possible not only for animals to move about freely on the landscape, but entire ecosystems could creep north, south, east or west as modifying conditions dictated. That most of present-day Florida was underwater just over 100,000 years ago is proof that entire assemblages of plants and animals moved in response to changing environmental conditions. These organisms have no less of a need to move across the landscape today.

Despite the popular image of south Florida, the region's dominant feature prior to intense human settlement and development was not sandy beaches or a foreboding Everglades—it was a vast interconnected system of forests that provided food, cover, and travel opportunities for its denizens. Just as a 17th

century squirrel could have remained in trees from the banks of the Ohio River to Lake Erie, a 19th century panther could have remained under a forested canopy from the mangroves of the Ten Thousand Islands to Orlando. During this imaginary journey, a dispersing Florida panther could have wandered through the Fakahatchee Strand, serpentined among the cypress of Corkscrew Swamp, and eaten deer in Kissimmee Billy Strand before entering Okeechobee's great pond apple slough. From here, the wandering panther could choose to continue on to the east coast and the Atlantic Coastal Ridge forest before turning right for Key Largo or left for Melbourne on a trek that would be interrupted only by shallow streams and other water bodies that were insufficient to slow it down. Such a cat would even have had the option of encircling the great lake along its northern shore and returning to southwest Florida via the natural land bridge that is now bisected by the dredged Caloosahatchee Waterway, or turning north for the more temperate forests of Arcadia, Lake Placid, Tampa, and beyond.

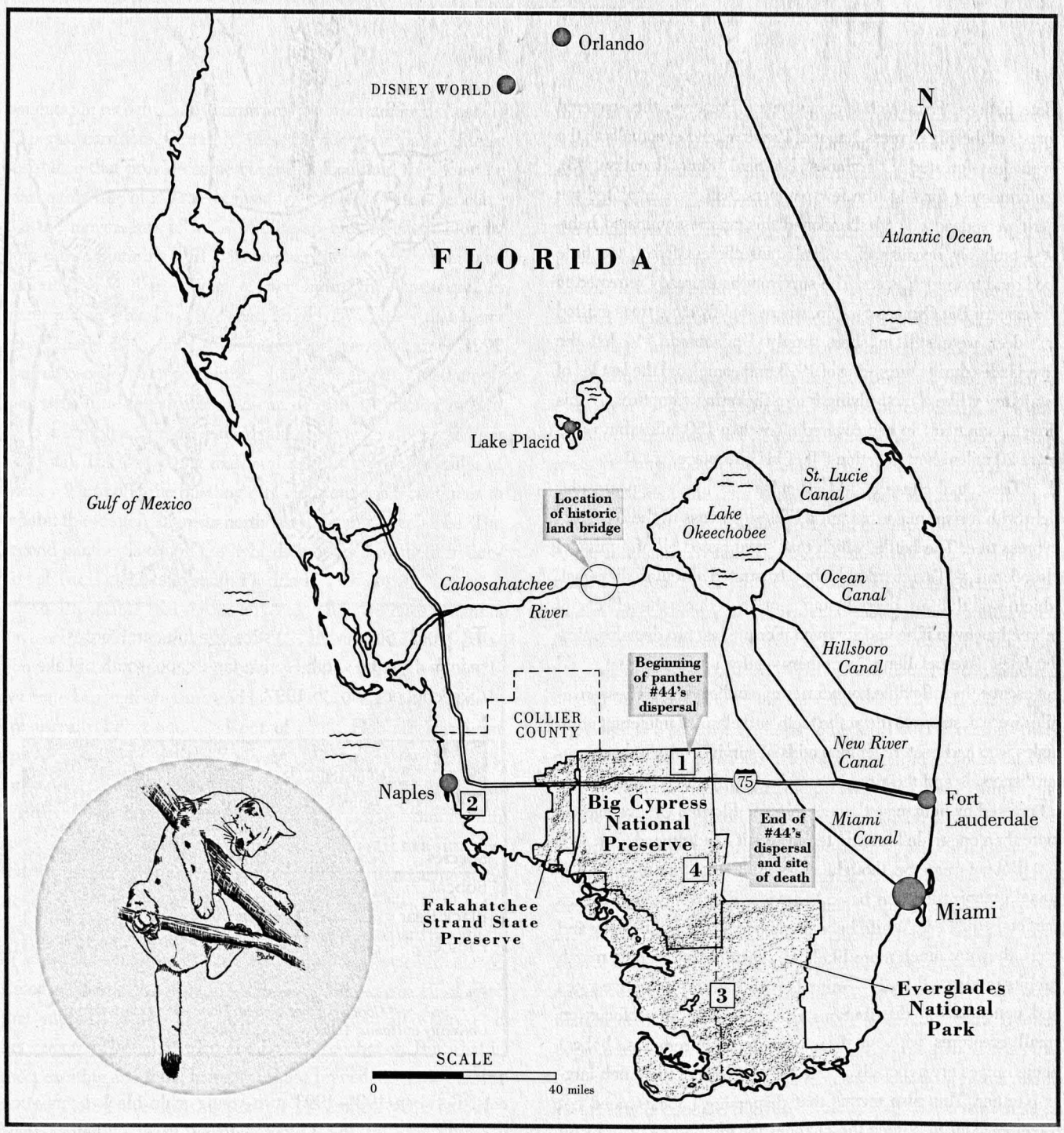
The problem for large forest carnivores living on small islands is that they live at low population densities; there is a lack of space for additional animals that would provide population and genetic security. Modern humans live in artificial abundance by virtue of our ability to transport and concentrate essential resources. Florida panthers, however, rely on large, widely distributed prey such as white-tailed deer to satisfy their nutritional needs—deer in south Florida are rarely concentrated. As a result, the typical social structure of panthers is an arrangement of scattered individuals who rarely meet face-to-face. There is no ecological equivalent of a grocery store for these animals.

Black bears take advantage of locally concentrated food supplies such as acorns, palmetto fruit, and carpenter ants. As a result, bear movements can appear quite restricted—but when one food supply disappears, another ripens to replace it. The fall migrations of black bears in south Florida are an example of this phenomenon as males and females alike abandon traditional summer home ranges and head to distant palmetto flats. During such food transitions it is not unusual for bears to travel 10 to 20 miles in a matter of days as they track the changing nutritional patterns of the landscape. When, after about a month, the local crop of saw palmetto fruit has been deposited in steaming piles along bear travelways, temporarily displaced bears retrace their steps home. Such landscape dynamics are the kinds of influences that maintain North America's southeastern-most bear population. Bears in south Florida need a lot space because their groceries are so widely spread; thus, their seasonally shifting feeding areas need to be interconnected by a network of forest patches and corridors.

One would think that with nearly two million acres of public preserves in south Florida, these "island" carnivores would have a secure future. Unfortunately, the largest preserve, Everglades National Park, provides little in the way of forest cover, and the next largest, Big Cypress National Preserve, supports a naturally patchy forest that supports the lowest densities of resident bears and panthers in the region. Coupled with the increasing abundance and use of roads within and around our public lands, this vastness shrinks to an insufficient envelope. Indeed, the highest densities of Florida's largest mammals appear to exist on or nearby private lands that were recognized more than a century ago for their inherent productivity. Their soils, which are capable of raising citrus, tomatoes, and cattle for both domestic and international markets, are certainly also inherently best for growing large carnivores and the foods they depend on. However, many ranchers and farmers find it increasingly difficult to avoid putting all of their land into intensive agricultural production because tax regulations discourage the maintenance of land in large tracts. Thus, whether the owner wills it or not, many ranches become checkerboards of new proprietors, and the new managers may not wish to protect wildlife or allow forest recovery.

All of Florida has been subjected to the pressures of a rapidly growing human population and the increased demand for the foods and services that its warm climate provides. South Florida, however, due to the greater difficulty in taming a wet and insect-infested landscape, has maintained more of its wild remoteness than anywhere else in the eastern United States. Recent land purchases and exchanges—efforts facilitated by creative corporate/government ventures, and the willingness of Florida's citizens to fund massive land-saving programs such as Preservation 2000 and Save Our Rivers—have slowed the tide of development in the southeast's largest remaining wilderness. But will this be enough for bobcats, bears, and panthers to survive and evolve as south Florida continues its transformation?

Perhaps the best answer to this question has been provided by the youngsters of our large carnivore populations. More than a decade of study has enabled researchers to document the fates of panther kittens and bear cubs—the essential building blocks of population growth and regeneration. The pattern for most solitary carnivores, whether they are leopards, grizzly bears, or wolverines, is for young males to leave home permanently. For bobcats this occurs at less than one year of age, whereas for bears and panthers the separation occurs at about 18 months. While many human parents might secretly wish for the same thing with teenage offspring, the critical effect of adolescent home range abandonment among carnivores is the



reduction of inbreeding among close relatives. Such movement, termed dispersal, has been observed in male mountain lions (the western version of the panther) to exceed a straight-line distance of more than 100 miles. These animals, if they survive the trip, may be rewarded with a new home complete with abundant food, and, if they are really lucky, members of the opposite gender.

While long-distance dispersal may be the rule for mountain lions, their tropical Florida relatives demonstrate a much different pattern. The dispersal of male Florida panthers, as for male mountain lions anywhere, begins with their mothers' return to prime physical condition (following the stress of 18 months of kitten-rearing) and the arrival of a male suitor. This seems to be the trigger that sends youngsters on their solitary way. One such kitten, male #44, began his dispersal (see location #1 on map) by leaving rich private ranch lands in eastern Collier County during March of 1992 and heading west toward Naples (location #2). This inexperienced young panther actually spent a week traveling the urban landscape, walking through growing subdivisions, and crossing busy commuter routes. Remarkably, no panther sightings or lost pets were reported to any authorities during his visit, and #44 soon reversed his heading, adding an eastward tack to his journey. This leg of his trek angled to the southeast, through the southern Golden

Gate Estates, Fakahatchee Strand State Preserve, the scattered forests of the Big Cypress National Preserve, and eventually to the even less-forested Everglades National Park (location #3). Unfortunately for #44, the few panthers that once inhabited the Park were dead or had abandoned this prairie-dominated habitat—probably because of naturally insufficient forest, too little food, and too much water. The survivors had already retreated to the eastern Big Cypress Swamp, where slightly more trees existed but deer were still in short supply. Undaunted, #44 left the Everglades during the spring of 1993 and completed the last leg of his journey like a moth flying into a flickering campfire. By this time his circular trip had covered more than 150 miles, but was a mere 20 miles short (location #4) of his birthplace.

The actual cause of #44's demise was likely a spectacular fight with a rival male that left a lifeless carcass at the base of a cypress tree. The battle, which may have lasted all of a minute, closed out #44's remarkable but frustrated circular dispersal, which would have been insufficient to reduce the effects of inbreeding even if he had survived. For the last two decades, similar fates have befallen many others—all young males that could not escape the inflexible boundaries of panther range. These juveniles were destined to die at the teeth and claws of intolerant adult males who had beaten the long odds of surviving their own circular dispersals and the risks of remaining within the island of forest created by human settlement in south Florida. On average, no more than one male kitten in ten makes it to adulthood.

Bobcats can be thought of as miniature panthers. Their social organization and basic behaviors differ only as much as the foods they eat. While bobcats do occasionally kill deer and hogs, they are much more likely to consume cotton rats, marsh rabbits, and small birds—animals with high reproductive rates and concentrated distributions. Because their diets focus on small creatures with small movement requirements, bobcat home ranges are generally about 20% the size of the much larger panther. This also means that dispersing bobcats need not travel very far to reduce the chances for inbreeding. The result is a very healthy population of bobcats in south Florida with numbers that may be 40 times more numerous than panthers. And, because they require less space than their larger relatives, bobcats are more likely to be found in relatively small patches of forest that may still exist near urban areas.

Black bears also appear to be somewhat better adjusted to surviving in a fragmented and human-altered landscape than panthers. While male bears may be similar to panthers in traveling long distances to escape the pressures of home, certain individuals seem capable of negotiating long, one-way dispersals despite obstacles that seem to have been barriers to big

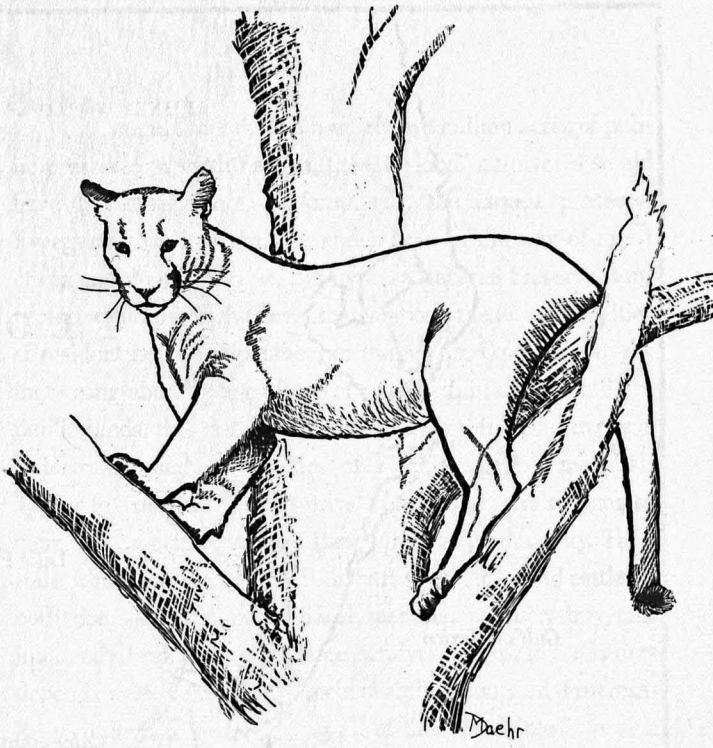


Table 1. Some vital statistics of adult carnivorous mammals in the south Florida landscape (south of Lake Okeechobee) prior to 1997.

	Home Range Size (square miles)		Longest Known Dispersal (straight-line miles)		
Species	Female	Male	Female	Male	Total Population
Bobcat	5	14	18	9	2290
Black Bear	21	110	35	70	1020
Panther	77	166	17	71	70–80

Figures are from Maehr, D.S. 1996. Comparative ecology of bobcat, black bear, and Florida panther in south Florida. PhD Dissertation, University of Florida, Gainesville, FL. 374pp.

cats. Between 1986–1993, two young male black bears successfully crossed the Caloosahatchee River. Whether they swam, used a bridge, or hitched a ride is unknown, but they made their way to areas well outside the influence of local population genetics. One of these bears, two-and-a-half-year-old male #M01, walked a straight-line distance of at least 70 miles before he was found in the company of an adult female bear in the outskirts of Lake Placid. From here, it would not be out of the question for a bear to hopscotch among forest patches and follow forested corridors to other fragments of bear habitat such as Green Swamp, Homosassa, and Ocala National Forest.

Unfortunately, too little is known about large carnivore ecology in Florida for us to predict exactly what landscape com-

ponents are recognized by carnivores as important ingredients of dispersal corridors. Certainly, these corridors are paths of least resistance that provide some cover and food, and they must be reasonably free of intense human activity. If we wish to encourage the movements of large wildlife species in south Florida, long-range planning will be necessary to prevent urban and agricultural land uses from overwhelming the landscape. In many places, this has happened already. We know that bears occasionally cross the Caloosahatchee River, and since 1997 two radio-collared male panthers have made unexpected crossings with little fanfare from researchers (the tracks of a third have been discovered near Myakka River State Park near Sarasota). The first young male walked to within a few miles of Disney World and the bustling city of Orlando. He continues to inhabit the scattered forests northeast of Lake Okeechobee. The second panther is one of the hybrids produced by the introduction of Texas cougars to south Florida in 1995.

Is it possible that the positive reproductive rates panthers have exhibited for more than a decade and the artificial population increases stemming from translocated Texas cats have finally created enough pressure and lack of space that young animals are literally being squeezed out of south Florida? Has what appeared to be a landscape barrier to panthers now become a landscape filter made less opaque with hypersaturated habitat? While the genetic transfusion may provide administrators with some short-term anxiety relief, it is just a quick fix to a situation that has appeared hopeless for many years. No landscape solutions have been adopted by natural resource agencies in Florida, yet panthers themselves seem to be giving us the answer. Both of the radio-collared panthers crossed the channelized Caloosahatchee at nearly the same location—a stretch of river that supports more forest on both banks than anywhere else between the Gulf of Mexico and Lake Okeechobee. But what is most exciting about the travels of these precedent-setting males is that their movements, separated by about a year, followed identical pathways along a landscape corridor identified by the Florida Greenways project. The blueprint for this work, spearheaded by researchers at the University of Florida, is a state-sized version of The Wildlands Project. It is a plan that has targeted strategic linkages between key natural areas through either protection or restoration. Over the course of one year, two panthers have validated the linkage that connects south Florida with the rest of the state, and have seemingly nominated the subspecies as a flagship for regional ecological restoration.

Unfortunately for these particular panthers, there is no evidence of females in their adopted landscapes. Perhaps all that is needed to promote more frequent panther movements across this waterway and the establishment of females is the enhancement of forest cover on its north and south banks. Reconnecting south Florida's forests with the swamps, piney woods, and scrub of south-central Florida would allow panthers and other wildlife the chance to colonize lands long abandoned or to link up with populations from which they have long been segregated. Although more research will be necessary to determine how to achieve such connectivity, there is enough evidence to suggest that the concept is sound and that some corridors are in use today. But how long will existing connections remain before even bears become land-locked in the forest island of south Florida? There may not be much time—biological theory suggests that any isolated population is doomed to extinction.

Solutions to landscape-scale questions are always cheaper the sooner they are implemented. Had underpasses for panthers along Interstate 75 failed to be installed until now, their lofty price tags would easily have doubled 1980s construction costs. Interestingly, there was no evidence that panthers would even use underpasses—it was truly a shot in the dark. Fortunately, the experiment worked and opened the door for constructing similar structures where the need to move animals safely past highways is a priority. Perhaps some kind of connecting structures should be considered for spanning the Caloosahatchee Waterway and thus relieving the pressure that continuing reproduction creates for panthers living on the island of south Florida. Europeans have constructed highway overpasses for some of their native species, enabling squirrels, European hares, and roe deer to move safely between artificially separated populations in the Netherlands. This kind of landscape repair will probably reduce the cost of long-term population management. Such a structure across the Caloosahatchee River would allow the population of panthers to grow beyond the century mark (recent population viability modeling suggests that the panther has the potential to increase its population size dramatically from about 70 to several hundred if given ample space). There is no reason that such a project could not be undertaken for south Florida carnivores. The evidence suggests that it would work—a landscape linkage and a figurative anchor that would keep south Florida from floating farther out to sea. ☾

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Jaguar and Wolf Recovery in the American Southwest

Politics and Problems

by Michael Robinson

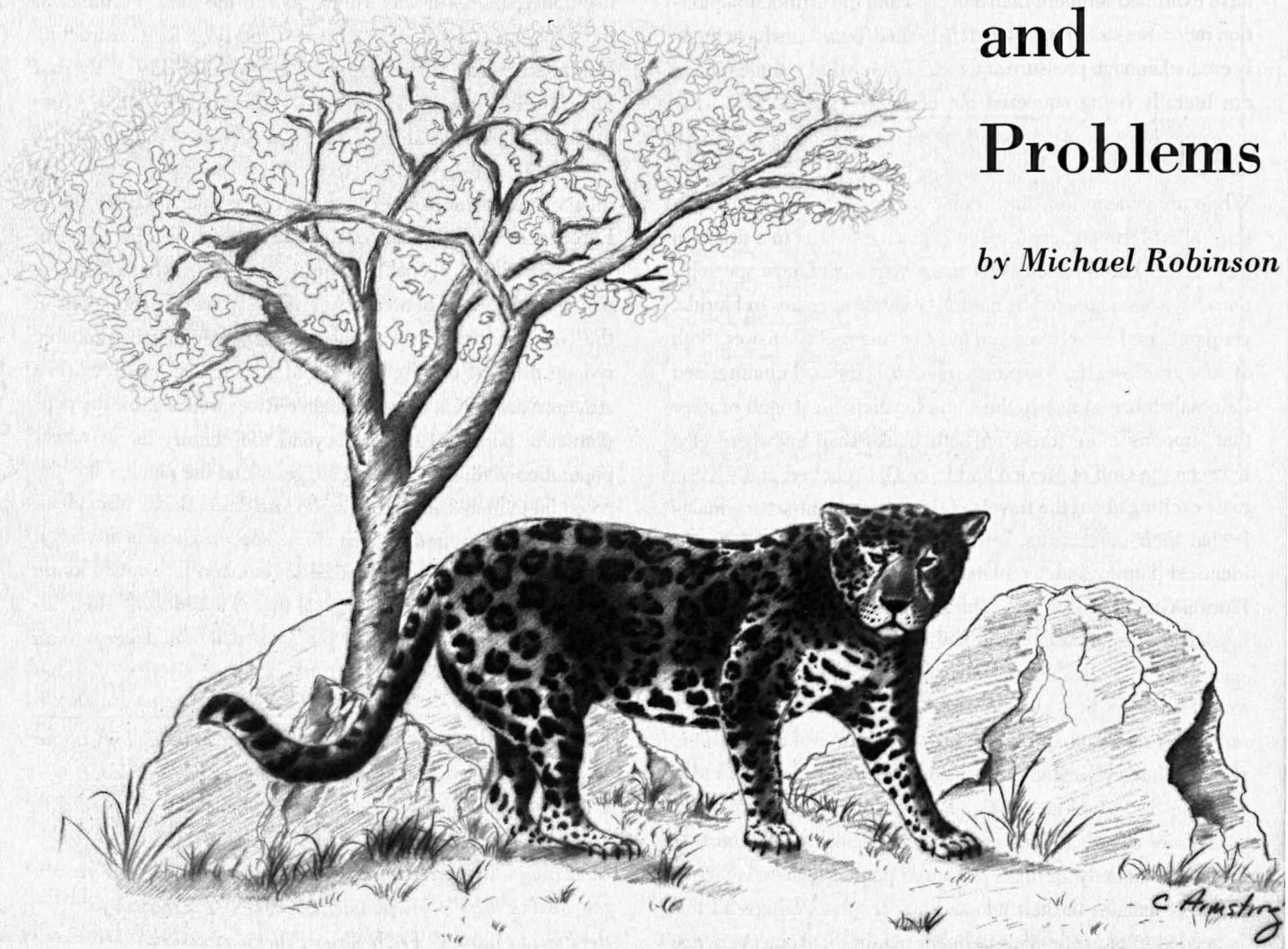


illustration by Cynthia Armstrong

May 10 was the last day of the 1999 spring turkey season in New Mexico, and as the sun went down John Trewern was driving home to Silver City out of the Burro Mountains after a day of hunting. With his wife, Melissa, and their four-year-old son in the pickup beside him, Trewern suddenly slammed the brakes to avoid hitting a large black feline that ran across the four-lane highway, leapt up the bank on the other side, and disappeared into the oak and juniper woodlands.[1]

Trewern had seen about a dozen mountain lions in the wild previously, but none "black as coal" like the cat that crossed the road before him. As a biology teacher who developed a wildlife curriculum for his high school students, he knew he'd seen either a melanistic mountain lion or a black color phased jaguar—either one remarkable.

The next morning Trewern set out with Dennis Miller, his former professor at Silver City's Western New Mexico State University, to inspect the site. Miller brought plaster material, and the two biologists found tracks in the gravelly soil beside the road. The resulting plaster cast, depicting a paw width of approximately one hundred millimeters, corroborated Trewern's account of a very large cat.

While experts cannot definitively say whether the track was that of a cougar or jaguar,[2] the sighting tantalizes those of us who envision a Gila Headwaters/Sky Island Bioregion replete with all its top-level predators. It also casts doubt on ecologically dubious and timid endangered species recovery strategies that would have sensitive species such as jaguars, Mexican wolves, and (potentially) grizzly bears adapt to a diminished landscape scarred by 19th century land-use decisions still enshrined in today's public policies. By showing up where they are not expected, jaguars may help us view the borderlands region as an ecological space that transcends human institutions.

The 8000-foot-elevation Burro Mountains southwest of Silver City are hardly pristine. Crisscrossed with roads, heavily grazed, and suffering from fire suppression, the range is an oft-forgotten disjunct corner of the Gila National Forest, better known for the world's first protected Wilderness Area: the Gila (subsequently split into two units, the Gila and Aldo Leopold Wildernesses).

But from an itinerant jaguar's point of view, the Burros might be seen as a stepping stone between the Gila Wilderness and either the Big Hatchet or the Animas Mountains in New Mexico's boot heel (the latter range is a direct spur of the Sierra Madres in Mexico). In fact, the Gila River, a possible migration corridor, connects the Gila Wilderness to a deep and roadless canyon through the Burro Mountains; these two wild areas are separated only by a dozen-mile-long agricultural valley.

Although remarkable, the Trewerns' experience is not unique; several other sightings suggest the occasional presence of jaguars in the Gila National Forest. Southwest of the Gila Wilderness, on an early fall evening in 1998, Glenwood, New Mexico residents Tom and Boe Duffy saw a large, golden-colored cat with black spots lope across double-laned Highway 180 in front of their car.[3] On the afternoon of August 25, 1990, in the Black Range immediately north of the Aldo Leopold Wilderness, biology professor Gerald Z. Jacobi of New Mexico's Highlands University, along with his wife Donna, a mammalogist, observed for approximately thirty seconds a large, reddish-brown cat with dark patterned spots over its entire body, trotting through the trees.[4]

Jaguars (*Panthera onca*) are native to the region; at least half a dozen reliable historic records show evidence of jaguars inhabiting almost every broad habitat type in New Mexico,[5] including a black jaguar reported between the Burro and Big Hatchet Mountains around 1910.[6] In 1900, a jaguar was observed killing a calf in the Mogollon Mountains (in an area now within the Gila Wilderness). Two years later, a jaguar was trapped and killed in the Black Range a scant mile or two from the location of the 1990 sighting.[7] Also in 1902, another jaguar was poisoned by a rancher in the Datil Mountains a few dozen miles further north, and still others were reported present in the Datils.[8]

Until recently, the last confirmed sighting of the species in New Mexico dated back to 1937, when a federal predator hunter in the San Andres Mountains of today's White Sands Missile Range pursued a jaguar with dogs, but was unable to shoot it.[9] Then, in March 1996, Warner Glenn, a rancher and hunting guide, photographed a jaguar that his hounds had trapped on a boulder in the Peloncillo Mountains along the New Mexico/Arizona/Mexico border.[10] In August of that same year, about a hundred miles east in the Baboquivari Mountains southwest of Tucson, Arizona, a different jaguar was caught on camera in similar circumstances. In fact, unlike New Mexico, Arizona's record of jaguar occupancy has been relatively unbroken, with jaguars killed by ranchers, the federal government, and private hunters every decade of the 20th century up through the 1980s;[11] there are rumors of a kill in the 1990s as well.

It is likely that while jaguars originally comprised a single connected population from the southern tier of the United States through Mexico and Central America into South America, now only dispersers from a population in Sonora, Mexico, end up in the US. There is no known reproduction

The potential for jaguar recovery in the Southwest is strong. Vast areas of roadless habitat remain, populations of most prey have rebounded from their early 20th century lows, large areas of cattle-free public lands have been established, and some ranch owners in the Peloncillo and Chiricahua Mountains now welcome the jaguar's return.

occurring in this country. Nevertheless, the potential for jaguar recovery in the Southwest is strong. Vast areas of roadless habitat remain, populations of most prey have rebounded from their early 20th century lows, large areas of cattle-free public lands have been established, and some ranch owners in the Peloncillo and Chiricahua Mountains now welcome the jaguar's return.

Not surprisingly, the principal obstacle to jaguar recovery in the Southwest lies in the intertwined political and regulatory process. Although jaguars have been listed as Endangered south of the border for decades, the US Fish and Wildlife Service (USFWS) long considered the animal extinct in the United States. In 1992, conservation biologist Tony Povilitis filed a petition to list the jaguar as Endangered in the United States, but the federal agency ignored the petition. In 1994, the Southwest Center for Biological Diversity (now the Center for Biological Diversity) filed suit and won a ruling requiring USFWS to decide on whether the western hemisphere's largest cat was eligible for protection under the Endangered Species Act in this country.

After completion of a status review, USFWS proposed to list the jaguar. But politics intervened once again. The game departments of the states of New Mexico and Arizona, pressured by the ranching industry, developed a Jaguar Conservation Agreement, which they argued was sufficient to recover the jaguar and obviate the need for federal involvement via an ESA listing. The agreement proposed such measures as public education to discourage jaguar shootings, researching jaguar habitat needs, and investigating reports of jaguars in the United States. Fish and Wildlife used the conservation agreement as an excuse not to act on its own listing proposal.

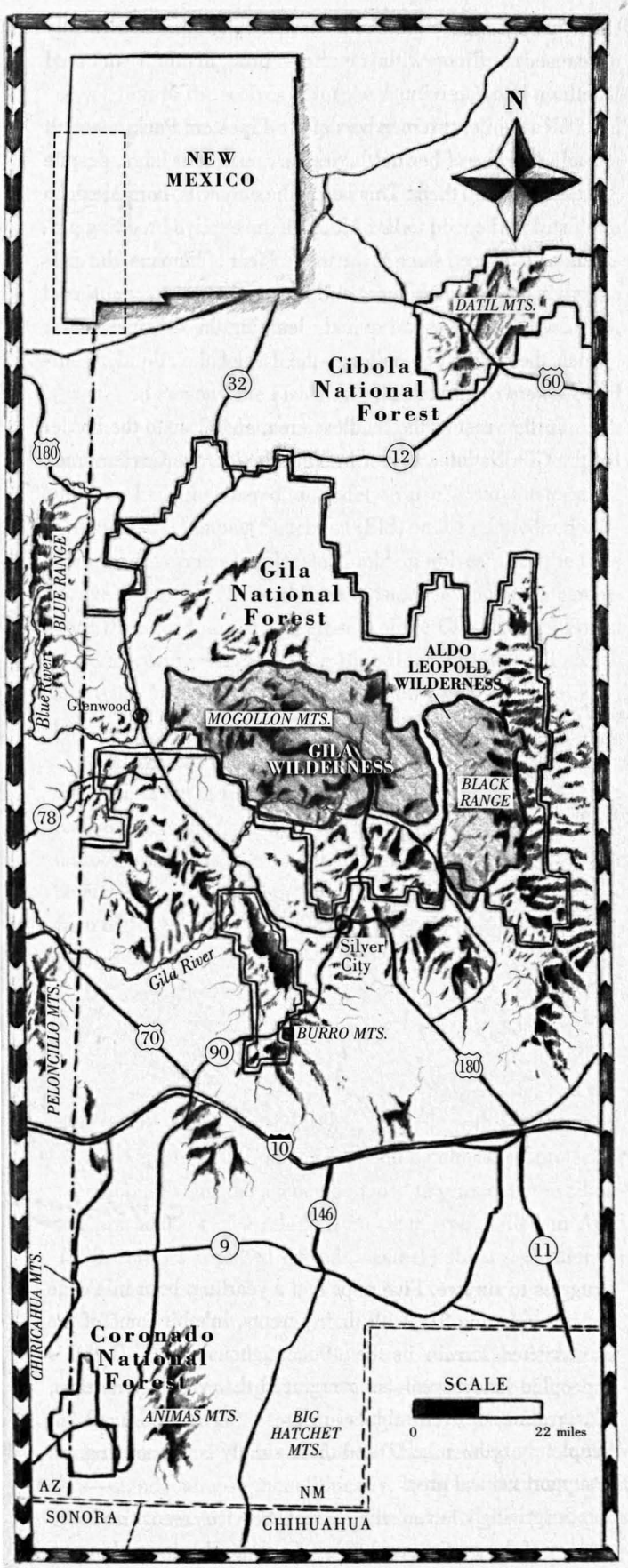
The Center for Biological Diversity then filed and won a second lawsuit forcing the Fish and Wildlife Service to make a final decision on the listing. Clearly, the conservation agreement, which contemplated very limited future actions on behalf of the jaguar, could not substitute for substantive recovery measures. As a result, the jaguar was formally listed as Endangered in 1997.

Although disappointed at the ESA listing, the original signatories to the conservation agreement have continued meeting within their established framework, as a means of dampening the federal government's ardor for assertive jaguar recovery actions. Today, the Jaguar Conservation Team includes representatives from an array of federal and state agencies, county governments, and ranchers, as well as conservationists.

Despite the conservationist presence, the team is dominated by the livestock industry and predator control advocates, and not surprisingly, has sought to limit the scope of actions taken on behalf of the jaguar. The team first attempted to confine any future recovery actions to the region south of Interstate 10—omitting the majority of historic jaguar habitat, including the Gila National Forest. That effort failed for lack of a scientific rationale, but the US Fish and Wildlife Service did defer to the team's circumscribed vision in its formal biological opinion on whether the activities of Animal Damage Control (the federal predator killing agency, now officially renamed Wildlife Services) negatively affect jaguars. No restrictions on the agency's poisons and traps are required, ruled Fish and Wildlife, except within an arbitrary zone in southwest New Mexico and southeast Arizona—excluding most of the Gila and other historic jaguar habitats in New Mexico and Arizona.

Even more outrageous, on the grounds that such a loss would not jeopardize the species, the USFWS issued an "incidental take" permit to Animal Damage Control, thereby granting the agency permission in advance to kill one jaguar in the course of its regular lethal activities. This claim flouts the fact that jaguars used to reproduce in the United States, but are now reduced to a few wanderers from Mexico. Given their obvious rarity, the loss of one (more) jaguar to federal predator hunters will most certainly jeopardize the species.

Even in the less hot-button arena of jaguar education, which the team originally touted as one of the most important



map by Cynthia Armstrong

avenues for preventing illegal killings of jaguars, politics has dominated. The education committee's signature achievement was the drafting of a high school curriculum centered on the theme, "Jaguar Conservation Agreement vs. the ESA." Earlier this year, the team voted approximately 120 to 3 not to replace this politicized curriculum with one focused on jaguar ecology.

Accurate and timely information on jaguar presence in the United States, according to the conservation agreement, is central to conserving the species. Yet despite many hours discussing the need to follow through on potential jaguar sightings, when biology professor Dennis Miller notified the New Mexico Department of Game and Fish about the Trewern sighting and the accompanying plaster cast, the department took no notice. A Game and Fish employee was actually blocked by his supervisors from attempting to capture and radio collar the animal (the team's agreed-upon protocol). And despite explicit requirements in the Biological Opinion on Animal Damage Control that the predator killing agency investigate within four days all reports of jaguars in areas in which it operates, such an investigation never occurred and news of the sighting took months to reach other Jaguar Conservation Team members. It turns out that area residents had been reporting a large black cat for months prior to the Trewern sighting, only to be repeatedly reassured by New Mexico Game and Fish that they must have seen a mountain lion.[12]

Apparently sanguine over the pace of the team's progress, the US Fish and Wildlife Service has failed to begin developing a jaguar recovery plan or to designate critical habitat for the jaguar. Recently, biologist Tony Povilitis, who originally petitioned the federal agency for the jaguar's listing, petitioned again for critical habitat designation.

EVEN IF A SPECIES RECOVERY PLAN IS FORTHCOMING, the jaguar's future may be surmised by the fate of its co-predator in the Southwest, the Mexican gray wolf (*Canis lupus baileyii*). Reintroduced into the wild in 1998 after a two-decade captive breeding program, the Mexican wolf recovery program has been stymied by the same political forces that govern the Jaguar Conservation Team. The results have proved catastrophic for wolves.

Although the Mexican wolf recovery zone consists of the entire Gila National Forest and the adjoining Blue Range of Arizona, wolves were released only into the Arizona portion of the zone, in order to assuage opposition from the New Mexico Game Commission (operating on behalf of the livestock industry). The wolves were expected to migrate east on their own and occupy the Gila.

However, the Blue Range includes heavily roaded areas above the Mogollon Rim, and heavily grazed areas in the roadless region centered around the Blue River. Five wolves were shot in 1998 in the roaded area, two disappeared under suspicious circumstances, and the rest were recaptured for their own safety.

Although a second year of releases has resulted in just one wolf killing (apparently a hit-and-run incident on a state highway), government management actions have had a similar effect to that of last year's poachers. Because the animals apparently preyed on livestock, Animal Damage Control captured seven wolves from the Pipestem Pack, the first wolves to reproduce successfully in the southwestern wilderness in over seventy years.

Shortly after their capture, three of the pups from this pack died of parvovirus. Parvo is usually fatal to approximately half of infected canids, but infections are often much more severe in stressed animals; according to a veterinarian with the recovery program, the pups contracted the disease in the wild but likely would have survived without the stress of captivity.[13] Shortly thereafter, two more pups from another pack already in captivity also succumbed to parvo, almost certainly infected by the Pipestem pups. While the original three pups might have died anyway, the two subsequent victims died solely because conflicts with ranchers brought their infected brethren into captivity.

Meanwhile, two members of the Pipestem Pack, an adult female and one of her newborn pups, remain at large, despite all efforts to trap them. This pup is the only wild-born Mexican wolf still in the wild today. Although the captive breeding program had dimmed some of the wolves' fear of humans, the ones surviving the government's destructive management and avoiding being shot are quickly learning the evasiveness for which their wild progenitors—the last of their kind to survive—were renowned.

Further east in the roadless area, and close to the border of the Gila National Forest in New Mexico, the Gavilan Pack struggles to survive. Five pups and a yearling, born in a cage but now roaming free with their parents, inhabit some of the least visited terrain in the 48 contiguous states. But this unpeopled landscape is so overgrazed that virtually no deer, elk, javelina, or even rabbits are present. The land has been completely "cow-nuked," and there simply isn't enough grass to support natural prey.

Surprisingly, even the Forest Service recognized the severity of the grazing, and ordered a reduction in stocking on

illustration by Cynthia Armstrong

the Wild Bunch Allotment, and a complete removal of cattle from the region the wolves occupy (for "range" reasons having no relation to the wolves). But the rancher, Carlyle Cathcart, asserting mythical private property rights to the National Forest, refused to remove his cattle, and the Forest Service then rescinded its stock reduction order.[14] In the meantime, the wolves killed three cows to feed their pups. As a result, the US Fish and Wildlife Service announced it may remove this pack from the wild as well. Although the wolves have since moved to a less heavily grazed area that supports natural prey, the threat of removal still hangs over their heads.

David Parsons, the Fish and Wildlife Service biologist and recovery team leader who skillfully maneuvered through tremendous political opposition to ensure the wolves' original release, had engineered a "safety valve" into the original Environmental Impact Statement (EIS) on the reintroduction—allowing his agency to relocate "problem wolves" from the Blue Range to the Gila National Forest instead of simply reincarcerating them for life. Large segments of the Gila National Forest avoid the twin problems of the Blue Range: heavy road access above the Mogollon Rim and heavy cow use below the rim. In fact, most of the Gila Wilderness is now cow-free.

But Parsons was blocked by higher-ups in his agency and the Department of Interior from exercising the provision to relocate wolves to the Gila. He spent months working to secure permission to relocate the Pipestem survivors, and requesting an amendment to the EIS to provide for releases of wolves directly from captivity to the Gila, bypassing prior release into the Blue Range. Shortly after he received clearance to act on both these steps, in October 1999, he unexpectedly lost his job. Now Fish and Wildlife's commitment to these crucial actions is in doubt.

Throughout the United States, the Fish and Wildlife Service acts on the notion that endangered wildlife, and particularly predators, can be recovered only with local support, which the agency garners by suspending almost all protective regulations. Thus, the agency declined to prosecute the admitted first shooter of a released Mexican wolf, killed in April 1998, and has repeatedly fought against habitat protection for ESA-listed species.

The Southwest experience with Mexican wolves and the early indications with jaguars illustrate the failure of this policy. As polls have long demonstrated, the majority of local residents in the Mexican wolf recovery area already support the animals' return.[15] Only one identifiable social group—ranchers—stands almost monolithically in opposition, and that group represents less than one percent of the rural region's population and economic base.[16]

The fact that the designation of Mexican wolves as "experimental, non-essential"—the legal mechanism under the ESA that allows for highly intrusive management—*manifestly failed* to prevent wolves from being shot should cause a reevaluation of the premises of our predator policies. Despite the contemporary flurry of reintroductions symbolizing a reversal of the US government predator extermination policy, rules intended to accommodate the livestock industry illustrate how little has actually changed.

Today, you can drive comfortably into the Blue Range, step out of your car, and you may be blessed to hear the howl of wild wolves. And as the crystalline wind of the last autumn of the 20th century tints the Gila's cottonwood and sycamore leaves with a jaguar-like yellow, fluttering beneath jaguar-pigmented rubicund canyon walls, you can imagine a quiet cat waiting in the shadows. The landscape itself seems almost gravid with yearning for these predators' return. Whether we have matured sufficiently to accept their gift of ecosystem health is still very much up in the air. ☾

Michael Robinson represents the Center for Biological Diversity on the Jaguar Conservation Team, and is completing work on a book that explores the political and cultural history of the federal wolf extermination campaign.

NOTES

1. Personal communication, J. Trewern (1999).
2. Letter from Jack L. Childs, 10/19/99.
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4. C. Gregory Schmitt, "A Preliminary Account of Jaguar (*Panthera onca*) Reports from New Mexico," New Mexico Department of Game & Fish (1997), and personal communication, G. Jacobi (1999).
5. See Vernon Bailey, *The Mammals of New Mexico*, US Bureau of Biological Survey (1931), pp. 283–284.
6. James A. McKenna, *Black Range Tales*, Rio Grande Press (1991), p. 255.
7. Elizabeth McFarland, *Wilderness of the Gila*, University of New Mexico Press (1974), pp. 44–46.
8. Bailey, *The Mammals of New Mexico*.
9. Schmitt, "A Preliminary Account of Jaguar (*Panthera onca*) Reports from New Mexico."
10. Warner Glenn, *Eyes of Fire: Encounter with a Borderlands Jaguar*, Printing Corner Press, El Paso (1996).
11. New Mexico Game and Fish Department records, cited in Alison Gabel & Gerald Scoville, "Jaguars, Ocelots, and Jaguarundis of Southeast Arizona: A Preliminary Report," Round River Conservation Studies (July 1999), Appendix V.
12. Personal communication, D. Miller (1999) and Anthony Manfredi (1999).
13. Email from Bret Snyder obtained from USFWS via FOIA.
14. Wild Bunch Allotment files obtained from Apache-Sitgreaves National Forest via FOIA.
15. League of Women Voters, *New Mexico Residents' Opinions toward Mexican Wolf Reintroduction*, December, 1995.
16. "Where do people earn a living? Agency answers the question," *Silver City Daily Press*, 12/31/98.

Howling with Strangers

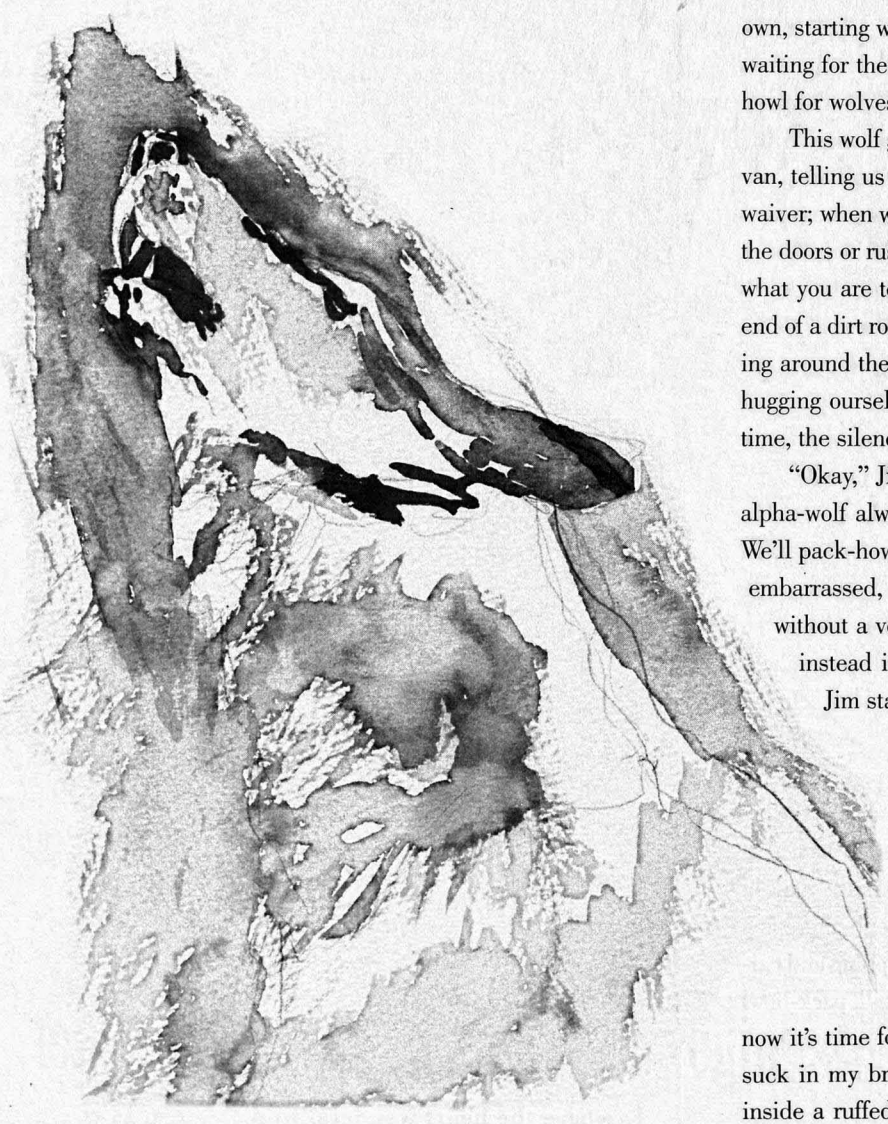
All 128 of us want to hear a wolf howl. So we are overflowing the bleachers and crowding around the edges of a room facing a picture window. Children sit on their heels under the window, their noses pressed against the glass. A young woman bounds in, wearing a plastic name tag like flight attendants wear. "Hi, I'm Cheri, your wolf specialist, and I'll be talking to you today about our wolf ambassadors." She is carrying a plastic tub filled with props: a gray wolf pelt, the skin from its face pressed flat, its eyes squeezed shut, its nose cracking off. A black wolf pelt. The leg bone of a moose. "Seven bites is all it takes for a wolf to crack through this bone," she says. We gasp—the bone's as thick and white as firewood. She has a plaster mold of the pawprint of a wolf, "as big as my hand with the fingers curled in," Cheri says. She holds up the mold and then holds up her hand, the fingers curled in. We gasp again—that big!

The wolves lounge around in front of the window, penned in by a hurricane fence that we can see plainly through the trees. They look a lot like dogs to me, but I don't know what I expected. I can't imagine one of those things circling menacingly around a moose. But maybe the wolves aren't that impressed with us, either. If they are looking through the window, the wolves will see the flat-nosed children, of course, and a German TV crew—tall young men charging around, jostling for position—and rows and rows of people much like myself—middle-aged, middle-income, middle-American, middle-weight and holding. Like a raisin in all that pudding, there is a thin man with waist-length bronze hair holding a baby in a porkpie hat.

We pass the moose bone from hand to hand, up and down the rows. Then a deer's leg with the fur and hoof still attached, the knee tendons blackened and curled. Here comes the black wolf pelt, its legs dragging out behind. The passing is solemn, silent, disconnected from any meaning that I can determine, like some ancient rite.

Cheri talks cheerily. "We have four wolf ambassadors," and she starts to name them: Lakota, Lucas....Behind her voice, we hear a distant fire engine. Suddenly, a wolf jumps to the top of a rock, lifts its head, and begins to howl. It's a reedy sound like a clarinet, rising and falling away in a minor key. The sound silences Cheri, who stands still, smiling. The siren wails and another wolf joins in, so it's a trio now—two wolves and a fire engine—*a-wooee, a-wooee, a-wooee*. Some people start to laugh, but stop themselves—this is supposed to be serious stuff. The man with the hair has his eyes closed and his chin up; he looks like he's having a religious experience. For its part, the wolf stands on the rock in a classic pose, pointing its muzzle to the sky as if it has seen its own promotional T-shirts. Every time Cheri starts to talk, the wolves and the fire engine kick in, howling, and drown her out. Everyone is smiling.

This essay appears in Kathleen Dean Moore's new book Holdfast: At Home in the Natural World *(©1999) and is used with permission of The Lyons Press.*



by Kathleen Dean Moore

I think we have heard wolves howl before, Frank and I, from our bed. When we first came to the Minnesota woods, we asked about wolves at the National Forest headquarters. The young woman there wanted to help. "Oh yes, you can hear them everywhere, even in the center of the town. They'll be far away, of course, but you can hear them." Then she lowered her voice. "They may not sound like what you think wolves sound like. They sound like violins. So if you wake up in the middle of the night and you hear violins, don't go back to sleep." Sure enough, that very night, we heard the sound of a single violin. We elbowed each other, then we lay stiff in the dark, our eyes wide, big smiles on our faces.

DON'T ASK ME WHY THIS IS SO IMPORTANT. DON'T ASK ME why we are now standing with a half dozen strangers outside the Wolf Center on a clear and icy night, dressed in everything we own, starting with pajamas, ending with fleecy ear-flapped hats, waiting for the wolf communication expert. We are going out to howl for wolves. It costs us seven dollars apiece, prepaid.

This wolf guy's name is Jim, and he bundles us into a white van, telling us the rules—wear your seat belt; sign the liability waiver; when we get to the woods, absolute silence—don't slam the doors or rustle your clothes or scrape the gravel, and do just what you are told. So now we are standing in pitch dark at the end of a dirt road deep in the northwoods, eight strangers standing around the van in absolute silence on a clear, cold night—hugging ourselves, making our feet stay still, listening. After a time, the silence becomes a presence, then a kind of itching.

"Okay," Jim says in a stage whisper. "I'll start, because the alpha-wolf always starts, and then, when you're ready, join in. We'll pack-howl for two minutes, then listen." I expected to feel embarrassed, howling with strangers, or humiliated, relegated without a vote to beta-wolf status, or omega. But what I feel instead is the silence. How will it be possible to begin?

Jim stands quiet for a few more minutes.

Finally, he leans over, takes an enormous breath, cups his hands to his mouth, leans back, and begins to howl. The tone of an oboe rises slowly like the crest of a dark wave, slips, falls away in deep liquid sound. Entirely different from the wail of the caged wolves, the song is as dark as the night, or the night is as deep and beautiful as the song—I don't know which. But now it's time for the beta-wolves. I cup my hands to my mouth, suck in my breath, and yowl like a stuck cat. A woman deep inside a ruffed hood howls mournfully, her voice heaving with melodramatic sobs. Frank barks behind me.

Jim has told us to work for discordance. Wolves in a pack will each howl on a different pitch, letting invader packs count their numbers, and sometimes wolves will switch keys in the middle of the howl, to give the impression that each one is several wolves. We work at it, starting our yappy howls on different pitches, but as the group howl draws out at the end, we find that we have tuned ourselves into a minor chord. We try again, yowling discordantly, and again we drift into something Bach would recognize, a rich Lutheran chord. It's as if we can't help ourselves, as if harmony is part of our nature. Jim cuts us off with a wave of his arm against the stars—the conductor of the galaxy choir.

Silence.

Then, off in the distance, we hear a tiny little, cracked howlette—unmistakably a pup. And answering that, a deep-throated, authoritative howl from far away. The pup shuts up. Some of us start to laugh silently, our shoulders jiggling, but now

illustration by Rod MacIver

we freeze: There are footsteps in the bushes. A soft step, a cracking twig, a long pause, then step, step, step—stealthy in the dark.

"Sometimes a wolf will walk right up to us," Jim whispers. I contemplate this possibility, measuring the distance to the van. Suddenly, Jim starts to whine and pant and scuff the gravel. I almost jump out of my skin. He pants some more. "Sometimes this draws them in. Nobody move." Nobody move? Is he kidding? He's thrashing around like some wounded animal and he expects us to stand there? What if it *is* a wolf? What if it's a bear? All my instincts signal, flee. Peer pressure pins me to the spot.

Eventually, when nothing materializes, Jim piles us back in the van and we move to a clearing at the center of a marsh where we disperse into the darkness on a dirt track. By now, the sky is so black and the Milky Way so bright that it casts its reflection on the water. There is a yellow glow to the north and as we watch, fingers of light reach into the sky, silhouetting the edge of the forest. Every pine cuts the shape of a wolf sitting on its haunches, its nose raised to the sky, silently howling. We are encircled by silent wolf-pines. It's very, very cold.

Jim starts first, his clear oboe tones, then the rest of us, cutting loose, howling at the wolves, at the northern lights, at the big black sea of night, at the bright hole of Arcturus, at Venus, at how far we are from town, at the idea of standing in the dark in the road, howling with strangers. And then suddenly there is a multitude of voices—barking and howling and yapping and carrying on like a drunken riot in wolf-town—a full pack-howl coming from behind the wolf-trees. We stop yowling, transfixed. The ruckus rises to a fever pitch and abruptly dies. Silence washes in, final and infinitely deep.

Nobody moves. Nobody talks. We stand together in the road and listen to the night. I love these people. I don't know a thing about them, but I love them. I want to move close to them and exchange big woolen hugs, ear-flaps pressing against cold noses, mittens patting padded backs. And maybe the wolves would join in, jumping around us, chittering, licking our faces while northern lights flicker and stars tick and the wind jangles with the smell of the marsh. Then maybe all the voices of the universe will come together in a harmonic chord that we can hear if we only listen. It is possible, I think—not likely, but possible—and I stand still, smiling in the dark. ☾

Kathleen Dean Moore is the chair of the Department of Philosophy at Oregon State University in Corvallis. She is the author of Riverwalking, *winner of a 1995 Pacific Northwest Booksellers Association Award, and* Holdfast, *from which this essay is excerpted.*

Isle Royale Fragments

every beautiful morning of the world
I choose the fog,
I choose the wolf,
I choose to learn to walk again
on moss with the moose through
water in air,
water under foot,
breathing the breath of the world
on every beautiful morning.

§

Nothing but moosetrails in the mist,
today's fog and wind,
trees against sky.
I want to disappear into cloud,
wander my way to sunlight,
follow the moose down
secret trails in the woods
to reach the places where the wolves
rest above the ridges, within us,
where the heart wanders, wild.

—Gary Lawless

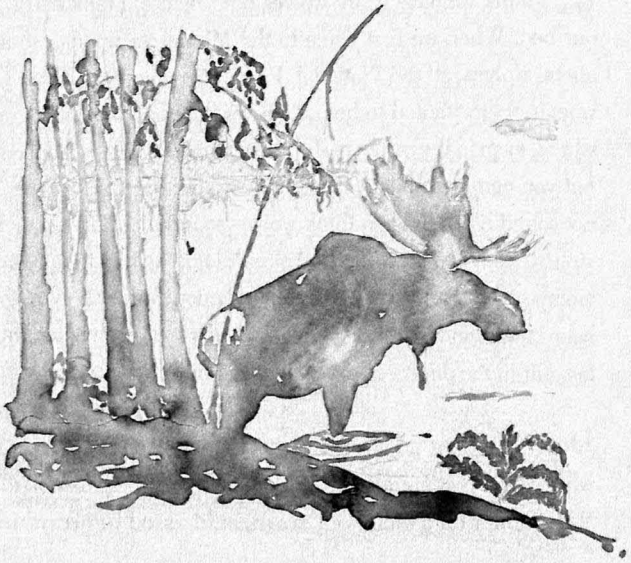


illustration by Rod MacIver

A RESERVE DESIGN

for the Klamath-Siskiyou Ecoregion

by Reed Noss

The Klamath-Siskiyou ecoregion (Fig. 1), comprising nearly 10.8 million acres in northwestern California and southwestern Oregon, is one of the most biologically rich temperate coniferous forests in the world. Considered an Area of Global Botanical Significance by the World Conservation Union (IUCN), the region contains approximately 3500 plant species, 281 endemic plant taxa (at the subspecies level), and the highest species richness of temperate conifers in North America (30 species, including six endemic to the region) (Smith and Sawyer 1988, DellaSala et al. 1999). World Wildlife Fund has recently rated the Klamath-Siskiyou ecoregion one of its "Global 200" conservation priorities and one of five highest priorities in North America (Ricketts et al. 1999). As of the early 1990s, approximately 33% of forested public lands in the region were mature (80+ years) or old-growth conifer forests, which is the highest proportion of any ecoregion in the Pacific Northwest and well above most other regions of the United States (FEMAT 1993).

fisher by Martin Ring

Despite its superlative biological values, few people other than scientists and activists on the West Coast have heard of the Klamath-Siskiyou region; fewer still are aware of its global conservation significance. With a national public largely ignorant of the Klamath-Siskiyou (in comparison to, say, the Everglades, which is biologically less rich), threats such as mining, logging, road-building, livestock grazing, fire suppression, and other activities proceed with little notice. One of the few people who has tried to educate a broader public about the Klamath-Siskiyou ecoregion is Lou Gold, whose nationwide lectures (especially in the late 1980s) helped gain the region some notice. It was Lou who, in 1992, asked me if I would write a proposal to develop a biodiversity conservation plan for the region. The Siskiyou Regional Education Project, which Lou cofounded, has been the main grassroots organization promoting research in the region since then. Funding was slow to appear, with the first grant arriving in late 1993 and significant funding not available until several years later. Recently, a broader group of conservationists, the Klamath-Siskiyou Alliance (which includes five regional groups, plus World Wildlife Fund) has come together to pursue long-term conservation in the region. The reserve design presented here represents a "Phase I" proposal based on biodiversity considerations, and has yet to be officially endorsed by the Klamath-Siskiyou Alliance. Colleagues who contributed to this research include Jim Strittholt, Ken Vance-Borland, Carlos Carroll, and Pam Frost. Further details on the reserve design can be found in Noss et al. (1999), published in a special issue of the *Natural Areas Journal* devoted to the Klamath-Siskiyou ecoregion.

My colleagues and I sought to conduct as comprehensive an evaluation of this heterogeneous region as possible: we didn't want to miss anything. The conservation plan was intended to fulfill four goals articulated by Noss (1992): (1) represent all kinds of ecosystems, across their natural range of variation, in protected areas; (2) maintain viable populations of all native species in natural patterns of distribution and abundance; (3) sustain ecological and evolutionary processes; and (4) maintain a conservation network that is resilient to environmental change. To fulfill these goals, we set out to combine three conservation planning approaches that have usually been pursued separately: (a) protection of special elements, such as rare species hotspots, old-growth forests, and critical watersheds for aquatic biota; (b) representation of all habitats and vegetation types within a network of reserves; and (c) meeting the needs of particular focal species, especially those that are area-dependent or sensitive to human activities (Noss 1996).

The Klamath-Siskiyou ecoregion is nearly two-thirds public land, mostly National Forest (see Fig. 1), which makes conservation planning somewhat easier than for regions with mostly private land. Nevertheless, protection levels for these public lands are low. We analyzed protection levels by assigning lands to four status categories recognized by the national Gap Analysis Program (GAP) (Crist et al. 1998). GAP Status 1 lands are more-or-less strictly protected and include Wilderness Areas, Research Natural Areas, National Parks and Monuments, and National Wild Rivers. GAP Status 2 lands are moderately protected and include National Recreation Areas, state parks, National Scenic Rivers, and BLM special designations. All other lands (GAP Status 3 and 4) we consider unprotected. Amazingly, the largest category of "reserves" in the region—the Late Successional Reserves (LSRs) established under the Northwest Forest Plan (USDA and USDI 1994)—do not meet the criteria for GAP Status 1 or 2. For example, old-growth forest has been logged in some LSRs since their establishment. With some tightening of restrictions, however, LSRs could qualify as protected areas. For our analyses we liberally considered LSRs as Status 2 reserves. With this generous assumption, Status 1 reserves presently constitute 12.8% of the region, whereas Status 1 and 2 reserves together constitute 31.9% of the region. Although both figures are high compared to much of the world, our analyses indicate that the extraordinary natural features of the Klamath-Siskiyou ecoregion are not well protected by this system of reserves.

The three-track evaluation methodology (special elements, representation, and focal species) is complex; I refer the reader to other publications and reports for details (Carroll et al. 1999, Noss et al. 1999, Strittholt et al. 1999, Vance-Borland 1999). Somewhat to our surprise, roadless areas on public lands turned out to function well as the basic "building blocks" of our reserve design. Together with existing protected areas, roadless areas create a virtually continuous system of wildlands across the heart of the region, and protection of the biologically most significant roadless areas comes close to meeting our stated conservation goals. Important habitats and other natural features not represented in roadless areas can be protected through conservation actions on a relatively small area of additional public and private lands.

We evaluated roadless areas within four size classes: (1) >10,000 acres (>4047 ha); (2) 5000–10,000 acres (2023–4047 ha); (3) 1000–5000 acres (405–4047 ha); and (4) <1000 acres (<405 ha). Class 4 captured roadless areas immediately adjacent to existing protected areas that appear smaller than 1000 acres only because of artificial administrative boundaries. Six

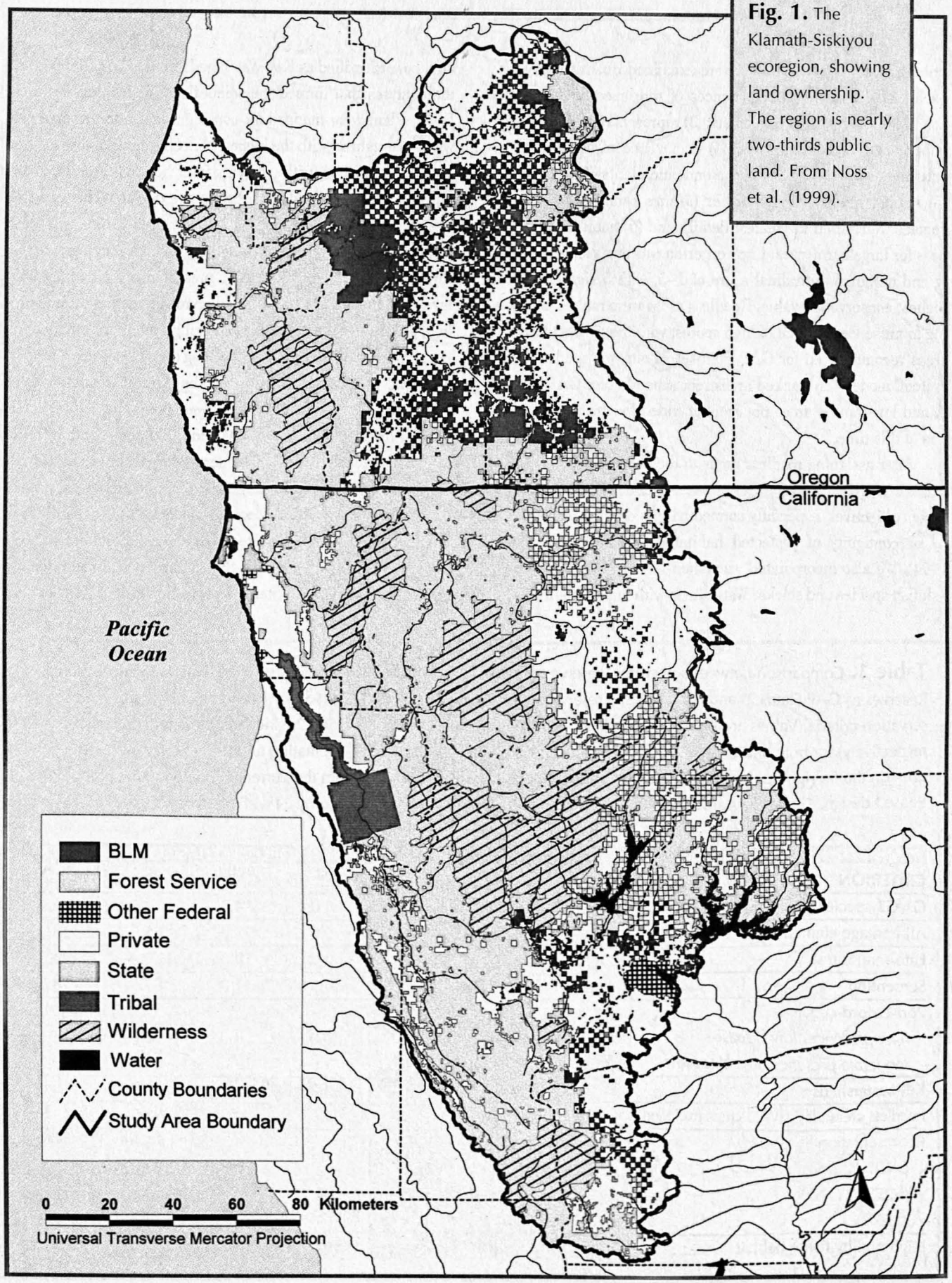


Fig. 1. The Klamath-Siskiyou ecoregion, showing land ownership. The region is nearly two-thirds public land. From Noss et al. (1999).

criteria of conservation value were examined quantitatively for each roadless area: (1) occurrences of rare species and plant communities; (2) late-seral forests; (3) representation of physical habitat and vegetation types; (4) occurrence of serpentine (a substrate favored by many of the endemic plants of the region); (5) habitat quality for the fisher (*Martes pennanti*, the focal species we studied in greatest detail); and (6) habitat effectiveness for large carnivores. Each criterion was analyzed separately and assigned an ordinal score of 1–5, with 5 signifying the highest conservation value. Roadless areas were ranked according to presence/absence of high scores, with the highest-ranked areas recommended for GAP Status 1 in our proposed reserve system, moderately-ranked areas recommended for GAP Status 2, and low-ranked areas not recommended for the reserve system at this time.

After assigning roadless areas to the proposed reserve system, we added intervening areas, as necessary, to achieve reserve design objectives, especially connectivity as defined by continuity or contiguity of protected habitat (Noss and Cooperrider 1994). We also incorporated watershed-level information for at-risk fish species and stocks. Watersheds with high salmon scores and those identified as Key Watersheds from FEMAT (1993; i.e., the analyses that formed the scientific basis for the Northwest Forest Plan) were mapped for consideration in the reserve network. Watersheds with the highest concentrations of disease-free Port-Orford-cedars (with data only from National Forests, unfortunately) were also added to the reserve design. (This endemic tree is threatened by a non-native root disease fungus, spread from one watershed to another along logging roads.) Physical/vegetative habitats not represented at a minimum 25% level in the reserve network based on roadless areas were identified, as were opportunities for achieving such representation.

Based on our scoring and ranking of roadless areas, we recommend protection of 90% of the largest roadless areas (>10,000 acres), 85% of those between 5000 and 10,000 acres, 56% of the areas between 1000 and 5000 acres, and 100% of the small roadless areas (<1000 acres) directly adjacent to existing protected areas. Including existing protected areas, protection of these roadless areas would place 1,373,805 ha (32% of the region) in GAP Status 1 reserves and an additional 457,891 ha (11% of the region) in GAP Status 2 reserves. In addition, we propose extending GAP Status 1 protection to 15,619 ha of pub-

Table 1. Comparison between the current reserve network (including the Northwest Forest Plan, with Late-Successional Reserves as GAP Status 2) and our proposed reserve design (Phase I) for the Klamath-Siskiyou ecoregion, for analyzed conservation criteria. Values are in percent area and include combined GAP Status 1 and 2 (strict and moderate protection, respectively) for both alternatives. GAP distinctions are not available (na) for representation and fisher components. The column on the far right (Δ) indicates the difference or change in percent coverage from the current condition to the proposed Phase I design. These gains are achieved by increasing protected areas in the region by 21%. From Noss et al. (1999).

	CURRENT CONDITION			PROPOSED PHASE I			Δ
CRITERION	**GAP 1**	**GAP 2**	**GAP 1+2**	**GAP 1**	**GAP 2**	**GAP 1+2**	
G1/G2 species occurrences	11.0	25.0	36.0	68.0	14.0	82.0	+46.0
All heritage elements	8.0	30.0	38.0	45.0	21.0	66.0	+28.0
Late-seral forest	16.5	27.0	43.5	50.0	18.0	68.0	+24.5
Serpentine	18.0	25.0	43.0	50.5	11.0	61.5	+18.5
Port-Orford-cedar							
high presence, low disease	36.0	46.5	82.5	88.0	8.0	96.0	+13.5
moderate presence, low disease	31.0	42.0	73.0	73.0	12.0	85.0	+12.0
Key watersheds	27.0	32.0	59.0	62.0	16.0	78.0	+18.0
Roadless areas (desig. Wilderness excluded)	1.0	48.0	49.0	83.0	9.0	92.0	+43.0
Representation							
(>10%)	na	na	72.5	na	na	86.0	+13.5
(>25%)	na	na	59.5	na	na	77.0	+17.5
(≥50%)	na	na	39.0	na	na	59.0	+20.0
High-quality fisher habitat	na	na	36.0	na	na	50.0	+14.0

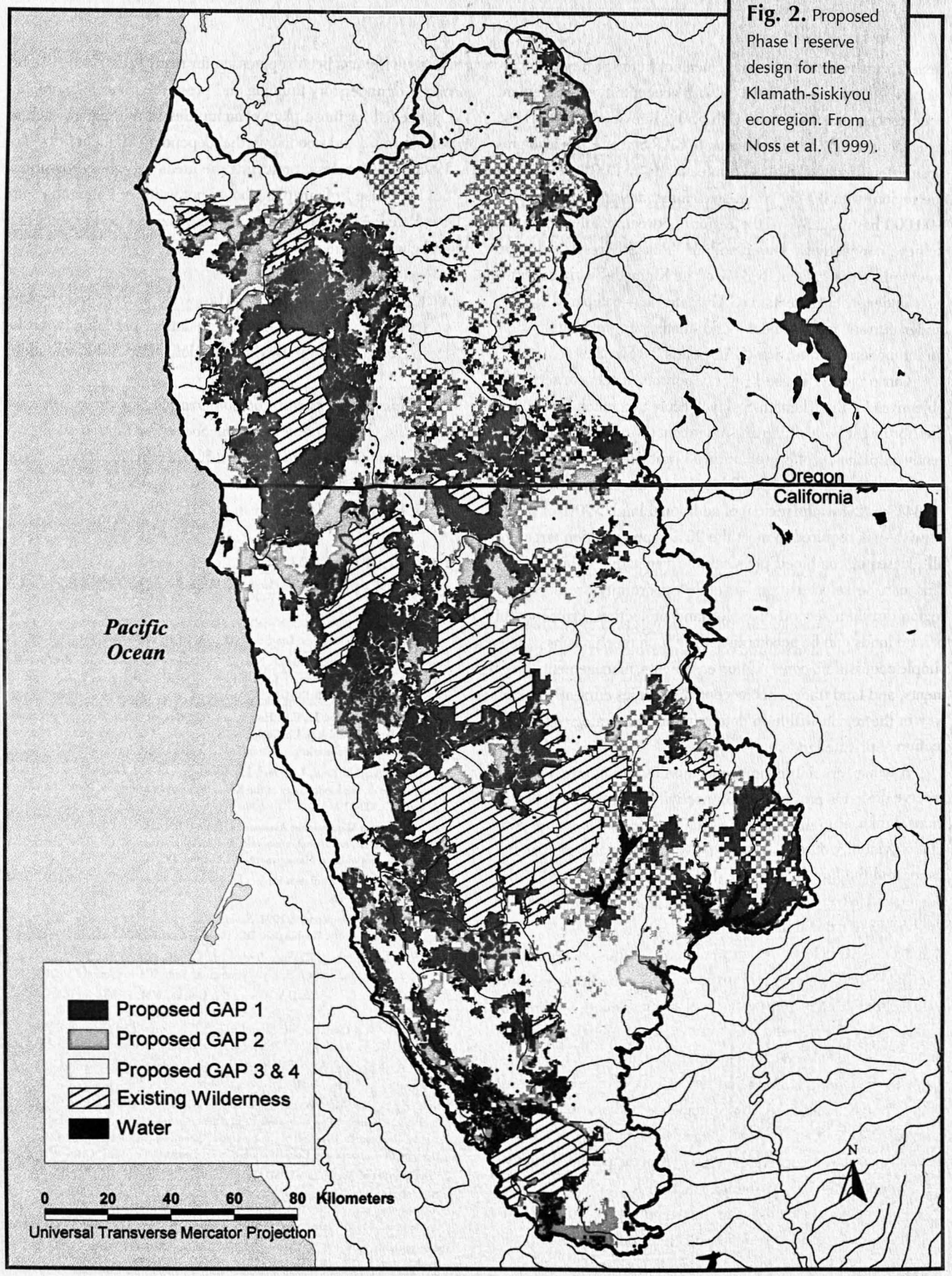


Fig. 2. Proposed Phase I reserve design for the Klamath-Siskiyou ecoregion. From Noss et al. (1999).

lic lands with globally imperiled element (rare species and community) occurrences, 17,913 ha with concentrations of element occurrences, and 35,033 ha with >50% late-seral forest. These extensions add 1.6% of the region to GAP Status 1. We also propose extending GAP Status 2 protection to 251,004 ha (5.8% of the region) with 30–50% late-seral forest and to approximately 100,000 ha (ca. 2.3% of the region) between roadless areas to achieve connectivity. This plan, our "Phase I" reserve design, would place approximately 34% of the Klamath-Siskiyou ecoregion under strict protection (GAP Status 1)—compared to 13% under current management—and another approximately 19% under moderate protection (GAP Status 2) (Fig. 2).

Our proposed Phase I reserve network meets conservation objectives for the Klamath-Siskiyou ecoregion much better than the Northwest Forest Plan and other conservation measures currently in place by offering improved protection to a number of important natural features (Table 1). However, approximately 89,341 ha (2% of the region) of additional land, >90% of which is private, is required to meet the 25% representation target for all classes of combined physical and vegetative habitats. This land can be selected from several "opportunity areas" in the region during a second phase of land protection. Protection of private lands can be accomplished by such mechanisms as fee-simple acquisition, conservation easements, management agreements, and land trades. Socioeconomic studies currently underway in the region will help determine useful strategies for protection of private lands.

Another crucial component missing from our Phase I reserve design is provision of connectivity to surrounding ecoregions. Linkages to surrounding regions are needed to assure population viability of wide-ranging terrestrial animals, such as the fisher and the large carnivores that may be reintroduced to the region, and to connect headwater areas with the Pacific Ocean for the benefit of salmon and other aquatic organisms. We estimate that a Phase II reserve design would enlarge the area protected as GAP Status 1 and 2 to approximately 60–65% of the region.

A Phase II reserve design will require more research in several areas of conservation planning. Also needed is research on topics related to ecological management of reserves and other lands in the region. Even the entire network of reserves we propose for the Klamath-Siskiyou ecoregion is probably too small to manage itself with a natural disturbance regime (see Baker 1992, Noss and Cooperrider 1994). A long period of active restoration, including obliterating and revegetating roadbeds, recontouring slopes, restoring streams and watersheds, controlling invasive exotic species, and reintroducing extirpated species, will be necessary to redevelop natural conditions. Because fire has been suppressed for many years, some combination of understory thinning and prescribed burning is probably needed for those plant communities in the region, such as oak savannas and woodlands, that depend on frequent fire (Agee 1993). Nevertheless, protecting the areas recognized as priorities for Phase I of our plan should not wait until all studies are completed, as options for maintaining their natural or semi-natural character are rapidly diminishing. ☾

ACKNOWLEDGMENTS This work was generously supported by the W. Alton Jones Foundation, the Foundation for Deep Ecology, and the David and Lucille Packard Foundation.

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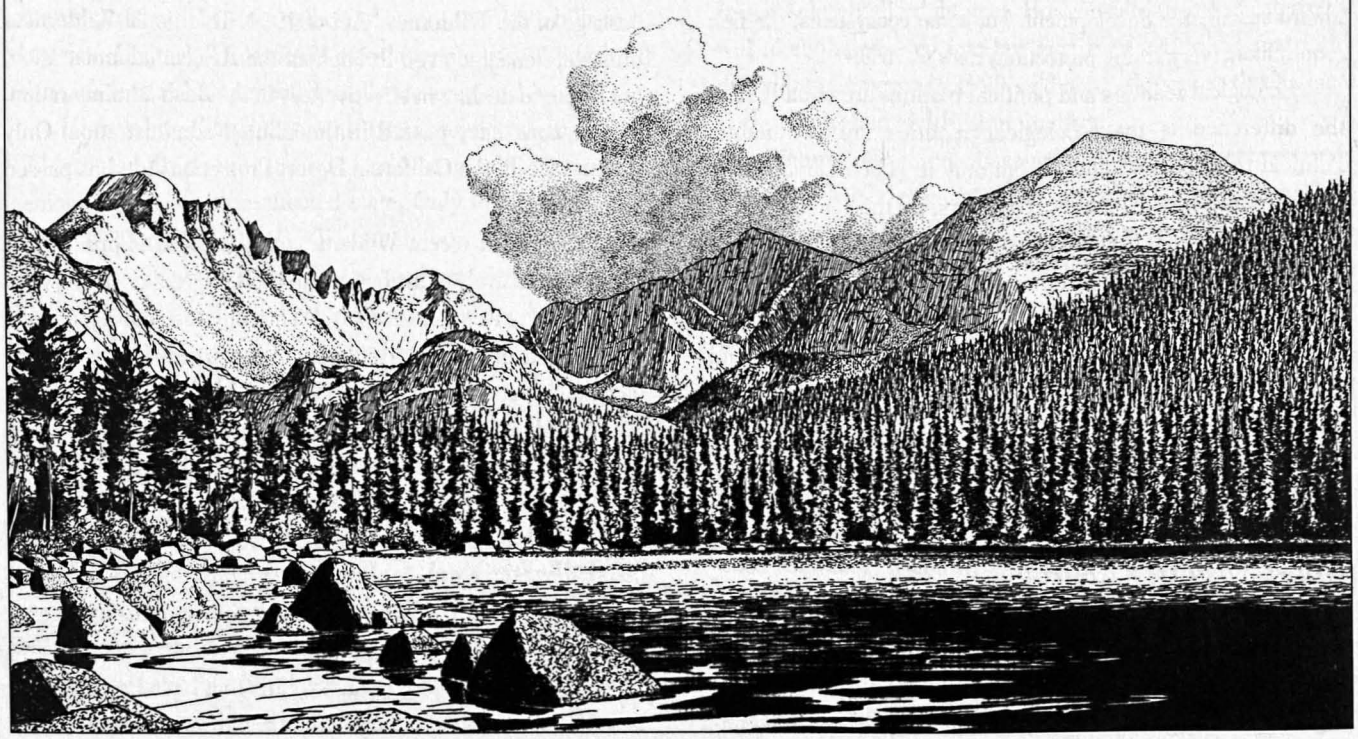
Big Wild

A Legislative Vehicle for Conserving and Restoring Wildlands in the United States

by Andy Kerr

Abstract

A new legislative strategy is proposed that synthesizes the best of existing strategies and can garner a critical mass of support among various conservation factions and the American voters. Compared to existing legislative proposals, Big Wild has the highest probability of being effective, both ecologically and politically. The area that could be covered by Big Wild (Phase I) is approximately 200 million acres of federal public lands across the nation administered by the Bureau of Land Management, Fish and Wildlife Service, Forest Service, and National Park Service.



Longs Peak and Bear Lake, Rocky Mountain National Park by Gus diZerega

The public land conservation movement is—at long last—poised to move from an almost exclusively defensive legislative posture to a primarily offensive posture.

Unfortunately, conservationists are factionalized behind differing strategies. Public land activists have been balkanized in these camps for several years, so it is unlikely that any current legislative approach will gain enough converts from the others to achieve the necessary mass of conservation community support. Even if critical mass were achieved for one approach, inherent flaws in all the current strategies would likely result in ecological and/or political failure. In defining success, both ecology and politics must be considered. This paper attempts to contribute to the debate and recommend an approach that can coalesce enough conservation community support to be successful.[1]

Ecological Realities versus Political Realities

Science, in particular the discipline of conservation biology, is stressing conservationists. If we are to ensure functioning ecosystems—both across the landscape and over time—the amount of protected land needed (in core reserves, corridors, and buffers, and with large carnivores) is much higher than present politics will accept. The sum recommendation of this new, yet very defensible, science is that at least one-quarter of the continental landscape must be in *very strong* protective categories, one-quarter in restrictive management that strongly favors conservation, and one-quarter in somewhat restrictive management that leans toward sustainable development. For some ecosystems, the first requirement (very strong protection) rises to 75%.[2]

Ecological realities and political realities are equally real; the difference is that ecological realities are immutable. Political realities are mutable, but only if: (1) conservationists are smart and effective political activists; (2) the general public cares and acts; and (3) the opposition isn't as smart and effective as conservationists.

Conservationists must both slow the rate of biological extinction (using defensive measures for temporary delay) and speed the rate of political transformation (using offensive measures for permanent change). We must look to our past to see what has worked (and why) and also be creative in pioneering new strategies.

Non-Legislative Approaches to Wildlands Protection

Conservationists' efforts in public education, grassroots organizing, administrative advocacy, Endangered Species Act listings, litigation, agitation, civil disobedience, etc. must all continue irrespective of what legislative strategy is undertaken. Properly executed, these tactics can approach—but not reach—zero extraction of timber, minerals, and grass from public land (as well as reductions in off-road vehicle abuse).

Recent significant reductions in public land timber cutting and/or livestock grazing, especially in the Pacific Northwest and Pacific Southwest, make it an excellent time to seek to convert administrative and judicial gains into permanent legislative protection.

Legislative Strategy

Current legislative approaches to public land protection can be placed in six categories:

- Traditional Wilderness Legislation;
- "Zero-Cut" Legislation;
- Forest Management Reform Legislation;
- Agency Reform Legislation I: Better Statutory Guidance;
- Agency Reform Legislation II: Better Bureaucratic & Economic Incentives;
- Annual Appropriations Efforts.

Traditional Wilderness Legislation. This is the tried and (formerly) true method of public land conservation, having been the preferred technique of the conservation movement since the passage of the Wilderness Act of 1964. Traditional Wilderness bills were enacted even throughout the Reagan administration, but began to decline in effectiveness in the Bush administration. Almost none have passed in the Clinton administration. Only one major bill, the California Desert Protection Act, has passed in the 1990s.[3]

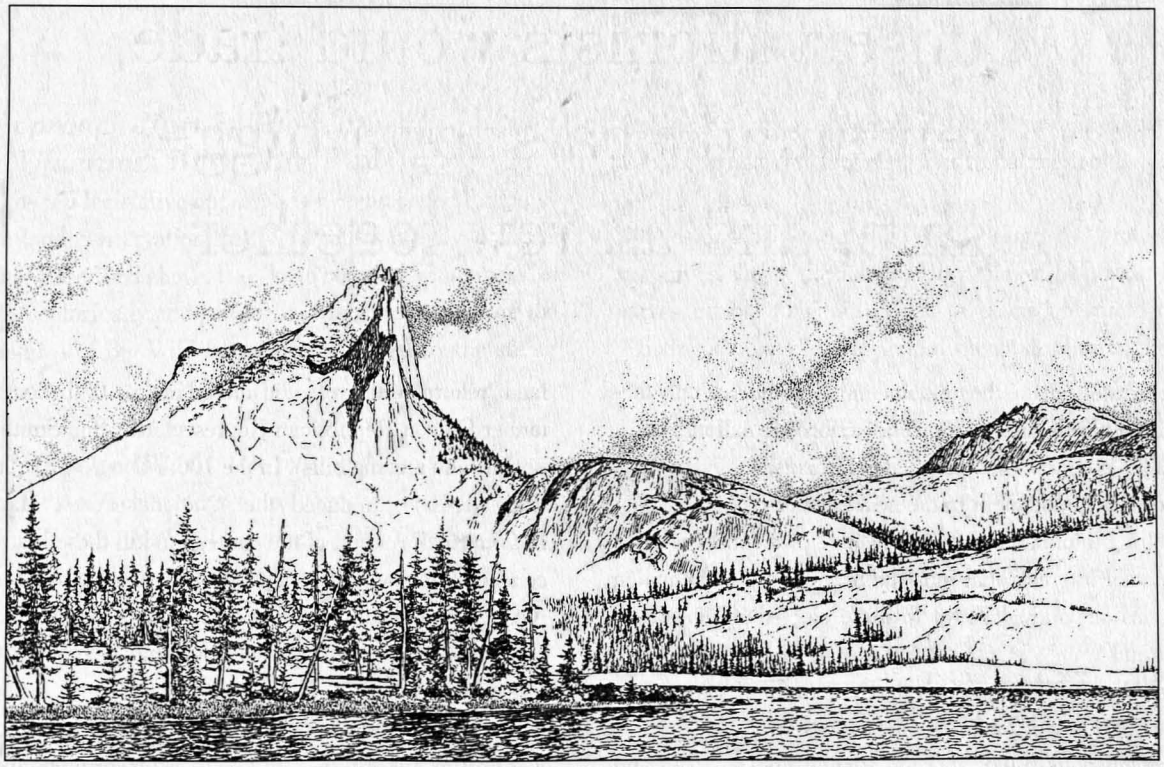
The lack of recent Wilderness designations is primarily—but not exclusively—attributable to the Congress changing from Democratic to Republican control. The congressional Republican leadership is infested with anti-Nature westerners. However, other factors have contributed to our lack of success in enacting traditional Wilderness bills, including, but not limited to:

1) the opposition has become more organized and effective;

2) as Congress turned against Nature, the conservation movement has had to spend more resources on defense rather than offense; and

3) traditional Wilderness bills are no longer the only game in town.

Since 1980, most Wilderness bills that have been enacted were done so as state bills. This trend has tended to vest more



power in a state's delegation than was held previously. Given the anti-wilderness prejudice that exists among many western legislators, such bills are going nowhere today.

Some regional bills, like the proposed Northern Rockies Ecosystem Protection Act, are multi-state bills, in part to make them national, rather than state, issues. Unfortunately, the scale of the combination results more in unifying a few bad state delegations than creating a large enough congressional coalition to overcome opposition. The strategy behind some other state bills (e.g., America's Redrock Wilderness Act to designate Utah Wilderness) is to make a state's unprotected wildlands a national issue.

History has shown that, with two exceptions, single-state Wilderness bills do not pass into law over the objections of the senior senator from the affected state. Only the Alaska Lands Act of 1980 and the Tongass Timber Reform Act of 1990 were enacted over the objections of a state's congressional delegation. Both times, all three members of the state's delegation were in the minority and not well respected in Congress; today these same individuals hold committee chairs.

Although America's Redrock Wilderness Act is a national conservation issue (witness the executive order for the Grand Staircase-Escalante National Monument during the 1996 presidential campaign), a political stalemate effectively exists. Conservationists cannot enact a bill into law that the Utah congressional delegation opposes, nor can that delegation pass a bill the conservation community doesn't want. It's one thing to get senators from other states to filibuster to kill a bad Wilderness bill supported by that state's delegation (as has been done for Utah), but quite another to pass a good bill over the objections of a state's delegation. While most apparent in Utah, such stalemates also exist elsewhere, especially in western states with solid Republican delegations, including senators that are committee or subcommittee chairs.[4]

"Zero Cut" Legislation. Zero Cut, or more accurately, the end of commercial logging on public land, is a developing campaign. It is absolutely the right goal. However, it is not legislation that will likely be enacted into law anytime soon. It was first introduced into Congress in 1995, and is now known as the National Forest Protection and Restoration Act.

Pictures of clearcuts have great effect on a select portion of the conservation community and the public. Such images, along with the fiscal folly of public lands logging, motivate some activists to exhibit great commitment to the Zero Cut cause. From a political standpoint, however, it is fundamentally a negative—rather than a positive—message, campaign, or goal.

Zero Cut is very unlikely to be enacted into law in one fell swoop because while it flames the passions of a highly committed group of activists, it will not achieve deep and wide support within the conservation movement. Internal division within the "zero-cut" faction is not helping matters and will in all likelihood continue, given the nature of their passion.

Recast into a more positive theme, ending all logging on all National Forests doesn't sound extreme to the American public. However, it is perceived as extreme to politicians. Those who rely exclusively on national polling data to develop and execute

Cathedral Peak and Lower Cathedral Lake, Yosemite by Gus diZerega

Conservationists would trade their small boats for a bigger ship, and all row together.

a political strategy make the fundamental error that the only factor affecting a politician's position and actions are national polls. In fact, many other factors influence politicians, such as the:

1) position of opponent in the next election;

2) polling information relevant to one's own constituency;

3) special interests that must be heeded due to campaign contributions or political power with the elected official's constituency; and

4) relative political strength and weakness of movements holding the majority or minority view on an issue.

If opinion polls ruled, abortion wouldn't be an issue and guns would be controlled.

Additionally, to pass Zero Cut, the conservation community would have to expend significant political capital (which we may not have or wish to spend) "saving" a huge amount of already clearcut land.

Forest Management Reform Legislation. Within the past decade, a variously named legislative vehicle has sought more restrictive—and therefore less harmful—logging of federal public land. It seeks to impose statutory management guidelines on forest managers. This approach has reached its apogee and is in decline, in part because of a split on the approach between the Forest Reform Network and Save America's Forests. While these factions have reunited behind one bill for this Congress, forest management reform legislation has failed to reach a critical mass of support in the conservation community, Congress, or with the public. Much of the original support for this legislative strategy has switched to other approaches, such as Zero Cut or direct reform of the federal land management agencies.

Agency Reform Legislation I: Better Statutory Guidance. A segment of the public land conservation community advocates improved "organic" acts (basic laws that govern land management agencies) for the Forest Service and Bureau of Land Management. Both agencies' organic acts have remained essentially unchanged since 1976.

No legislative proposals have been offered by conservationists, but have been by our opposition. Both forest and grassland "reform" bills were considered in the 105th Congress (i.e., former Oregon Republican Representative Bob Smith's "forest health" and grazing bills). In the 106th Congress, Senator Larry Craig (R-ID) introduced the "National Forest Management Reform Act." As part of the strategy to kill these kinds of bills, conservationists may wish to introduce counterproposals. Agency reform doesn't really excite us as a movement, and it certainly doesn't excite American voters.

Agency Reform Legislation II: Better Bureaucratic & Economic Incentives. Rather than prescriptive and restrictive statutory language, another approach, best articulated by resource economist Randal O'Toole, is to change the bureaucratic and economic incentives that cause land managers to behave as they do.

Some in the conservation community believe that incentive reform has theoretical merit but is impractical politically.[5] It is impractical because most public land conservationists are at heart Calvinist regulationists, and this kind of reform has been strongly embraced by libertarians. Conservationists are generally suspicious of libertarians because the central organizing principle of libertarianism is no government (and therefore no regulation) rather than environmental protection. Whether the results may coincidentally advance both goals is politically irrelevant, given the gulf between the two groups.

Annual Appropriations Efforts. Action in this arena has dominated conservationist action since 1984, primarily because of the defensive battles that must be waged annually against anti-Nature legislators' attempts to attach their fantasies to annual appropriations bills. We have worked offensively to attach our policy initiatives to those same appropriations bills.[6]

An advantage to the appropriations approach is that this political train must leave the station every year and we have a chance to be on it (or be run over by it). However, as a long-term strategy to save the world, the annual appropriations process is limited.

The aforementioned strategies all have merit. They have, to varying degrees, raised awareness and framed issues. But given the magnitude of the task before us, new thinking is needed.

New Approach Part I: The Mother of All Wilderness Bills—Big Wild

A new two-step legislative approach is recommended for federal public land conservation. Big Wild draws heavily from the approaches described above. It seeks to combine what works, or can work, ecologically and politically. Discussed below are the major features of Big Wild (as currently viewed by the author and subject to change).[7]

1. One legislative bill. The title must grab the attention and values of the American voters. One suggestion is the *American Wilderness Heritage, National Security, Family Togetherness and Personal Freedom Protection Act*.[8]

2. Multiple legislative titles. The one legislative bill would be composed of numerous separate and free-standing "titles" (a congressional term of art that means, in effect, big subtitles), which address ecological and/or political needs of particular states or regions. Separate titles could include, but are not limited to, the following:

America's Redrock Wilderness Act (BLM Utah); Arctic National Wildlife Refuge Wilderness Act (Alaska); Arizona Wilderness Act (USFS & BLM); Arkansas National Forest Wilderness Act; California Wilderness Act (USFS & BLM); Chugach National Forest Legislation (Alaska); Colorado Wilderness Act (USFS & BLM); Eastern Montana Wilderness Act (BLM); Georgia National Forest Wilderness Act; Idaho High Desert Protection Act (BLM); Maine Woods National Park Act; Minnesota National Forest Wilderness Act;[9] Nevada Wilderness Act (USFS & BLM); New Hampshire National Forest Wilderness Act; New Mexico Wilderness Act (BLM); North Carolina National Forest Wilderness Act; Northern Rockies Ecosystem Protection Act;[10] Oklahoma National Forest Wilderness Act; Oregon Desert Conservation Act (BLM & USFS); Oregon Forest Wilderness Act (USFS & BLM); South Carolina National Forest Wilderness Act; Tennessee National Forest Wilderness Act; Texas National Forest Wilderness Act; Tongass National Forest Round III (Alaska); Utah Forest Wilderness Act; Vermont National Forest Wilderness Act; Virginia National Forest Wilderness Act; Washington Wilderness Act (USFS & BLM); White Mountains National Park Act; and Wyoming Wilderness Act (BLM).

Other states could be included as well. The total amount of land that would be protected by Big Wild is estimated to be roughly 200 million acres.

3. All federal land agencies. Big Wild would include lands within the National Forest, National Park, and National Wildlife Refuge systems and Bureau of Land Management holdings. It could also address certain surplus Department of Defense lands.

4. National in scope. Big Wild is designed to protect land and resources across the nation. Big Wild will be most helpful to states unable to attain adequate ecological protection using existing approaches. Big Wild does not depend on the acquiescence of firmly anti-Nature congressional delegations.

To pass Wilderness bills in most eastern and the "left coast" states, the support of a critical mass of a state's congressional delegation is necessary. Fortunately, it's far easier to obtain, given the urban and suburban nature of the states' voters and the ideological composition of such delegations. However, the size of such bills is usually limited by the state's congressional delegation. Big Wild can result in more protection for such states than traditional state Wilderness bills.

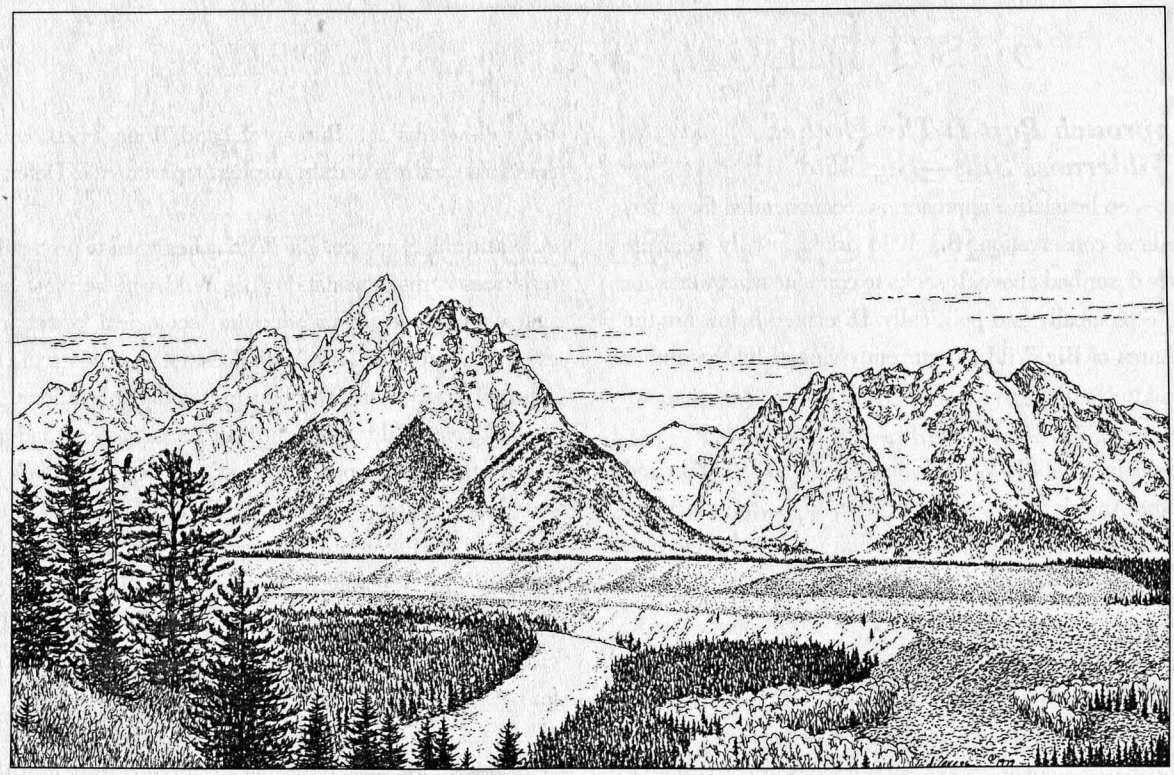
A major advantage of Big Wild over the current strategy of statewide Wilderness bills stems from the "free vote."[11] A "free vote" is one by a senator or representative that has no political downside. For example, a vote on a Wilderness bill way out west has no negative political impact on a senator from New Jersey. Conservationists and the public in that state will support it. The timber, mining, and grazing industries have no presence in the state, so such a vote is without political cost. There is a boatload more free votes on western wilderness issues in the East than on eastern wilderness issues in the West. Anti-Nature western legislators would never vote for Wilderness in the East.

5. Close loopholes in the Wilderness Act. A title could also be included to close the loopholes in the Wilderness Act that pertain to livestock grazing (end public land grazing with compensation),[12] mining (require a validity determination to extinguish the bogus claims, and target the rest for compensation), and logging and roading (remove the "forest health" loophole).

6. More than just Wilderness. While primarily a Wilderness bill, individual titles could have other federal protective categories, existing and proposed (such as for restoration), including but not limited to: National Conservation Area; National Monument; National Park; National Preserve; National Recreation Area; National Reserve; National Scenic Area; National Wildlife Refuge; Wild and Scenic River; Wilderness Recovery Zone.

All but "Wilderness Recovery Zone" have been enacted previously by Congress.

7. Expansion of Land and Water Conservation Fund. A title could be included to address needed reforms—conversion



to a true trust fund and increasing revenues—of the Land and Water Conservation Fund. LWCF should provide *at least* a billion dollars annually for public acquisition of imperiled wildlands, thus enlarging the public domain.

Some Prerequisites. Before Big Wild is introduced, it is assumed that:

1. Initial citizen conservationist wildlands inventories are completed (they need not be perfect) in states that still need them.

2. Citizen legislative proposals are developed for states that need them.

3. A presidential administration that can be made favorable to the effort is in office.

New Approach Part II: Conservation Biology-Based Study Provisions—Big Wild II

As part of the effort to protect the remaining wild public land base (and in many places begin restoring damaged public land), conservationists need to anticipate the success of Big Wild and concurrently provide for the next big bite of the legislative apple: Big Wild II. This next bite must be the further implementation of conservation biology-based principles (the first principle—preserving the remaining wildlands—having been achieved), including the restoration of much degraded land, both public and private.

Presently, conservationists have *no* chance of persuading Congress to order the rewilding of half the nation, no matter how scientifically justified. This is the case especially if conservationists (even with the most distinguished group of scientists that could be assembled) are the messengers who first suggest it. Instead, rewilding on the scale necessary has a political chance only if conservationists can first persuade Congress to ask the big questions themselves.

A last title in Big Wild could require the National Academy of Sciences to report to Congress, within three years, on the steps necessary to ensure the full ecological functioning of all major US terrestrial and aquatic ecosystems, both across the landscape and over time, including the reintroduction of extirpated species and control of exotic species. Such an effort could include specific recommendations and be map-based.

Each area-specific title of Big Wild could have a similar provision that required the proper agency (the Fish and Wildlife Service, National Park Service, Forest Service, and/or Bureau of Land Management, as appropriate, in consultation with other government and non-government institutions) to address the same issues—specific to the ecosystem or state addressed in that title.

Recommendations arrived at through these scientific processes would likely include:

1. end all destructive activities on public land (logging, livestock grazing, mining, damming, motorized recreation, etc.);[13]

2. strengthen the Endangered Species Act;

3. enact an Endangered Ecosystem Act;

4. expand the public lands;[14]

5. end predator control efforts;

6. curb industrial recreation;

7. end the use of dangerous pesticides on public lands.

Snake River Overlook, Grand Tetons by Gus diZerega

Advantages of Big Wild

1. *The amalgamation of conservation effort can result in greater gains.* Rather than divided efforts, all effort would be focused on *one* legislative campaign. Conservationists would trade their small boats for a bigger ship, and all row together.

2. *Financial and personnel (volunteer and staff) resources are used more efficiently, and more resources are acquisitioned overall.* Consider the numerous members of Congress from eastern states without much public land. With some local organizing in the district, their vote can be obtained. Why duplicate resources having multiple concurrent campaigns, each requiring the same amount of effort to get that same vote? It need only be done once.

Beyond efficiency, more campaign resources can be obtained. Big Wild is large enough to excite more conservation activists, conservation funders, and American voters to new levels of involvement.

3. *Media would be focused on a singular legislative effort.* One very large effort will attract more earned media than several smaller efforts. In addition, our paid media moneys can be used more efficiently.

4. *The marginal additional benefits exceed the marginal additional costs.* Yes, Big Wild would unite timber, mining, grazing, energy, and off-road vehicle interests, but it would also unite and excite the American conservation movement and our allies. Big Wild is large enough to command attention as a national issue. The larger the political context of the issue, the better conservationists do.

Crafting traditional Wilderness bills to appease special interests does not work.[15] We have just as much opposition to a score or more separate traditional Wilderness bills as we would have to Big Wild. We cannot avoid this opposition, and in fact should welcome it. The conservation community, not the special interests, has the national political strength on Wilderness.

5. *Local conservation activist autonomy is maintained.* By dividing Big Wild into as many titles as necessary, the bill can be tailored to meet both the local ecological and political needs of the various states and bioregions. Each title would be managed by the same interests who are leading such efforts now.

6. *Ecological reality is addressed and political reality is changed.* By changing the political context from one or a few states to the whole nation, the gap between ecological and political realities can be narrowed. Political limitations that militate for smaller acreage in an attempt to enact legislation through a state's delegation become far less significant in a national political context. Victory for Big Wild depends on getting the votes in Congress, not the acquiescence of the affected state's delegation.

7. *The bottleneck issue is resolved.* Conservationists have much land to save and not much time to do it. The bottleneck of current Wilderness legislation allows for no more than three (most likely two) legislative campaigns to effectively exist simultaneously. These campaigns not only compete with each other, but they also prevent other campaigns from moving forward. Even at optimistic rates in a state-by-state strategy, our legislative goals would take decades to complete.[16]

8. *The fate of America's last wildlands can be made a national issue.* Ecological destruction is an issue that must gain the nation's attention. Big Wild is the best way to do it.

9. *It is the best possible position when the deals go down.* Take a hypothetical US senator from a west coast state. This senator can receive pressure from below (in-state conservationists), the side (from other US senators pressured by their own in-state conservationists from below) and above (the administration).

In traditional state Wilderness bills, the pressure from below is either inadequate to achieve legislation at all, or will likely result in a "rock-and-ice" (or "rock-and-sand") bill. The pressure from the side—given the tradition of the Senate to defer on matters affecting one state—is gentle at best, and the only likely positive result will be the inability of that state's senator to pass a bill that conservationists oppose. Similarly, the pressure from above is not significant, given that the administration usually has larger and supposedly more important priorities than a particular state Wilderness bill.

In a national bill, the pressure comes from the same directions, but the dynamic changes. The pressure from below is greatly enhanced by increased pressure from the side and above. From the side, since Big Wild is a national bill and support will be strong in other states, eastern senators won't feel the obligation to defer to western senators on the matter. Since the size of Big Wild will generate adequate excitement among the entire conservation community, it will become a priority of the administration.

The result is that when the final deals are cut, conservationists are in the best possible position to get the most. If we have done our organizing properly, the inevitable horse-trading will not be trading Wilderness here for Wilderness there (within or between states). If we do our politics correctly, the horse-trading will not result in less Wilderness acreage, but a plethora of new federal buildings, post offices, bridges, and research grants flowing to a state in the years running up to the reelection of key members of that delegation.

Advantages of Big Wild II

1. *A second bite of the legislative apple for conservationists.* Requiring a study and a report to Congress sets the political

stage for the next phase of the continuing effort to conserve and restore ecosystems.

2. *The best way to approach Congress to address the issue of "what's ecologically necessary."* Large-scale wilderness protection and restoration, while quite rational ecologically, are presently quite radical politically. Over time, and with proper preparation, that which is rational can become reasonable.

Who Needs Big Wild?

Though various current protection efforts may be bioregional or ecosystem-based, this analysis is focused on the political subdivision of the state.[17] Some states need Big Wild more than others, but all could benefit. All western states can be divided into three categories:[18]

Those that *could probably never* pass strong permanent protective legislation without Big Wild. This includes most interior western states (Arizona, Colorado, Idaho, Montana, New Mexico, Utah, and Wyoming).

Those that *could possibly* pass permanent protective legislation without Big Wild. This includes three of the four "left coast" states: Nevada, Oregon, and Washington (all are presidential swing states). Given its large urban population, Colorado is *theoretically* possible, but it does have two Republican US senators opposed to the rather modest state bill introduced by Democratic House members. Most eastern states would also likely fall into this category.

Wilderness bills for these states that passed would be modest, limited to what was acceptable to the state's delegation (or a majority thereof). In Oregon, for example, this means whatever Democratic senior Senator Ron Wyden wants (and he's becoming joined at the lip with Republican junior Senator Gordon Smith—they do joint townhall meetings). Big Wild, by enlarging and changing the political context, would result in other US senators (and the administration) pushing Wyden (and Smith) more than Oregon conservationists can do alone.

Those that *could* pass permanently protective legislation without Big Wild. There is little question that California could pass a bill that could please the state's conservationists. It's an urban and green enough state. However, Senator Barbara Boxer and—most importantly—Senator Diane Feinstein still have political limits below our ecological needs. As in the Oregon example above, having other senators and the administration advocating for California wildlands would likely increase the final acreage.

Arguments Against Big Wild

"Putting all your eggs in one basket." The most plausible argument advanced by advocates of state Wilderness legislation against Big Wild is that it "puts all your eggs in one basket." For only one western state, California, is this a legitimate concern. For most states, the eggs are theoretical. For those states with a real egg, it won't likely be of much size or taste, unless all eggs are in the same basket. Even for California, Big Wild makes sense for the reasons stated above. California could choose to go it alone. However, if conservationists in all the other states chose to pursue Big Wild, California could potentially be competing with a much larger national effort for funder and public attention. Big Wild is not a basket, but a heavily armored mobile egg carton.

"As California goes, so go the others" or "Utah: The First Domino." This argument is that the logjam is broken by the leading states (California by its greenness, Utah by the length and depth of the campaign), after which others will fall into place.

In 1984, Oregon did break a logjam which allowed the passage of several other bills. The logjam, though, was not on designating Wilderness per se, but a hangup on language regarding the remaining non-wilderness roadless areas (Montana, Idaho, and Wyoming never passed "RARE II" legislation).[19] California can go forward, as can some other states, but Utah probably will not.

A plethora of state Wilderness bills is comparable to a MIRV ICBM.[20] If enough state Wilderness bills are launched, the reasoning goes, some will reach their targets. However, the "targets" are states defended by senators and representatives who are very effective Patriot missile systems that only need to hit their *one* target.

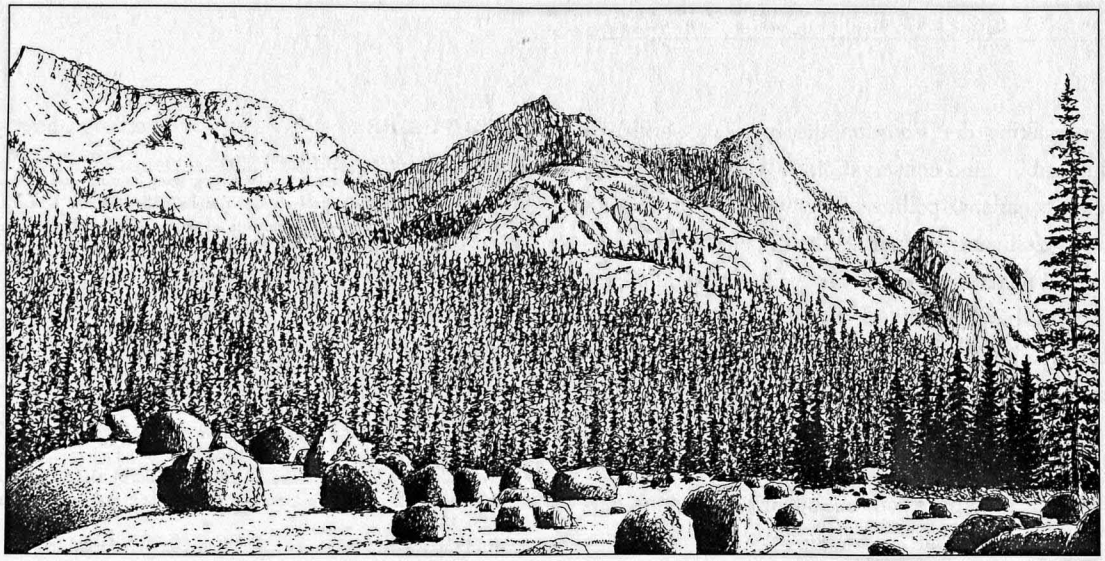
Why Big Wild Can Win[21]

Let's count the hypothetical votes in the 106th Congress.[22] First, two enlightening facts:

1. *The members of the Florida House delegation equal the combined delegations of the eight Rocky Mountain states.*[23]

2. *This strategy doesn't require the vote of one Republican senator west of Chicago for its success (though we shouldn't write off all of them).*

The House of Representatives: We need 218 of 435 votes to pass. A majority is quite possible for Big Wild, especially in the House, where deference to federal matters affecting another's congressional district is much less prominent than in the Senate. Three-quarters of the House represents districts east of Dallas, Texas. California has 52 seats. The urban nature of that state's



delegation makes most of them consider Wilderness, even California Wilderness, a "free vote." If Big Wild is bottled up in committee, a "discharge petition" could be undertaken.[24]

The Senate: The peculiar institution of the U.S. Senate provides some unique challenges to overcome. The nature of the Senate is to work by unanimous consent. This gives great power to any one senator to "object" to procedural actions (thus requiring a majority vote to continue) or, in the case of legislation, to put a "hold" on a bill. The power of such holds is the threat to filibuster a bill on the floor.[25]

Filibusters bring the Senate to a halt and the leaders make efforts to avoid them, usually by not bringing up the bill as long as the hold is in place. This gives great power to the holding senator to extract concessions to make the bill acceptable. If the objections cannot be addressed, and the proposing senators don't care enough and/or don't have enough political power to end a filibuster (assuming the hold threat was not hollow), the bill dies. If the bill is of enough importance to a majority, it moves forward; if a filibuster ensues, 60 votes are needed to end debate (cloture).

The political dynamics of this are clear: One or two holds from the affected state are enough to prevent any action on a statewide Wilderness bill. Forty holds on a national Wilderness bill, if it is of adequate political importance to 60 senators and the administration, are not. (This assumes that conservationists have mounted a vigorous campaign to make Big Wild a national political issue.)

The rules and tradition of the Senate also allow any one senator to move to amend any legislative language they wish onto any bill they wish. No rule of germaneness is followed. So, for example, if Big Wild is bottled up in a hostile committee, and we otherwise think we have the votes, a vote on Big Wild can be forced by attaching it to a bill likely to pass. Let's tally the Senate votes that we could reasonably hope to win:

Northeast and Mid-Atlantic (all Democrats and Republicans)	24
Midwest (includes some Republicans)	16
South (all Democrats[26] and at least 2 Republicans)	10
Left Coast[27] (all Democrats)	8
Mountain (all Democrats)	2
TOTAL	60

This analysis also assumes concerted effort to move western Democrats on the issue. If we continue to make the Wilderness issue bipartisan, we can win. As important as is making Big Wild a "free vote" for as many senators as possible, we must also make it as costly a vote as possible for senators in opposition. In the past, certain public land issues have been elevated to the national spotlight. It can happen again.

The Need for Market Research

Increasingly, our wildlands protection efforts are based on natural science, as they should be. Conservationists also need to use political science to help achieve the goals required by ecological imperatives. As the public land conservation community debates future courses of action, it would be useful to have high quality polling and extensive focus group research that compares and contrasts the approaches outlined in this paper.

The rationale to incorporate state and regional Wilderness efforts in one large national Wilderness bill is compelling. However, the nationalization strategy of Big Wild is essentially the same as that of the Zero Cut and Forest Management Reform efforts. The question arises as to which national approach best captures the hearts and minds of the American voters.

Such marketing research may not change the minds of those most entrenched or invested in a particular strategy,[28] but it can be very helpful to conservation activists who are willing to reconsider approaches. It can also assist the funding

Lower Cathedral Range, Yosemite by Gus diZerega

community in making decisions on the most cost-effective investments in public land conservation.

An extensive national polling effort, with a large enough sample to show significant regional results, should be undertaken (after an initial focus group or two) to explore current public attitudes now, as well as those attitudes after being exposed to our (and our opponents') best arguments. The results should be interpreted and made available to the conservation community.[29]

Conclusion

One should always try to pick both one's battles and one's battlegrounds. Big Wild does that.

To enact Big Wild, a level of trust and cooperation not seen for a long time in the public land conservation movement would be essential. This will not be easy, but the increased probability of achieving our goals should make the effort worthwhile and successful.

Big Wild addresses both ecological and political concerns. It can satisfy the goals of most conservationists. Big Wild will not satisfy those who believe it is morally wrong both to log public lands and to advocate anything but ending that logging immediately and completely.

Big Wild will not satisfy agency reformers, but would reduce the pressing need to do such reform.

Big Wild can satisfy the growing constituency for conservation biology-driven protection efforts.

If Big Wild I & II are enacted, the conservation movement resources now bound up in efforts to protect public land could, at long last, begin to be redirected toward private land conservation.

At any given time, can more than one major public land legislative effort be successful? Probably not. Must there be unanimity behind one approach? No, but there must be a critical mass of support—and Big Wild is the most likely vehicle for substantive near-term progress on protecting America's natural heritage. ☾

ACKNOWLEDGEMENTS The author wishes to acknowledge the following people for their very helpful reviews of earlier drafts and/or discussions: Ric Bailey, David Carle, John Davis, Brock Evans, David Johns, Jim Jontz, and Mike Medberry. Though they helped improve it greatly, any errors in fact or flaws in logic are the author's.

Andy Kerr (andykerr@mind.net) spent two decades with the Oregon Natural Resources Council, retiring as executive director. He now consults on environmental issues and has helped co-found a new advocacy organization, Alternatives to Growth Oregon (www.AGOregon.org).

ENDNOTES

1. Worth noting here is that the author:
   - Favors the end of commercial logging, grazing, mining, and off-road vehicle use of public land, but disagrees with the minority view among the Zero Cut faction that the only way to achieve that end is to advocate for zero cut and nothing else; rather, he believes that a few politically feasible, incremental steps will be necessary to reach the goal of forever wild protection of public land.
   - Believes that the principles of conservation biology must be implemented in a political context, though it sure as hell will not be easy.
   - Favors the relative permanence and strength of congressionally designated Wilderness and similar designations, and believes in the "power of wilderness" to motivate the conservation movement and the American voters.
2. See in general: Noss, R.F., and A. Cooperrider. 1994. *Saving Nature's Legacy: Protecting and Restoring Biodiversity*. Defenders of Wildlife and Island Press, Washington, DC; Noss, R.F. 1992. "The Wildlands Project land conservation strategy." *Wild Earth* (Special Issue): 10-25; and Soulé, M. and R. Noss. 1998. Rewilding and Biodiversity: Complementary Goals for Continental Conservation. *Wild Earth* 8(3): 18-28.
3. Also enacted were the Opal Creek Wilderness Act of 1996 and the Oregon Islands Wilderness Additions Act of 1996 (both in Oregon)—the only significant additions to the Wilderness System by the 105th Congress.
4. Essentially every senator from a majority party with at least two years in office is a chair of some subcommittee.
5. Including the author of this paper, who considers himself a "flexitarian."
6. Never forget: exploiters do "riders" and conservationists do "amendments." Our amendments to appropriations bills are more germane than their riders. Riders suspend or repeal a statute. Our efforts are usually "cut and shift" (e.g., spend less money on roads and logging and more on restoration and endangered species).
7. The author wishes to give large credit to others whose thinking on Big Wild has both preceded and developed concurrently, in particular Jim Jontz of American Lands.
8. Brock Evans of the Endangered Species Coalition came up with the name to make the point that public land conservationists must market their efforts as consistent with key values of voters.
9. Which would fix the Boundary Waters Wilderness incongruities, once and for all.
10. Includes portions of Montana, Wyoming, Idaho, Oregon, and Washington.
11. The author is indebted to Senator Bob Packwood for explaining the concept of the "free vote" to me many long years ago.
12. See "The Voluntary Retirement Option for Federal Public Land Grazing Permittees," by the author, published simultaneously in *Rangelands* 20(5), October 1998 and *Wild Earth* 8(3), fall 1998.
13. Perhaps in the form of "forever wild" language.
14. This also implies the end of land exchanges.
15. For example, while the new Colorado Wilderness legislation would grandfather existing grazing and mining, such a gesture did nothing to pacify the opposition of the mining and cattle industries.
16. The failure to move a national public land effort (Zero Cut or forest management reform) is not a bottleneck, but lack of a critical mass of conservationist support.
17. The two fundamental units of ecological organization are the watershed and the congressional district.
18. The lack of categorization of eastern states reflects ignorance by the author, not any lack of interest in including them in Big Wild.
19. "RARE II" was the Forest Service's second Roadless Area Review and Evaluation that culminated in a legislative proposal to Congress.
20. Multiple Independent Re-entry Vehicles Intercontinental Ballistic Missile.
21. The author is indebted to Jim Jontz for this analysis.
22. If the House of Representatives changes to Democratic hands in the 107th Congress, or the Republican majority shrinks in the Senate, both of which are likely if you believe most pundits today, the passage of Big Wild is even more probable. Of course, this assumes that J. Danforth Quayle ("It isn't pollution that's harming the environment. It's the impurities in our air and water that are doing it.") does not become President.
23. Arizona 5, Colorado 6, Idaho 2, Montana 1, New Mexico 3, Utah 3, Wyoming 1, Nevada 2.
24. If a majority of House members sign a discharge petition, a bill buried in committee must come to the floor for a vote.
25. Filibuster: "The use of obstructionist tactics, especially prolonged speechmaking, for the purpose of delaying legislative action."
26. Remember, Big Wild would be an administration priority.
27. California, Hawaii, Nevada, Oregon, and Washington.
28. It could, however—if the research comes to favor their approach—serve to reinforce, ratify, and vindicate those most entrenched and invested.
29. Disclaimer: The author isn't suggesting that a chosen legislative strategy be based solely on market research. Other political considerations also come into play. Nonetheless, such information, if properly obtained and accepted by the public land conservation community, can go far to develop a more unified strategy.

I recently read an editorial concerning the proposed reintroduction of wolves into New York's Adirondack Park, which is, at six million acres, the largest state park in the US and the Northeast's preeminent natural area. It is decidely unlike most US parks in that it contains many permanent human communities—the park's ownership mix is roughly 50% public land, 50% private. The writer of this editorial, who was not at all anti-wolf, asserted that the idea of reintroducing wolves was not a home-grown idea; rather, it was being imposed by people from outside the region, primarily, the author suggested, from "urban environmentalists." It was also noted that many Adirondackers would not welcome the return of the predator. The writer concluded that without local acceptance, the proposal would—and should—fail.

Disregarding the question of whether the editorialist had his facts straight about Adirondack wolf recovery, let's consider this perspective. One hears the basic message about local control and acceptance as a prerequisite for the reintroduction of grizzly bears into Idaho's Bitterroot Mountains, from those opposing creation of a Maine Woods National Park and Preserve, and from those who fought the recent establishment of the Grand Staircase-Escalante National Monument in southern Utah.

Selfish Genes, Local Control, and Conservation

by George Wuerthner

prairie dogs by Lezle Williams

The standard assumption is that if one can't get local acceptance, and even enthusiastic support for conservation measures, one shouldn't attempt to overcome local opposition. Many conservationists, particularly from the wing of our movement that touts "community-based conservation," seem to believe that any concessions necessary for garnering local support must be accepted, else conservation goals will not be achieved. Seldom recognized is that in making compromises to achieve local acceptance, one usually gives up most of the benefits of the original conservation proposal.

Thus, we reintroduce black-footed ferrets as "experimental, non-essential animals" so we don't have to change any federal or state policies regarding the killing of prairie dogs. (Indeed, prairie dogs, the ferret's main prey, continue to be shot and poisoned to the point that no remnant prairie dog complexes in the US are large enough to sustain a viable ferret population.) We may have succeeded in appeasing local opposition, but it remains to be seen whether we have improved the likelihood of the ferret's survival.

Opposition to the imposition of conservation measures assumes that locals know what is best for themselves and the land. It's based on what I believe is a naive assumption that people "wouldn't destroy the land that they depend upon." Ranchers wouldn't overgraze rangelands or their cows would have no forage. Fishermen wouldn't overfish because their livelihood depends on sustainable fisheries. Loggers wouldn't cut trees faster than they can grow back. Or so we are told. Yet most humans are very good at living in denial when it comes to maximizing our own coffers. Rationalizations that things aren't as "bad" as they seem are heard over and over again just before a resource population crashes, or the trees are all cut, or the rangelands turn to dust.

Certainly, gaining local acceptance is a big advantage, but few truly good conservation proposals anywhere have had wholesale local support. Most people, including most conservationists, appear to be unaware that a review of American conservation successes shows the repeated imposition of regulations and limits over spirited local objection.

Conservation History

When the first National Forests were selected from public domain lands in the West, western congressional representatives, along with the ranchers, loggers, and mining companies whose interests they represented, fought their establishment. Most federal and large state parks have a similar history of local or state opposition, starting with Yellowstone. For twenty years after the establishment of Yellowstone National Park, Montana's congressional delegation regularly introduced legislation to eliminate or shrink the park, claiming that Yellowstone's trees, grass, water, and minerals were needed for regional economic prosperity. When President Teddy Roosevelt created the Grand Canyon National Monument in 1908, he did so over the strenuous objections of Arizona residents and congressional representatives. And residents of Jackson Hole argued that creating a Grand Teton National Monument would turn Jackson into a "ghost town." (Anyone who has been to Jackson lately knows it's anything but a ghost town.)

This same story is repeated over and over throughout American conservation history. The 1981 Alaska National Interest Lands Conservation Act (ANILCA) created dozens of new conservation units in the state, over the opposition of most Alaskans and their congressional delegation. More recently, the 1994 California Desert Protection Act, which expanded several park units and created the new Mojave Preserve and dozens of new Wilderness Areas, was fought by the local congressional representative and many people living in and near the new units.

The aforementioned writer of the editorial on Adirondack wolf reintroduction seems to forget that the Adirondack Park was largely created by the political pressure of residents in New York City and Albany over the objections of those actually living in the proposed park region. Had we waited for local acceptance of the idea of an Adirondack Park, it is doubtful there would be any debate today about reintroducing wolves in the Adirondacks—rather than a park there, we'd probably have clearcuts, cows, and condos, as across Lake Champlain in Vermont.

Although very little old-growth forest has been spared from the chainsaw in the Pacific Northwest, what remains has been saved despite the opposition of local timber-dependent communities and logging companies. Ironically, the economy of this region has experienced record growth since spotted owl concerns slowed the cutting.

In short, history suggests that important land protection efforts almost always occur over the objections of local communities and local economic interests. Indeed, I would argue that the less local control of natural resources, the better for the land. And when I speak of the "land," I include the larger human and wildlife communities.

Some may try to paint my perspective as elitist cultural imperialism. To the contrary, I'm for truly democratic control of resources. Democratic control by a larger representation of all affected people is far more likely to reflect a non-economic, non-selfish perspective. If we can find a way to record the votes of plants and animals, we should expand democracy to include their voices as well. In many cases, when conservationists argue

for land preservation, they are articulating the perspective of those creatures who don't speak our language—in essence, expanding the circle of "affected" individuals, enlarging the community to which we belong, as Aldo Leopold prophesied half a century ago.

Conservation properly involves thinking ahead many generations, sacrificing personal benefit now for the yet unborn. I would argue that conservation and the sustainable use and protection of resources is *contrary* to our basic evolutionary heritage. Despite the popularity of the notions of husbandry and "stewardship," I believe such ideas are more mythical than real. Historically, where exploitation appears to be sustainable, closer examination generally demonstrates either a lack of need or exploitative ability. Despite wide cultural differences, the propensity to overexploit is almost universal—a common human trait. Given access to guns and horses, some American Indians were just as willing to annihilate bison as the whites who commenced the slaughter. Part of our genetic heritage is to exploit resources to the extent that we are easily able, since for most of our evolutionary history this was essential for survival. With the advent of modern technologies, however, this genetic predisposition has become destructive—maladaptive even—if viewed from a species level.

Selfish Genes and Evolutionary Behavior

Given a free hand, most humans tend to maximize their individual welfare at the expense of the collective whole. One can't depend upon "stewardship" to protect valuable resources—particularly those of a public nature such as water, soil, biological diversity, and wildlands. Indeed, our selfish nature may be a genetically determined behavior. The "selfish gene" theory suggests that all animals strive to promote their self-interest. The ultimate "goal of all life," if you will, is to replicate itself, and pass on its genes to future generations. Individuals seek to gain advantage for themselves or their kin, even at the expense of their species' survival. This often means individuals strive to garner greater resources than others have, explaining why people overfish, overgraze, overhunt, overtrap, overlog: If you have a lot of resources—meaning *money* today—you can trade it for whatever you can't get any longer from the local forest, sea, or rangelands.

In the race to acquire resources, those who ignore long-term viability for short-term gain typically "win." This is particularly true in our modern economic system. For instance, it

Firehole Basin, Yellowstone by Evan Cantor

makes adaptive sense for the stockholders of the timber companies in Maine (all acting as selfish individuals) to overcut the woodlands. Not cutting trees would mean their assets (trees) are subject to potential loss. They could burn up in a fire. Insects could kill them. Windstorms could blow them over. The longer the rotation between logging, the more one is exposed to potential loss. On the other hand, if you cut the trees down as fast as you can—as many corporations are doing—you not only get all the economic benefits now rather than at some future date, you also turn trees into cash, and in today's booming market, stocks accrue "value" faster than do trees.

If one considers the behavior of timber corporations from an evolutionary perspective (with a corporation being like an individual), it seems particularly naive for conservation groups in the Northeast to be championing the "working forest" when history and biology both suggest that timber companies will maximize their profits at the expense of ecological integrity. Though the worked-over forests may keep a reasonable number of trees growing on the land, giving the appearance of a reasonable compromise between economic exploitation and forest preservation, we must not forget that growing trees is different than conserving natural forests. Working timberlands are not the same as working forest ecosystems.

Examples from around the world where people "close to the land" live in "harmony" with Nature are more often consequences of limited ability to maximize exploitation than a result of innate conservation ethics. The limited impact of American Indian tribes compared to the invading European culture (a process that was, of course, brutally violent, marked by a genocidal fervor and accompanied by extraordinary ecological destruction as European settlers appropriated the continent's natural capital) was, I would argue, more a consequence of low population numbers and limited technology than a result of cultural adaptations. If you spend 30 minutes to make a single arrowhead, how frequently are you going to fire arrows at animals just for "fun"?

The rare exceptions to this human proclivity to overkill are the result of social prohibitions that limit individuals' tendency to maximize their own accumulation of resources. Certainly many indigenous cultures developed social norms that resulted in a more ecologically benign relationship with Nature than contemporary industrial societies. Social norms do not, however, invalidate the idea of the selfish gene. Remember, the goal is to maximize one's personal fitness. But as social animals, humans cannot afford to ignore the opinions and perspectives of the larger community. To be "successful" as an individual requires adherence to the specific cultural values of the society in which we live. Sometimes a social prohibition against excessive exploitation, enforced by "laws," may preclude maximizing personal gain. This is, in effect, what happens when we declare an area a park or place other restrictions on the exploitation of natural landscapes.

We are not completely at the mercy of our genes, however. Humans do many things that appear to be disadvantageous from a biological perspective. We are also capable of altruism, good will, call it what you may, although some biologists would argue that underlying almost all apparent examples of altruism are selfish motives.

Nevertheless, wildlands preservation will almost always be opposed by local economic and political interests since it involves a protection and allotment of resources that decreases the opportunity for local individuals to maximize resource acquisition. From an individual perspective, it makes good sense to oppose conservation efforts locally—especially if you are in a position to capture a significant amount of the resource yourself.

Establishment of a park, for example, that prohibits resource extraction such as logging, hunting, or livestock grazing reduces the overall potential resource capture by individuals engaged in these economic activities. It directly affects *their* individual fitness and resource acquisition. Even if, overall, the creation of a park may expand economic opportunities, the individuals who will benefit are typically different from those currently enjoying the status quo.

One can show that creation of the Grand Staircase-Escalante National Monument will in the long run enhance the local economy, quality of life, and landscape processes. Yet, many of the benefits will go to future inhabitants, as current local residents may lack the skills and entrepreneurial spirit to profit from the change in land status.

There are, of course, exceptions to the above generalizations. Sometimes the momentum for change is strong enough, and enough local people make the transition from one economy to another, that opposition turns to support.

However, people respond to any proposal that will affect their ability to acquire resources and wealth, and most people won't jeopardize their overall power, wealth, and status for the good of the community at large—particularly if that "community" consists largely of unrelated strangers.

Policy Implications

Several policy recommendations follow from this line of reasoning. First, if I am correct in assuming that most conservation measures, while beneficial to the community at large, are often recognized as neutral or negative by vocal and powerful local

interests, then money, time, and energy spent to garner local support might be better spent developing support among the larger constituency that has less of an economic stake in the outcome.

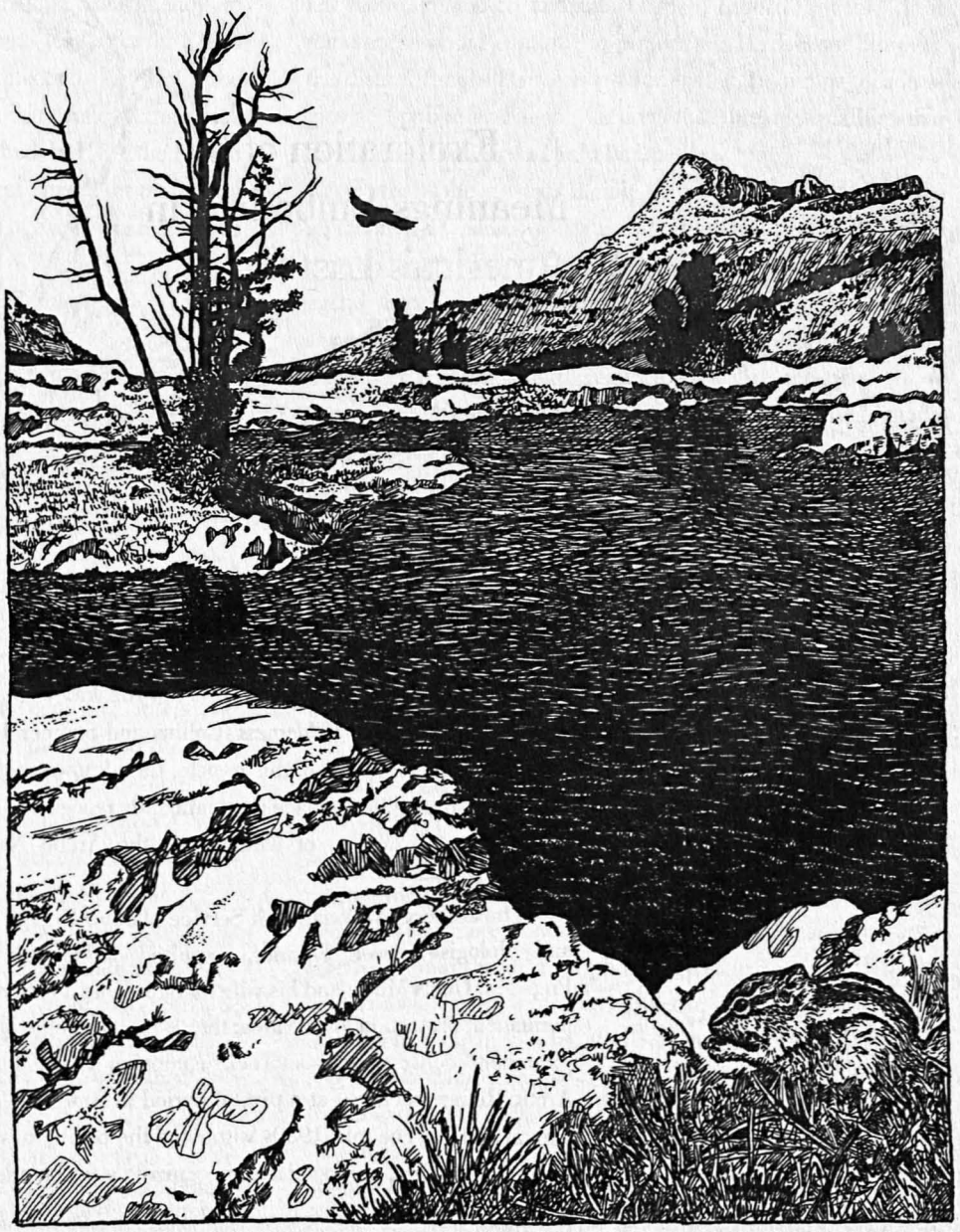
That doesn't mean conservationists should ignore local opposition. Often the opponents' passion is exaggerated due to misinformation about the consequences of conservation proposals. Neutralizing or weakening their passion by education may be possible. Demonstrating persuasively the overall benefits to the community may decrease opposition and perhaps even create support for land protection.

Stewardship, a currently popular notion among mainstream conservationists, is nothing more than enlightened self-interest, and self-interest doesn't always benefit the community at large, particularly if the community is expanded beyond humans. Most "win-win" situations highlighted in the media ignore wild Nature, which often still loses.

Second, we need an environmental ethic. Religion, ethics, and other value systems form our social contract. In the long run, the most successful way to curb our selfish tendencies is to develop an ethic that looks far beyond the individual. By seeing ourselves as part of a larger biotic community, we recognize destruction of species and ecosystems as an attack on each individual's self-interest. Checks and balances are thus put in place on how much anyone can maximize his or her own fitness at the expense of others.

Finally, rather than expect local support for conservation proposals, we should expect opposition, and work beyond it. The real cultural imperialism is following the dictates of special interests. We need to provide a voice for all beings, and this means expanding the circle of debate and participation to those beyond local human communities. ☾

Writer and photographer George Wuerthner (POB 3156, Eugene, OR 97403) is the author of over twenty books on natural history, geography, and recreational values of America's wild places. His latest work is a natural history guide of Olympic National Park (Stackpole Books, 1999).

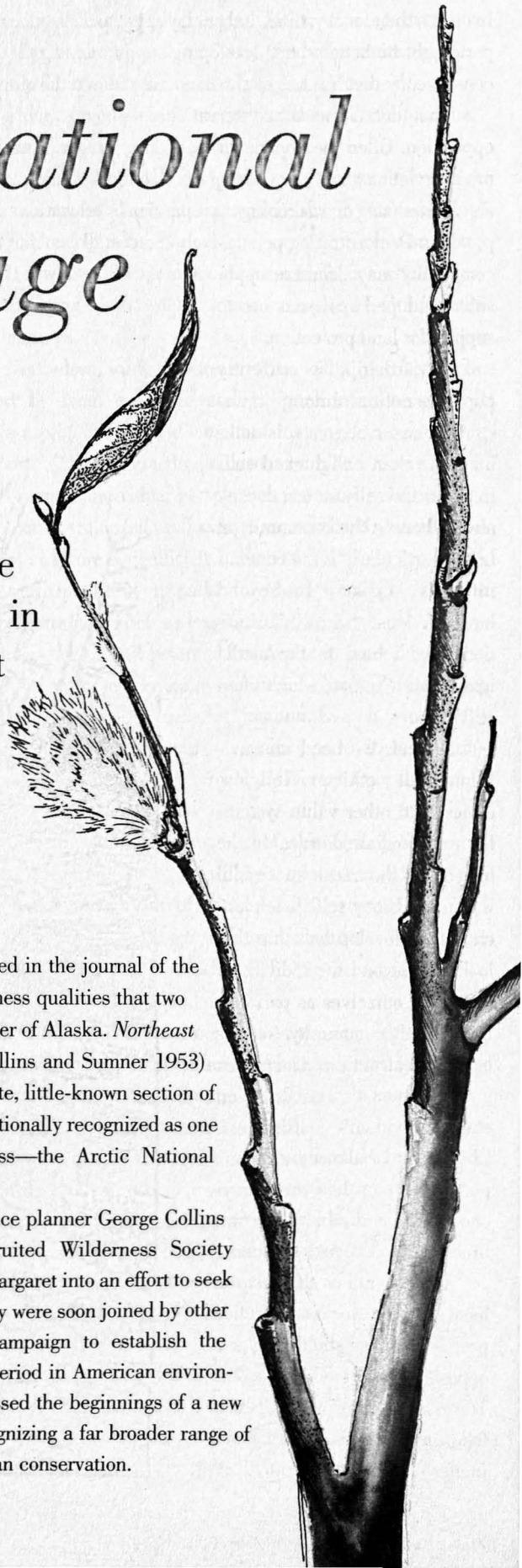


Alaska Basin, Grand Tetons by Evan Cantor

The Arctic National Wildlife Refuge

An Exploration of the Meanings Embodied in America's Last Great Wilderness

by Roger W. Kaye



In 1953, a feature article appeared in the journal of the Sierra Club extolling the wilderness qualities that two scientists found in a remote corner of Alaska. *Northeast Arctic: The Last Great Wilderness* (Collins and Sumner 1953) began the transformation of this remote, little-known section of the Brooks Range into a place internationally recognized as one of the finest examples of wilderness—the Arctic National Wildlife Refuge.

The authors, National Park Service planner George Collins and biologist Lowell Sumner, recruited Wilderness Society President Olaus Murie and his wife Margaret into an effort to seek permanent protection for the area; they were soon joined by other prominent conservationists. Their campaign to establish the Arctic Refuge occurred at a pivotal period in American environmental history. The mid-1950s witnessed the beginnings of a new environmentalism, a perspective recognizing a far broader range of landscape values than that of utilitarian conservation.

Two key figures of this emerging paradigm strongly influenced the perceptual lens of the refuge founders: Robert Marshall's writings about wilderness and about adventuring in the Central Brooks Range expanded their understanding of the psychological benefits and cultural values one could experience in this landscape; and Aldo Leopold had a "profound effect" on the range of scientific, experiential, and symbolic values they perceived wild places to hold. "It was his ideas that we brought with us to Alaska," Collins said.

Through the late 1950s, the founding conservationists' writings inspired a growing constituency to write, speak, and testify for the area's permanent protection. In 1960, the nine-million-acre Arctic Range was finally established. In 1980, the Alaska National Interest Lands Act more than doubled the Range and renamed it the Arctic National Wildlife Refuge.

The Arctic Refuge remains a place "where the wild has not been taken out of the wilderness," an agency brochure advises prospective visitors. "Perhaps more than anywhere in America," it continues, the refuge "is a place where the sense of the unknown, of horizons unexplored, of nameless valleys remains alive" (US Fish and Wildlife Service, undated).

But what constitutes this "sense" of wildness? Is it the refuge's incomparable natural scenery, or its assemblage of wilderness-dependent wildlife, symbolized by the 120,000-strong herd of free-roaming caribou, or the ecological integrity of the five major ecosystems through which the caribou flow? All these things, certainly—but the statement alludes to something beyond biophysical qualities. The brochure's words were inspired by what Olaus Murie (1959a) articulated in his congressional testimony, stating:

> *It is inevitable, if we are to progress as people in the highest sense, that we shall become ever more concerned with the saving of the* intangible resources, *as embodied in this move to establish the Arctic Wildlife Range.* (emphasis added)

Murie readily admitted his inability to define the intangibles that figured so prominently in the establishment of the Arctic Refuge. Since his time, environmental psychologists have labeled these intangible resources as "psychologically deep," "subliminal," "preverbal," and "archetypal." Perhaps they are best summarized by Aldo Leopold's (1966) simple phrase, "Values as yet uncaptured by language" (p.102).

The Wild in Wilderness: At Risk?

The hard-to-define character of these qualities challenges wilderness advocates, managers, and policy makers who wish to preserve them. But as environmental psychologist Herbert Schroeder (1996) reminds us, their elusive nature is part of their essence and strength—their mystique. Like the wild caribou, the psychological and metaphysical stuff of wildness ought to be left alone, unstudied and unexamined. Indeed, it could be if remoteness would continue to protect this landscape. But even the distant Brooks Range is not far enough from new technologies and public and agency actions that threaten qualities that the founders believed should be timeless.

Perhaps the most intangible threat Murie resisted was the attachment of names to natural features (Murie 1959b). But recently, part of the Arctic Refuge was named for a former agency head, who, by all accounts, was well-liked by the conservation community. Nevertheless, as the director of a Fairbanks environmental organization put it, the name "took some of the wild out of the Refuge," and "some ineffable quality has been lost."

A greater threat to elusive wilderness qualities may be the potential development of "quiet" helicopters. If helicopter technology produces quieter machines, the legitimizing rationale used to exclude them (noise) from the refuge's non-Wilderness designated areas may be voided. Further, recent legislative attempts to allow helicopters in Alaskan Wilderness highlight the need to understand how peoples' experience may be altered if they know that any destination, every place along their route, could be accessed by a machine.

Visitors have also questioned the effect of new technologies such as communications systems and the now ubiquitous global positioning systems. But a developing technology that may become even more controversial—and which raises questions that reach into the deepest philosophical underpinnings of the wilderness idea—is wilderness trip-planning computer software.

By linking high-resolution remote sensing imagery with geographic information system (GIS) resource databases, this technology may result in Internet trip-planning programs that facilitate "shopping" for desired wilderness qualities. Wilderness destinations, routes, and features specified in a user's "motive profile" could be "ordered up" and viewed in

arctic willow by Mara Bacsujlaky

detail. A first-generation prototype of such a program is now proposed for the Boundary Waters Canoe Area (Lime and others 1995); a researcher with the effort predicts that eventually the technology could lead to virtual reality "fly-overs" of wilderness, along with enhanced "fly-ins" for close-up views of selected features or routes. "If there is anything I can tell you about this technology," Michael Lewis said, "the sky is the limit" (personal communication 1996).

Subjects of my research who have contemplated the prospect of *just knowing* such a technology might someday overlay Arctic Refuge have described it as "sacrilegious as playing a video game in church." They ask what would happen to the *essence* of wildness if they knew there were no secret places, no hidden corners along their route that aren't digitized, thus dispelling the sense of mystery and the experience of exploration and discovery. And beyond the experiential aspects, how might such changes affect the symbolism this place has come to hold?

Exploring the Underpinnings of Wilderness

This research project explores the system of thought and belief that underlies objections to such potential changes to the Arctic Refuge wilderness. It seeks to describe the network of beliefs, values, and attitudes associated with this northern expanse of mountains, tundra, and forest—endowing it with a sense of place and embodying it with a set of meanings that have led to its emergence as an experiential and symbolic landscape of national significance.

The inquiry employs the tools of exploratory, phenomenological, and interpretive inquiry. It draws on three sources of data: the wilderness themes identified through content analysis of 19 writings of those who were most instrumental in establishing the Arctic National Wildlife Refuge, supplemented by interviews with three of them; wilderness themes identified in 25 popular literature sources subsequent to the refuge's establishment; and, most importantly, exploration of the perception and experience of wilderness-oriented refuge visitors who serve as case studies. These people are referred to as co-researchers because of their collaborative role in the study.

Wilderness Meanings Associated with the Arctic Refuge

Emerging from the three data sources are 14 meanings the refuge represents to wilderness-oriented people. Four of these are widely associated with wilderness in the popular literature, are readily accepted by managers and decision makers, and are recognized in Arctic Refuge planning and management documents. These common meanings recognize the Arctic Refuge as: 1) a place for wildlife, particularly for sensitive species not tolerant of civilization, or not tolerated by civilization; 2) a place of scenic values; 3) a place of scientific values; and 4) a setting for wilderness "recreation."

Ten meanings are less recognized. Their role in the establishment of the refuge—and in the experience, perception, and valuation of it as wilderness—are less understood. Of course, the importance of each varies widely among individuals. The relative influence of each is not evaluated, because none operates in isolation. In the mind they form a gestalt. They meld into one another. One's conceptualization of this environment derives less from recall of individual component meanings than from an overall "impression" based on a largely unconscious interaction of them.

1. The Arctic Refuge provides a connection to American cultural heritage.

> *This area offers what is virtually America's last chance to preserve an adequate sample of the pioneer frontier, the statewide counterpart of which has vanished.*
>
> —George Collins and Lowell Sumner, 1953

The idea that wilderness is a vestige of our frontier heritage is deeply embedded in the American notion of wilderness. It was a prominent theme in several of the writings of Leopold that inspired the refuge founders. Also influential was Robert Marshall's (1938) proposal for a permanent frontier in northern Alaska: "In Alaska alone can the emotional values of the frontier be preserved" (p. 1).

The idea of preserving a remnant of the frontier and related experience opportunities became prominent in the public testimony supporting establishment of the Arctic Refuge (Kaye 1998), and continues to resonate through the popular literature. Consider *Nameless Valleys, Shining Mountains,* John Milton's (1970) discovery of "wilderness on a scale the mountain men once knew in our far west" (p. 63) and his feeling that Lewis and Clark "would probably have felt much as we did" (p. 113).

Co-researchers commonly report catching an occasional experiential glimpse of this past. Author and co-researcher Debbie Miller, for example, vividly recalls instances where she imagined, "This is what it must have been like for the early explorers...the feeling of exploration they must have known." She looks back upon childhood exposure to frontier imagery as among the influences that led her to become a veteran of thirty-some extended trips in the Arctic Refuge, experiences that inspired her to become a nationally recognized leader in the effort to protect the refuge from oil development. "If we lose places like the Arctic Refuge, we lose something of ourselves too," she says, citing historian Wallace Stegner. "It's part of Americans' geography of hope."

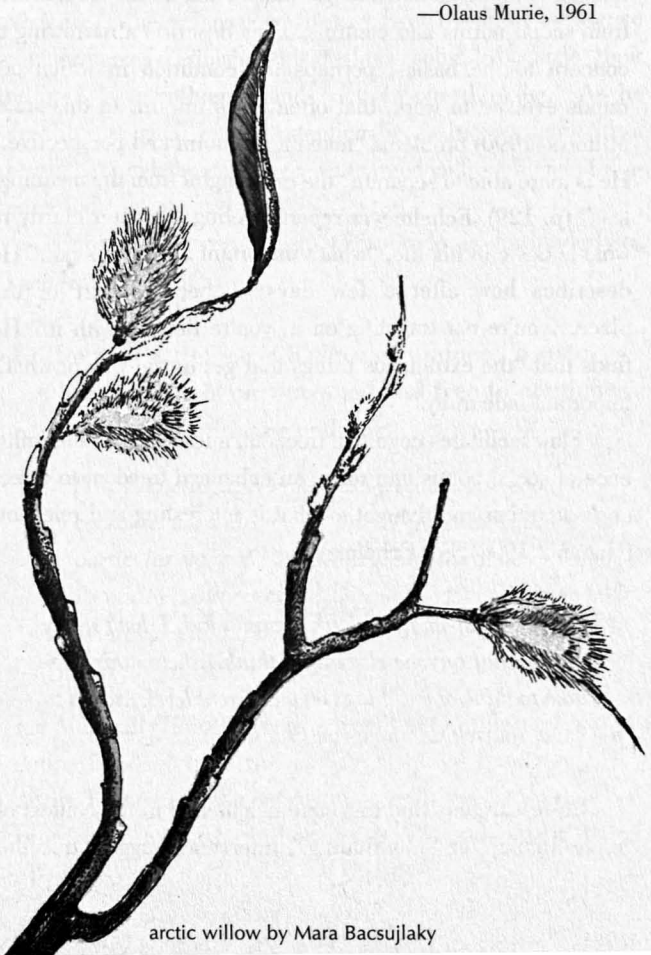
Co-researcher and geophysics professor Keith Echelmeyer says, "On the longer trips I get this sense of not visiting, but moving through the land as Lewis and Clark must have felt." These experiences seem to be neither imaginings nor trip motivations or expectations. Echelmeyer says:

> *It's something that just comes to you when you don't know what's ahead. It's an understanding of what it was like to be in that era....It's an identity with a period I find most interesting.*

Recent literature in environmental psychology (Kaplan & Kaplan 1995) and archetypal psychology (Pearson 1991) suggests examining the role of the frontier and its explorers as more than just touchstones to this venerated past; they may symbolically represent what Olaus Murie and others considered an innate human impulse, represented by the following meaning...

2. The Arctic Refuge is a place of mystery and unknown, a place for exploration and discovery.

> *The urge to go places...to explore...to discover...this urge has come down to us from the earliest time and we must not ignore it if we believe in progress of the human spirit.*
>
> —Olaus Murie, 1961



arctic willow by Mara Bacsujlaky

This theme has recurred through the popular literature of the Brooks Range since Marshall (1956) first extolled its unknown character and "the exhilarating feeling of breaking new ground" (p. 49). In the glossy book *Earth and the Great Weather,* Kenneth Brower (1970) revels in finding a valley "unexplored as far as we know" (p. 70). In her book *Midnight Wilderness* (1990), Miller describes "that exhilarating sensation that we may have walked in places where perhaps no human had ever set foot" (p. 133). Encapsulating a theme expressed by all the co-researchers, she says

> *There is a tremendous sense of adventure in not knowing what lies ahead. Perhaps one of the greatest values in experiencing this primeval wilderness is the element of discovery.* (p.150)

This enchanting component of the refuge experience seems to arise from an aura of mystery, the sense that there is something within or beyond a scene that is not apparent (Kaplan & Kaplan 1995). This uncertainty engages visitors' predictive and inferential capabilities, impelling them to venture forth and explore. Empirical research supports what Leopold, Marshall, and Murie knew intuitively: the aura of the unknown deepens the wilderness experience.

Concern about erosion of this quality is the primary basis for co-researchers' objections to the potential electronic information technology. Expeditionary traveler and co-researcher Roger Siglin speculates that just knowing that comprehensive digital information overlays his route would erode his most memorable experiences: "discovering hidden nooks and crannies that you stumble onto."

Before his journeys, Siglin spends evenings staring at maps, planning and imagining. What would happen to the anticipation, he asks, "if I had to decide whether or not to first 'explore' the route and 'discover' the features on the computer?"

In both the refuge literature and the experiences of co-researchers, namelessness contributes to this experience. It is a major theme in Milton's *Nameless Valleys, Shining Mountains.* Echelmeyer says a named feature is less beckoning because "its connection to pre-modern times is lost...the name limits your imagination." For co-researcher and high school teacher Frank Keim, "One can hardly explore a named mountain. I'm more inclined to climb a less interesting but unnamed one."

Literature of evolutionary psychology suggests that what the refuge founders and the co-researchers experienced here—the urge to search out distant, unfamiliar places, to explore, meet challenges, and perhaps return from the wilderness something more

Left: Mardy and Olaus Murie at Last Lake, on Sheenjek River, 1956.

Center: Robert Marsha

Right: Last Lake, Sheenjek River.

than they were before—is but a re-enactment of one of the oldest and most universal themes of human mythology: the journey quest.

Thus, what people explore here is not just what's around the next bend or over the horizon.

3. The Arctic Refuge provides psychological benefits associated with solitude.

> *...but we long for something more, something that has a mental, spiritual impact on us.*
>
> —Olaus Murie, 1959

Murie's statement reflects one of the earliest themes of the wilderness literary tradition. He recognized that vastness, remoteness, and the separation from modern society's influence that they engender contribute to the Arctic Refuge's renown as a place of solitude—a setting particularly conducive to introspection, self-reflection, restoration, and personal growth.

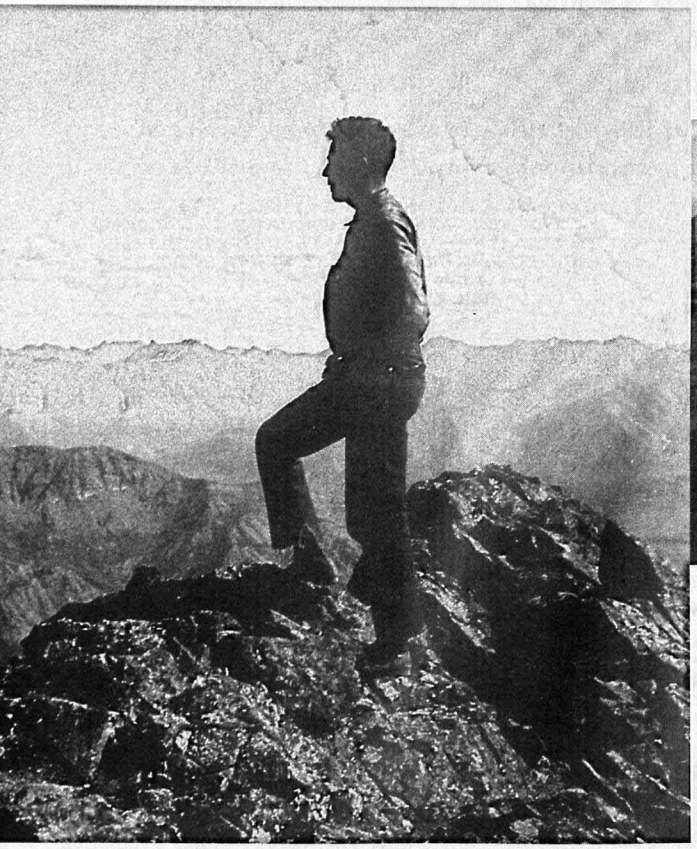
Far more than aloneness, solitude is a complex and multidimensional experience. Two dimensions well represented in both the refuge literature and the interviews are the experience of the Flow State (Csikszentmihalyi 1990) and Cognitive Freedom (Hammitt 1994).

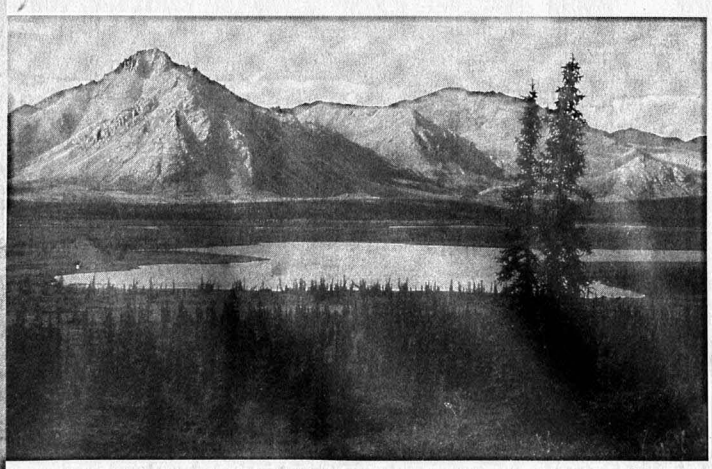
Flow experience characterizes Murie's (1957) description of the refuge as "a world that compelled all our interest and concentration and put everything else out of mind" (p. 275). Co-researchers describe frequently experiencing the components of flow: absorption in the experience, an exclusion of irrelevant concerns, the coalescence of their actions, intentions, and thoughts into a single theme, and a sense of freedom from social norms and controls. They describe a narrowing of concern to the basics, perhaps the condition in which our minds evolved to work, that often turns inward. In this state, Milton's (1990) problems "take on new form and perspective." He is more able to separate "the meaningful from the meaningless" (p. 129). Echelmeyer reports feeling a greater clarity of what is basic in his life, "what's important and what's not." He describes how after a few days "I become part of the place...you're not traveling on it, you're flowing with it." He finds that "the extraneous things that get in the way of what's important fade away."

Flow facilitates cognitive freedom, a lessening of the influence of social norms and roles, an enhanced freedom to direct one's attention and thought to what is interesting and relevant. (Hammitt 1994). For Echelmeyer,

> *I lose my self-image. It's like being a kid. I don't worry about what anyone else might think...there's this freedom to think about things on a different level...to get to know yourself and how you fit into things.*

Co-researchers find this state heightened in the context of "route-finding" or "way-finding." Interviews suggest that the





process of getting from one place to another facilitates the process of getting from one way of thinking to another.

Echelmeyer reports that this effect is notably lessened in other areas where signs point the way. Even the unseen presence of place names diminishes this quality of solitude because "their purpose is to influence and control your thinking." As he describes it, such human intentionality is incongruent with a place that fundamentally represents freedom from human influence and control.

Enhancing these effects of solitude is an underlying knowledge that...

4. The Arctic Refuge is a place of wildness, a state where Nature is uncontrolled and free to continue along its evolutionary pathway.

> *[The Arctic Refuge] symbolizes freedom...freedom to continue, unhindered and forever if we are willing, the particular story of Planet Earth unfolding here...where its native creatures can still have freedom to pursue their future, so distant, mysterious...*
>
> —Lowell Sumner, 1985

For Marshall (1956), a condition central to wilderness was "its entire freedom from the manifestation of human will" (p. xxxii). That essentially defines "untrammeled," a word he used repeatedly and which became a key descriptor in the Wilderness Act. Olaus Murie (1961) described the campaign to establish the refuge as the "basic effort to save a part of nature, as evolution has produced it" (p. 2). Justice William O. Douglas (1960) wrote that the refuge "must forever remain...where the ancient ecological balance provided by nature is maintained" (p. 30).

In the popular literature, Brower's account of traversing the refuge describes him pondering "connections to the beginnings of life that wilderness has so far preserved." He asks, "Do we really want to repudiate the evolutionary force?" (p. 14). Milton (1969) expresses the hope that "man continues to have the good sense to allow some of the earth to go its own way" (p. 63).

Common across all co-researchers' accounts is the notion that *wildness*, often held just at the edge of conscious awareness, is the characteristic that sets the refuge experience apart from others. It deepens solitude.

Interestingly, co-researchers don't think to include wildness when asked to list trip attributes. Yet it seems present, if only in the back of their minds. School teacher Frank Keim, for example, compares two trips he did one summer, one on the Forty-Mile River and one in the Arctic Refuge. His float trip was as scenic and adventurous as his refuge hike, but an unseen difference between the two areas substantially affected his perception and experience of them. As part of a predator control program, wolves had been captured, sterilized, and released in the Forty-Mile area. While natural numbers of wolves still inhabited the area, "knowing part of this place had been manipulated for human ends bothered me," he said. " I never could forget it." Reflecting on this in the refuge a few weeks later, he came to the realization that "wildness subconsciously does something for me."

Likewise, Siglin compares his trips in the refuge to those in Grand Teton Park, which he says has far more spectacular scenery. But he knows the park is neither as ecologically intact

photos: US Fish and Wildlife Service

nor as free of human intentionality. Thus, in comparison with the Brooks Range, he says, "Teton Park has preserved the body of wilderness, but not the soul."

5. The Arctic Refuge provides a connection to the natural world and our species' evolutionary past.

> *Before discussing the Arctic Range in detail, let me first consider how it happens that we want wild country. We came by this urge through evolution.*
>
> —Olaus Murie, 1961

Murie echoed ideas that were often expressed by Marshall and Leopold about the re-experience of ancient influences that once surrounded and formed us as a species. Such sentiments continue to resonate through refuge writings and interviews.

While crossing the Romanzof Mountains, Milton (1969) pondered the importance of wild places where one "can relearn what he is and where he came from" (p. 63). Wright (1973) tells readers that wilderness needs to be preserved "as a laboratory in human values...a place where man discovers firsthand the kinships, harmonious interdependencies, the essential connections of all life systems" (p. 135). Brower (1970) fears the loss of "those unbroken, living connections to the beginning of life that the wilderness has so far preserved" (p. 14). Hiking across the refuge's coastal plain, Miller (1990) experienced "an overwhelming sense that we have been thrown back to a more primitive age" (p. 4).

Keim describes how when he is "out long enough to feel like I'm just part of the country" (flow experience), he senses being "back in touch...with where I came from and where I'm going." Interviews suggest that as with many wilderness meanings, this connection more often enters awareness retrospectively. "Out there it's more of a feeling than a subject of thought," Keim says. His wilderness trips provide contextual images through which he later interprets the messages of his conservation readings and connects them to his life.

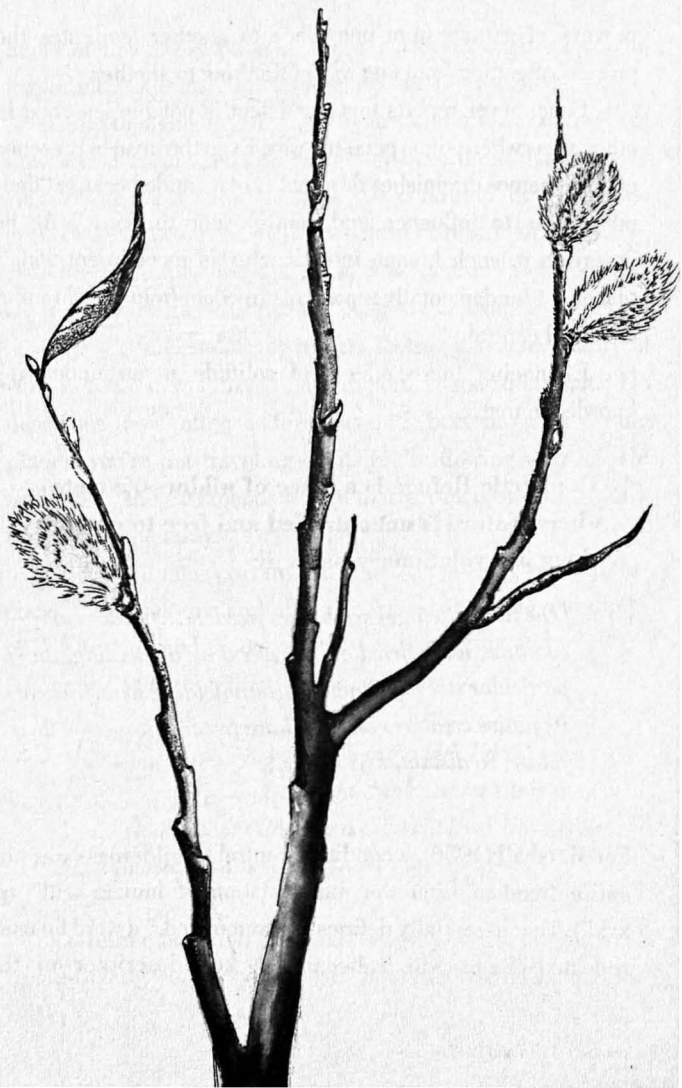
Hunting guide Sandy Jamison describes the "primal sense of hunting" as what distinguishes his hunts in the refuge from those in non-wilderness areas. Like all the co-researchers, he recalls certain memorable experiences that summarize or encapsulate what is special about this wilderness. For him, it was sitting on a hilltop watching for caribou—"a time machine experience that can transport you back in time before the world was altered." Sensing the outside world loosening its grip on him, Jamison said, "I felt a part of that mysterious force that moves the caribou. For those few days of my life, I was a part of the natural order of things."

6. The Arctic Refuge is a place to approach and experience humility.

> *A poetic appreciation of life, combined with a knowledge of nature, creates humility, which in turn becomes the greatness in man.*
>
> —Olaus Murie, 1973

Immersion in the refuge wilderness often expands perception. Co-researchers report that they can see themselves in proportion to something they perceive to be greater than modern society and its creations. This meaning is often manifest in the "diminutive effect" of feeling enveloped by vast or monumental surroundings. As expressed by Marshall (1956): "As I walked for hours beneath the stupendous grandeur of these colossal mountains, I felt humble and insignificant" (p. 22).

The refuge invites comparison of the human life span with geologic time. Miller (1990), for example, describes how "The vastness of the surrounding arctic landscape makes me feel like an insignificant speck of human life, and these rocks place humans entirely off the geologic time chart" (p. 217).



This meaning is also manifest as a broadening of identity, seeing oneself less as one of a dominant species than as a small part of a greater community of life. As expressed by Douglas (1960): "Here [a person] can experience a new reverence for life that is outside his own and yet a vital and joyous part of it" (p. 31).

Evidence of such feelings has been found in the experiences of all co-researchers, yet none reports seeking them. Humility seems to be an emergent quality which arises quietly, stimulated by immersion in natural conditions and a non-manipulative *relationship* with nature.

Echelmeyer provides examples of how these feelings are lessened in the presence of technology, because "technology is about changing things, not accepting things as they are in nature." He no longer carries a firearm for bear protection because "a gun puts you *in control* of the bear, above it...you lose that sense of vulnerability and alertness...the feeling of smallness."

Keim experiences "a personal paradigm shift" in which he feels humbled, yet at the same time empowered, by the realization that "we are a part of something that's much greater than us." It is a realization that "just doesn't come to you in normal life."

7. The Arctic Refuge is a place of intrinsic value.

> *Wilderness itself...does it have a right to live? Do we have enough reverence for life to concede this right?*
>
> —Margaret Murie, 1957

Just knowing this place exists. This is the value of wilderness the renowned ecologist and refuge supporter F. Fraser Darling described as "something we gain from its great function of being." However, the meaning is also represented by the Leopoldian notion that Nature can have worth in itself, not contingent upon any human benefit.

Milton, for example, says the refuge "should be left alone to continue its age-old cycles of life and season." He describes the popular reasons for preserving wilderness, such as recreation, as secondary values of the refuge. "But that is not the purpose of this place," he writes. "It's purpose is to *be*. Man's role should be...let it be" (p. 105). Similarly, during his trip, Brower (1970) realizes that wilderness should be left "to serve its highest purpose—being there for itself and its indigenous life forms" (p. 14).

Co-researchers express similar sentiments. Keim, for example, expresses strong disagreement with the idea that the refuge should be managed to provide human benefits. He advocates placing some large portion of the refuge off-limits to all human use as "a gesture of respect for uncontrolled nature." During his trips, he says there's a "background voice" reminding him "you're just a guest up here...a completely and totally privileged guest."

8. The Arctic Refuge is a bequest to the future.

> *I feel so sure that, if we are big enough to save this bit of loveliness on our earth, the future citizens of Alaska and of all the world will be deeply grateful. This is a time for a long look ahead.*
>
> —Margaret Murie, 1959

"Future generations" is a phrase often connected to the Arctic Refuge and a concern related to most other meanings. It is often expressed as a moral obligation to provide future generations the experiential and non-use benefits the refuge provides. As Brower (1970) expressed it, we must "find the grace to leave the arctic as we found it...for the next people to pass that way" (p. 181).

Olaus Murie (1961) sought to "let people of the future have a little opportunity to go to the wilderness to have the inspiration that comes with the frontier" (p. 68). Murie also foresaw the future scientific value of the refuge, emphasizing that it "should be kept for basic scientific study, for observation, as a help to us for our understanding of the natural processes in the universe" (p. 65). Virginia Wood (1959) advocated that the refuge should be preserved as a standard of reference for future change, "a natural laboratory where biologists of today and the future can study to find the answers to the recurring question: What was the natural order before man changed it?" (p. 135)

Miller (1990), who dedicated her book to her young daughters "and future generations of wilderness seekers," notes that bequest value becomes an increasingly important aspect of the refuge as she matures. She believes that the refuge provides critical habitat for endangered experiences—experiences that should be the right of every generation. Like other co-researchers, she tends to use the word *timeless* in relation to bequest value, explaining that the concept of timelessness connects our generation with those of the past and future.

9. The Arctic Refuge is a place of restraint.

> *...this attitude of consideration, and reverence, is an integral part of an attitude toward life, toward the unspoiled, still evocative places on our planet. If man does not destroy himself through his idolatry of the machine, he may learn one day to step gently on this earth.*
>
> —Margaret Murie, 1957

This meaning is largely expressed as the boundaries of the Arctic Refuge symbolizing the boundaries our society is able to place on development and the use of technology. With Leopold, Marshall (1933, 1956) disparaged mechanized access to wilderness, less because of physical impacts than because of the impact he believed the presence of technology had on a person's way of thinking, the feeling of isolation and unknown it dispels, and the sense of dominance it conveys.

Similarly, Wright (1973) describes her repulsion in encountering a helicopter west of the refuge boundary. She says it was not the "screaming whine" of the helicopter that bothered her as much as the machine as "a symbol of human choices." "It is the values guiding those who decide what use to make of this supercraft, this symbol of the incredible power and accomplishment of our technology, that disturbs me..." (p. 221).

The use of snowmachines in the refuge (allowed by the Alaska National Interest Lands Conservation Act) disturbs Siglin as well. "They contradict the idea of wilderness." Yet while Siglin believes they should be prohibited in all Wilderness, he has used them in the refuge. In fact, contradictions are acknowledged by all co-researchers, and they illustrate an important point: As do systems of religious belief, this wilderness ideal often includes inconsistencies. As with religious belief, the wilderness ideal is not a linear system of logic. Its function as a framework for perception and experience and as a guide to behavior is, like the Lutheran or Catholic's faith, accompanied by an occasional discrepancy. Inconsistencies are a reminder that the set of meanings that form this wilderness ideal are, foremost, a human construct.

But one need not backpack or float through the refuge to embrace the notion that it is a place of restraint. Countless Americans who will never visit have campaigned to prevent oil development in the refuge. Their testimony expresses the idea that our society's willingness to forgo oil-dollars here symbolizes an encouraging capacity to limit ourselves—an ability they believe essential if we are to learn to live within the finite ecological limits of the Earth.

A distinctive feature of the Arctic Refuge is that leaving this wilderness untouched requires the sacrifice of millions, perhaps billions, of barrels of oil. Sacrifice, as economist Robert Nelson (1997) has noted, has historically been a component of religious belief systems, deepening their meaning and serving as an expression of commitment. Thus, he characterizes the Arctic Refuge as "a symbol signifying the willingness of society...to preserve a multi-billion-dollar cathedral." That sacrifice, he says, stands as "one of the greatest...testimonies ever made to the glory of the [wilderness] faith" (p. 9).

10. The Arctic Refuge is a sacred place.

> *. . . this last American living wilderness must remain sacrosanct.*
>
> —Justice William O. Douglas, 1960

Douglas's writings echo the recurring sentiment that this place connects people to—allows them to participate in—something they perceive to be of a more timeless and universal significance than modern society and its creations. As such, the Arctic Refuge is among the world's landscapes that, across cultures and across time, have served humanity as a sacred place.

For some, this sacredness is a religious connection, as wilderness was John Muir's mirror reflecting the creator. But in fact, none of the co-researchers are followers of a doctrinaire religion. They perceive sacredness in the more secular, transcultural sense of the concept, described by anthropologist Emile Durkheim as *that which is set apart as the embodiment of ideals* (Pickering 1975). For the refuge founders, that ideal was largely rooted in the creative process of evolution that links humans to the natural world and all other life forms. Thus, for Olaus Murie (1961), the campaign to establish the Arctic Refuge was "this basic effort to save part of nature, as evolution has produced it" (p. 2). The refuge was to remain "a little portion of our planet left alone" (p. 4). As Lowell Sumner (1985) expressed it, the refuge was to be a landscape where people of the present and future can

> *be inspired, and understand a little of the majestic story of evolution, but also where we can learn to appreciate and respect the intricate and inscrutable unfolding of Earth's destiny.* (p. 2)

Hunter Sandy Jamison describes his refuge experiences as a connection to "what it is that nurtured us and brought us to who we are and where we are." Unaltered, wild country is where we are most likely "to learn things about ourselves and our relationship to the planet." He believes humans have an inherent "yearning to connect to something beyond your life and lifetime." "That's what people want out of religion," he says. "It's what I find in wild country with wild animals."

Geophysicist Keith Echelmeyer considers the refuge a sacred place "in the sense that people should not be in control here, not above the land and animals." He believes the greatest benefit of his experiences occur from the sense of humility that emerges: "knowing you're not in charge...flowing with the land as the animals flow with it...being one with where you are." "Reverence" and "respect," Echelmeyer says, frame his attitude toward the refuge.

For teacher Frank Keim, the refuge is a medium through which our evolutionary continuity with the natural world is most apprehensible. His trips "bring it home to you that we're not the purpose of it all...it puts me back in touch with where I came from, where I'm going." He says he becomes "more little, but deeper as a person" when surrounded by "the ultimate processes and conditions we evolved from." "To experience that," he says, "is among the highest values of this place."

Conclusion

The Arctic Refuge has become a condensation symbol, summarizing and evoking an array of experiential and symbolic meanings. This fact is not, of course, a decisive argument against development, new technologies, or other potential changes. Rather, the components of this system of meaning are only some among many public values that need to be considered in developing policy on where—or whether—to draw the line on such actions here. Two premises underlie this inquiry: 1) Public policy is best served when the full spectrum of both the benefits and the costs of an action are considered, and 2) Wilderness often receives less than fair consideration because the measurement and comparison of environmental costs and benefits are carried out within a dominant decision-making paradigm often insensitive to core wilderness values. The economic and other benefits of actions that impact wilderness values have been well represented. What is needed is a more equitable understanding and consideration of those "intangible resources" Olaus Murie spoke for that may be diminished or lost. ☾

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Book Reviews

Reviewed in this issue

The Science of Conservation Planning:

Habitat Conservation Under the Endangered Species Act

by Reed F. Noss, Michael A. O'Connell, and Dennis D. Murphy; Island Press (1718 Connecticut Ave. NW, Washington, DC 20009); 1997; $25 paper; 246 pp.

The Science of Conservation Planning is the consummate handbook for scientists, environmental planners, and activists looking for a concise treatment of conservation biology's role in the design of regional reserves and habitat conservation plans. The product of three of the nation's leading conservation biologists, this up-to-date volume provides process, framework, and clear guidelines for applying modern conservation science to plans for regional habitat protection. The reader is treated to a brief history of habitat-based conservation plans, their principles, and the criteria for assessing the adequacy of such plans. The range of topics, integration of disciplines, and landscape-scale approach makes this a good text not only for conservation and environmental planning curricula, but also for resource policy classes wrestling with the challenge of maintaining biodiversity and ecosystem processes on which all life and economies depend.

This book offers critical assessments of current needs, informed by the authors' decades of trench-hardened experience. The chapters are laced with useful, highly digestible graphics and flow diagrams, with case histories ranging from Florida scrub communities to fire and dam issues in the West. Solid suggestions are proposed on how scientists may contribute to crucial management issues without falling into the advocacy of individual values—a discussion that many academics might find startling and satisfying. The authors provide refreshing critiques of some naive conservation concepts, and cogent arguments against setting aside small untouched areas, lest the scale of disturbance erase them. I also appreciated the call for large undisturbed sites to act as scientific controls and provide benchmark data. Here in the Denial-land of multiple use, that proposition is refreshing.

Although this book has been available for over a year, its relevance is undiminished, so fresh are the insights of the authors. As though to emphasize that point, *Bioscience*'s recent Policy Forum (November 1999) reports on habitat conservation plans by Karieva, Regetz, and Doak; the contributions of Noss et al. to the debate about large-scale plans were clearly evident.

I would have liked to have seen more recognition of the importance of large intact systems to long-term nutrient cycling and other "ecosystem services" on which our civilization depends—for example, recognizing that intact temperate rainforests have always been "working forests" and the liquidation of those "resources" is disassembling the factory at a larger temporal and spatial scale.

As the plight of species isolated in smaller and smaller tracts continues, one of the biggest hurdles for conserving regional-scale, multi-ecosystem reserves is the gulf between the committed campaigners and their access to the storehouse of conservation science literature. As Steve Gatewood commented in these pages two years ago: "Good science is essential to the process. A well-documented technical foundation is the best defense against high paid biostitutes representing the opposition." A manual to meet these needs is at hand.

Every section of this book delivers crucial intelligence. It will not disappoint.

Reviewed by **BARRIE GILBERT**, *who teaches in the Conservation Biology Program at Utah State University, Logan*

God's Last Offer:
Negotiating for a Sustainable Future

by Ed Ayres; Four Walls Eight Windows (39 West 14th St., Rm. 503, New York, NY 10011); 1999; $22 hardcover; 357 pp.

In the excellent tradition of World Watch Institute's *State of the World* reports, Ed Ayres, editor of *World Watch* magazine, has written a big picture analysis of our global malaise that is both easy to understand and very, very compelling. *God's Last Offer* may be the first truly "millennial" book of the new era. Ayres's book is notable because not only does he give us up-to-date information on what he calls the four "spikes" that endanger humanity and living Nature (population growth, consumption, global warming, and extinction), but he also exposes the problem of synergy. When these four horsemen of the apocalypse ride together, their planetary impact is compounded. In addition, black holes in the information available to the body politic make it exceedingly difficult for the average person to see the magnitude of the looming threats and know how to counter the forces of destruction.

Ayres sees the information problem as perhaps the most critical because "few of us have thought about what to do if our biosphere should begin to fail." Indeed, we don't have a clue about how to respond because most people are completely unaware that the biosphere is failing. Ayres tells us that part of the reason that we cannot imagine massive ecological collapse is because the truth about smaller ecological disasters is being kept from us. For instance, news coverage of the accelerating series of 100-year and 500-year floods in recent years has failed to make the connection between these catastrophic events and global climate change.

One key to correct perception of the threats we face is to see how the four spikes are connected to one another and to realize that there will be "shocks of synergy" from their interaction. An example of unexpected synergy is the recent discovery of ocean dead zones. A huge zone in the Gulf of Mexico is now devoid of all life as agricultural and industrial chemicals pouring in from the Mississippi tie up oxygen and poison the waters.

The last offer of the book's title is the chance to recognize that the future of the planet is now in human hands and to act accordingly. Ayres urges us to pay as much attention to the content of the information we consume as the content of our food. The average American family has the TV blaring 7.5 hours a day, and entertainment—sports, movies, fashion, and shopping—has become the junk food of consciousness. Creating one's reality around such trivia amounts to denial and "denial is the flipside of sentience." Reducing our consumption and connecting to our bioregions will be essential for any semblance of a healthy future. Those of us who are able to create a community around a sense of place may be better able to withstand the food and water shortages, pandemics, floods and droughts, and social disruption that are on the horizon as global ecosystems degrade exponentially. *God's Last Offer* is not for the faint of heart. Yet heart and the courage to proceed with eyes wide open are what can—perhaps—finally save us.

Reviewed by **KELPIE WILSON**, *executive director of the Siskiyou Project in Cave Junction, Oregon*

illustration by Tim Yearington

Blue Ridge 2020:
An Owner's Manual

by Steve Nash; University of North Carolina Press (PO Box 2288, Chapel Hill, NC 27515-2288); 1999; $19.95 paper; 223 pp.; color plates, maps, tables, endnotes, index.

The Blue Ridge Mountains, covering 17,000 square miles from Pennsylvania to Georgia, constitute a geographically and geologically distinct region of great natural richness. They are also a source of wood pulp and saw timber, a recipient of severe air pollution, and—with three National Park units and seven National Forests—the wilderness playground of the booming Southeast, both enjoyed and threatened by the prosperous society that surrounds them. Steve Nash, an environmental journalist and associate professor of journalism at the University of Richmond, has written a book unique in its focus on the possible future of this paradoxical paradise within a specific time period. What will happen to the natural systems of the Blue Ridge, he asks, over the next two decades?

In his search for answers Nash combines scholarly research with a typically journalistic use of interviews, a marriage that yields a rich variety of data and opinion. Eleven chapters outline such agents of change as exotic species, airborne pollutants, and development pressures, in terms both qualitative and statistical. Along the way Nash scatters 21 self-contained sidebars called "Solutions," which present possible antidotes to the ruin predicted in the main text. These range from pollution controls to "smart growth" zoning, but many share the all-too-familiar conjunction of technical feasibility with political and social difficulty.

Nash deliberately avoids information from environmentalists and industry, relying instead on what he believes to be the more impartial evidence supplied by government and academia. This may seem a dubious preference to those of us who have seen how much less than impartial those sources can be. But anyone fearing an optimistic prognosis will be pleasantly surprised, if there is any pleasure in having one's grimmest visions confirmed. The material Nash gathers speaks warningly for itself, and his own sympathies with the cause of conservation are clear. "The natural systems of the mountains," he writes, "are of critical importance to us, and in their own right. We can afford to sustain them; we can't afford not to."

Blue Ridge 2020 will serve the resident, visitor, and student of the Blue Ridge as a compendium of easily accessed information on the region. It may also stand as a model for similar reviews of knowledge about local ecosystems. Perhaps most important, it can point the way toward the use of projections about the future as guides to responsible action in the present.

Reviewed by **JAY KARDAN**, *writer and conservation activist, Palmyra, Virginia*

Nature Lover's *Library*

Recently published books that may be of interest to conservationists

The Charged Border: Where Whales and Humans Meet by Jim Nollman. 1999. Henry Holt and Company, New York, NY. 249 pp. $25.

The Dawn of Conservation Diplomacy: US-Canadian Wildlife Protection Treaties in the Progressive Era by Kurkpatrick Dorsey. 1998. University of Washington Press, Seattle. 328 pp. $35.

Ecology: A Pocket Guide by Ernest Callenbach. 1998. University of California Press, Berkeley. 154 pp. $9.95.

Frogs: A Wildlife Handbook by Kim Long. 1999. Johnson Books, Boulder, Colorado. 192 pp. $15.95.

A Golden State: Mining and Economic Development in Gold Rush California edited by James J. Rawls and Richard J. Orsi. 1999. University of California Press, Berkeley. 325 pp. $50.

Green Culture: Environmental Rhetoric in Contemporary America edited by Carl G. Herndl and Stuart C. Brown. 1996. University of Wisconsin Press, Madison. 315 pp.

Green Volunteers: The World Guide to Voluntary Work in Nature Conservation edited by Fabio Ausenda. 1999. Green Volunteers, Milano, Italy. 250 pp. $19.95.

An Invitation to Environmental Philosophy edited by Anthony Weston. 1999. Oxford University Press, New York, NY. 196 pp. $14.95.

Mountain Sheep of North America edited by Raul Valdez and Paul R. Krausman. 1999. University of Arizona Press, Tucson. 353 pp. $55.

The Pheasants of the World: Biology and Natural History, Second Edition by Paul A. Johnsgard. 1999. Smithsonian Institution Press, Washington, DC. 398 pp. $50.

Practical Approaches to the Conservation of Biological Diversity edited by Richard K. Baydack, Henry Campa III, and Jonathan B. Haufler. 1999. Island Press, Washington, DC. 320 pp. $35.

The Salt House: A Summer on the Dunes of Cape Cod by Cynthia Huntington. 1999. University Press of New England, Hanover, NH. 224 pp. $22.95.

Sunrise to Paradise: The Story of Mount Rainer National Park by Ruth Kirk. 1999. University of Washington Press, Seattle. 152 pp. $40.

Uphill Against Water: The Great Dakota Water War by Peter Carrels. 1999. University of Nebraska Press, Lincoln. 247 pp. $25.

The Way to the Salt Marsh: A John Hay Reader edited by Christopher Merrill. 1998. University Press of New England, Hanover, NH. 256 pp. $15.95.

Whales of the West Coast by David A.E. Spalding. 1998. Harbour Publishing, British Columbia, Canada. 211 pp. $18.95.

Wildflowers of the Eastern United States by Wilbur H. Duncan and Marion B. Duncan. 1999. University of Georgia Press, Athens. 380 pp. $29.95.

illustration by Tim Yearington

California Wilderness Conference 2000

The California Wilderness Coalition, along with the Sierra Club, The Wilderness Society, and numerous state organizations, is sponsoring a conference to build support for the effort to designate additional Wilderness throughout California. The gathering of activists, scientists, artists, and policy-makers will be held from May 5–7, 2000 at California State University Sacramento. Highlights will include presentations by Dave Foreman, Gary Snyder, and Doug Scott and workshops on grassroots organizing, land management issues, and conservation strategies. For information or to get involved, contact Bob Schneider, Verve Enterprises/CWC, 2402 Westernesse Rd., Davis, CA 95616; 530-304-6215; fax 530-758-4391; verve@dcn.davis.ca.us.

Carnivores 2000

Defenders of Wildlife's third national conference will be held in Denver, Colorado from November 12–15, 2000 at the Omni Interlocken Resort Hotel. "Carnivores 2000" will focus on predator biology and conservation in the 21st century. Submit proposals for 1½-hour sessions by February 29, 2000; submit paper and poster proposals by March 30. For more information or a brochure, contact Heather Pellet, Defenders of Wildlife, 1001 14th St., NW, Suite 1400, Washington, DC 20005; 202-789-2844 ext. 315; carnivores2000@defenders.org.

Northwest Wilderness Conference

The Wilderness Society, Washington Wilderness Coalition, and other organizations are sponsoring the Northwest Wilderness & Parks Conference (NWWPC) from March 31–April 2, 2000. The event will be held at The Mountaineers Building in Seattle. For information contact NWWPC, 12730 9th Ave. NW, Seattle, WA 98177; nwwpc@speakeasy.org; www.speakeasy.org/~nwwpc.

Wolf Conference

The International Wolf Center and University of Minnesota Duluth University College will host "Wolves: A Global Symposium" on February 23–26, 2000 in Duluth, MN. The gathering of wolf advocates, agency personnel, biologists, and NGOs will feature presentations by scientists from around the world on wolf recovery and management. For information, contact International Wolf Symposium, UMD—University College, 251 Darland, 10 University Drive, Duluth, MN 55812; 218-726-6819; merickso@d.umn.edu.

SCB Meeting

The Annual Meeting of the Society for Conservation Biology will be held from June 9–12, 2000 at the University of Montana, Missoula. Contact Fred Allendorf (darwin@selway.umt.edu) or Dan Pletscher (pletsch@forestry.umt.edu) or visit www.umt.edu/scb2000/ for information.

New volume of Nature Literary Series available

Into the Field: A Guide to Locally Focused Teaching offers ideas for educators with essays by Clare Walker Leslie, John Tallmadge, and Tom Wessels. This third volume in the Orion Society's Nature Literary Series is available ($10 postage paid) from the Orion Society at 195 Main St., Great Barrington, MA 01230; 888-909-6568; www.orionsociety.org.

Land Air Water: Environmental Law Society

The Environmental Law Society at the University of Oregon School of Law presents the 18th Annual Public Interest Environmental Law Conference, "Six Billion Downstream," from March 2–5, 2000, at the new William Knight Law School on the University of Oregon campus. Contact the School of Law at L-A-W@law.uoregon.edu; www.pielc.uoregon.edu/.

Environment and Community Conference

The Center for Environmental Arts and Humanities at the University of Nevada, Reno will sponsor the North American Interdisciplinary Conference on Environment and Community from February 10–12, 2000. Registration is $40 for students; $60 for nonstudents. For information contact Corey Lewis or Scott Slovic at 775-784-8015; corey@scs.unr.edu; slovic@unr.edu.

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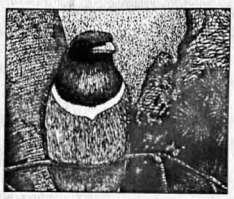

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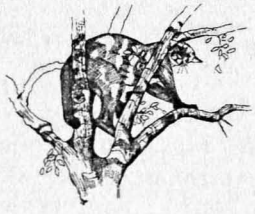

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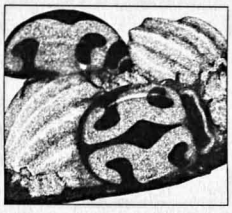

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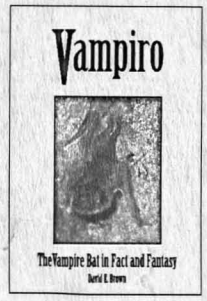

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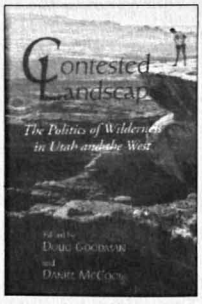

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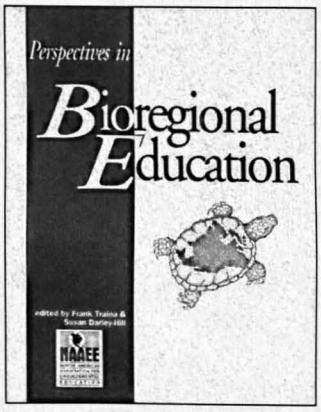

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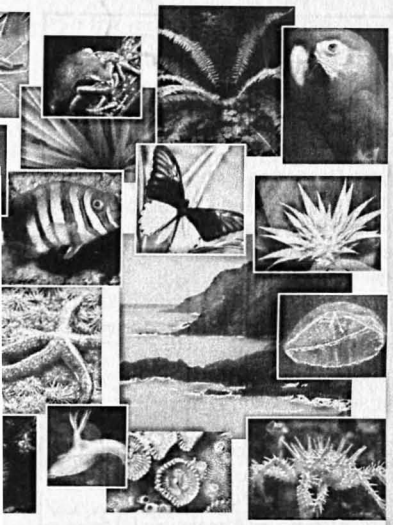

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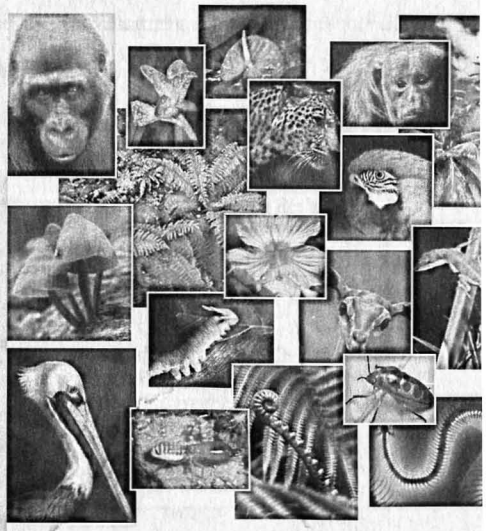

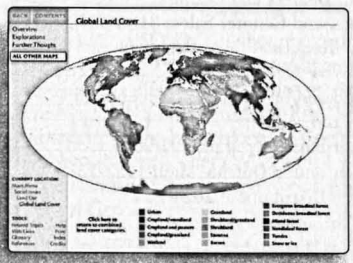

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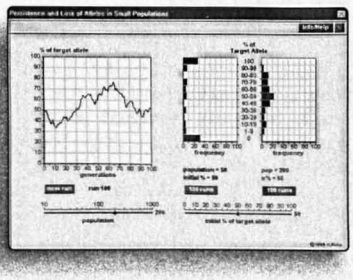

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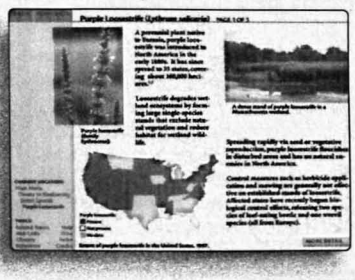

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Edward O. Wilson is University Professor Emeritus at Harvard University. Arguably the most important evolutionary biologist of his time, he has made seminal contributions to the study of evolution and ecology, created the field of sociobiology, and was one of the earliest voices to speak out about biodiversity loss. Among his books are *The Diversity of Life* (Harvard, 1992), *Naturalist* (Island Press, 1994), *In Search of Nature* (Island Press, 1996) and *Consilience* (Knopf, 1998).

Dan L. Perlman has taught conservation biology at Harvard University for nine years, in addition to teaching all ages from preschool to post-graduate education for college professors and professionals. He has designed curricula, co-authored with Glenn Adelson the textbook *Biodiversity: Exploring Values and Priorities in Conservation* (Blackwell, 1997) and is a nature photographer and former systems analyst.

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Publication: Wild Earth
Publication No.: 1055-1166
Date of Filing: 9/14/99
Frequency: Quarterly
No. of issues published annually: 4
Annual subscription price: $25
Mailing address of publication: P.O. Box 455, Richmond, VT 05477
Editor: Tom Butler
Owner: The Cenozoic Society, Inc. (a non-profit corporation)
Bondholders and Mortgages: none
The purpose, non-profit status, and exempt status for Federal income tax purposes has not changed in the preceding 12 months.
Avg. preceding yr./Actual no. nearest filing
Total No. copies: 9500/9500
Paid and/or Requested Circulation: (1) Sales through Dealers and Carriers, Street Vendors, and Counter Sales: 3164/3370; (2) Paid or Requested Mail Subscriptions: 3743/3784
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BACK ISSUES

1/Spring 1991 • Ecological Foundations for Big Wilderness, Howie Wolke on The Impoverished Landscape, Reed Noss on Florida Ecosystem Restoration, Biodiversity & Corridors in Klamath Mtns., Earth First! Wilderness Preserve System, GYE Marshall Plan, Dolores LaChapelle on Wild Humans, and Bill McCormick's Is Population Control Genocide?

2/Summer 1991 • Dave Foreman on the New Conservation Movement, Ancient Forests: The Perpetual Crisis, Wolke on The Wild Rockies, Grizzly Hunting in Montana, Noss on What Wilderness Can Do for Biodiversity, Mendocino NF Reserve Proposal, Christopher Manes on the Cenozoic Era, and Part 2 of McCormick's Is Population Control Genocide?

3/Fall 1991 • SOLD OUT (but photocopies of articles available). The New Conservation Movement continued. Farley Mowat on James Bay, George Washington National Forest, the Red Wolf, George Wuerthner on the Yellowstone Elk Controversy, The Problems of Post Modern Wilderness by Michael P. Cohen and Part 3 of McCormick's Is Population Control Genocide?

4/Winter 1991/92 • Devastation in the North, Rod Nash on Island Civilization, North American Wilderness Recovery Strategy, Wilderness in Canada, Canadian National Parks, Hidden Costs of Natural Gas Development, A View of James Bay from Quebec, Noss on Biologists and Biophiles, BLM Wilderness in AZ, Wilderness Around the Finger Lakes: A Vision, National ORV Task Force

5/Spring 1992 • Foreman on ranching, Ecological Costs of Livestock, Wuerthner on Gunning Down Bison, Mollie Matteson on Devotion to Trout and Habitat, Walden, The Northeast Kingdom, Southern Rockies Ecosystem Protection, Conservation is Good Work by Wendell Berry, Representing the Lives of Plants and Animals by Gary Paul Nabhan, and The Reinvention of the American Frontier by Frank and Deborah Popper

6/Summer 1992 • The Need for Politically Active Biologists, US Endangered Species Crisis Primer, Wuerthner on Forest Health, Ancient Forest Legislation Dialogue, Toward Realistic Appeals and Lawsuits, Naomi Rachel on Civil Disobedience, Victor Rozek on The Cost of Compromise, The Practical Relevance of Deep Ecology, and An Ecofeminist's Quandary

7/Fall 1992 • How to Save the Nationals, The Backlash Against the ESA, Saving Grandfather Mountain, Conserving Diversity in the 20th Century, Southern California Biodiversity, Old Growth in the Adirondacks, Practicing Bioregionalism, Biodiversity Conservation Areas in AZ and NM, Big Bend Ecosystem Proposal, George Sessions on Radical Environmentalism in the 90s, Max Oelschlaeger on Mountains that Walk, and Mollie Matteson on The Dignity of Wild Things

8/Winter 1992/93 • Critique of Patriarchal Management, Mary O'Brien's Risk Assessment in the Northern Rockies, Is it Un-Biocentric to Manage?, Reef Ecosystems and Resources, Grassroots Resistance in Developing Nations, Wuerthner's Greater Desert Wildlands Proposal, Wolke on Bad Science, Homo Carcinomicus, Natural Law and Human Population Growth, Excerpts from *Tracking & the Art of Seeing* and *Ghost Bears*

Wildlands Project Special Issue #1 • TWP (North American Wilderness Recovery Strategy) Mission Statement, Noss's Wildlands Conservation Strategy, Foreman on Developing a Regional Wilderness Recovery Plan, Primeval Adirondacks, Southern Appalachians Proposal, National Roadless Area Map, NREPA, Gary Snyder's Coming into the Watershed, Regenerating Scotland's Caledonian Forest, Geographic Information Systems

9/Spring 1993 • The Unpredictable as a Source of Hope, Why Glenn Parton is a Primitivist, Hydro-Quebec Construction Continues, RESTORE: The North Woods, Temperate Forest Networks, The Mitigation Scam, Bill McKibben's Proposal for a Park Without Fences, Arne Naess on the Breadth and Limits of the Deep Ecology Movement, Mary de La Valette says Malthus Was Right, Noss's Preliminary Biodiversity Plan for the Oregon Coast, Eco-Porn and the Manipulation of Desire

10/Summer 1993 • Greg McNamee questions Arizona's Floating Desert, Foreman on Eastern Forest Recovery, Is Ozone Affecting our Forests?, Wolke on the Greater Salmon/Selway Project, Deep Ecology in the Former Soviet Union, Topophilia, Ray Vaughan and Nedd Mudd advocate Alabama Wildlands, Incorporating Bear, The Presence of the Absence of Nature, Facing the Immigration Issue

11/Fall 1993 • Crawling by Gary Snyder, Dave Willis challenges handicapped access developments, Biodiversity in the Selkirk Mtns., Monocultures Worth Preserving, Partial Solutions to Road Impacts, Kittatinny Raptor Corridor, Changing State Forestry Laws, Wild & Scenic Rivers Act, Wuerthner Envisions Wildland Restoration, Toward [Population] Policy That Does Least Harm, Dolores LaChappelle's Rhizome Connection

12/Winter 1993/94 • A Plea for Biological Honesty, A Plea for Political Honesty, Endangered Invertebrates and How to Worry About Them, Faith Thompson Campbell on Exotic Pests of American Forests, Mitch Lansky on The Northern Forest, Human Fear Diminishes Diversity in Rocky Mtn. Forests, Gonzo Law #2: The Freedom of Information Act, Foreman on NREPA and the Evolving Wilderness Area Model, Rocky Mtn. Nat. Park Reserve Proposal, Harvey Locke on Yellowstone to Yukon campaign

13/Spring 1994 • Ed Abbey posthumously decries The Enemy, David Clarke Burks's Place of the Wild, Ecosystem Mismanagement in Southern Appalachia, Mohawk Park Proposal, RESTORE vs. Whole-Tree Logging, Noss & Cooperrider on Saving Aquatic Biodiversity, Atlantic Canada Regional Report, Paul Watson on Neptune's Navy, The Restoration Alternative, Intercontinental Forest Defense, Chris McGrory-Klyza outlines Lessons from Vermont Wilderness

14/Summer 1994 • Bil Alverson's Habitat Island of Dr. Moreau, Bob Leverett's Eastern Old Growth Definitional Dilemma, Wolke against Butchering the Big Wild, FWS Experiments on Endangered Species, Serpentine Biodiversity, Andy Kerr promotes Hemp to Save the Forests, Mapping the Terrain of Hope, A Walk Down Camp Branch by Wendell Berry, Carrying Capacity and the Death of a Culture by William Catton Jr., Industrial Culture vs. Trout

15/Fall 1994 • BC Raincoast Wilderness, Algoma Highlands, Helping Protect Canada's Forests, Central Appalachian Forests Activist Guide, Reconsidering Fish Stocking of High Wilderness Lakes, Using General Land Office Survey Notes in Ecosystem Mapping, Gonzo Law #4: Finding Your Own Lawyer, The Role of Radio in Spreading the Biodiversity Message, Jamie Sayen and Rudy Engholm's Thoreau Wilderness Proposal

16/Winter 1994/95 • Ecosystem Management Cannot Work, Great Lakes Biodiversity, Peregrine Falcons in Urban Environments, State Complicity in Wildlife Losses, How to Burn Your Favorite Forest, ROAD-RIPort #2, Recovery of the Common Lands, A Critique and Defenses of the Wilderness Idea by J. Baird Callicott, Dave Foreman, and Reed Noss

17/Spring 1995 • Christopher Manes pits Free Marketeers vs. Traditional Environmentalists, Last Chance for the Prairie Dog, interview with tracker Susan Morse, Befriending a Central Hardwood Forest part 1, Economics for the Community of Life: Part 1, Minnesota Biosphere Recovery, Michael Frome insists Wilderness Does Work, Wilderness or Biosphere Reserve: Is That a Question?, Deep Grammar by J. Baird Callicott

18/Summer 1995 • Wolke on Loss of Place, Dick Carter on Utah Wilderness: The First Decade, *WE* Reader Survey Results, Ecological Differences Between Logging and Wildfire, Bernd Heinrich on Bumblebee Ecology, Michael Soulé on the Health Implications of Global Warming, Peter Brussard on Nevada Biodiversity Initiative, Preliminary Columbia Mtns. Conservation Plan, Environmental Consequences of Having a Baby in the US

19/Fall 1995 • SOLD OUT (but photocopies of articles available). Wendell Berry on Private Property and the Common Wealth, Eastside Forest Restoration, Global Warming and The Wildlands Project, Paul J. Kalisz on Sustainable Silviculture in Eastern Hardwood Forests, Old Growth in the Catskills and Adirondacks, Threatened Eastern Old Growth, Andy Kerr on Cow Cops, Fending of SLAPPS, Using Conservation Easements to save wildlands, David Orton on Wilderness and First Nations

20/Winter 1995/96 • ***TWP Special Issue #2.*** Testimony from Terry Tempest Williams, Foreman's Wilderness: From Scenery to Strategy, Noss on Science Grounding Strategy and The Role of Endangered Ecosystems in TWP, Roz McClellan explains how Mapping Reserves Wins Commitments, Second Chance for the Northern Forest: Headwaters Proposal, Klamath/Siskiyou Biodiversity Conservation Plan, Wilderness Areas and National Parks in Wildland Proposal, ROAD-RIP and TWP, Steve Trombulak, Jim Strittholt, and Reed Noss confront Obstacles to Implementing TWP Vision

21/Spring 1996 • Bill McKibben on Finding Common Ground with Conservatives, Public Naturalization Projects, Curt Steger on Ecological Condition of Adirondack Lakes, Acid Rain in the Adirondacks, Bob Mueller on Central Appalachian Plant Distribution, Brian Tokar on Biotechnology vs. Biodiversity, Stephanie Mills on Leopold's Shack, Soulé asks Are Ecosystem Processes Enough?, Poems for the Wild Earth, Limitations of Conservation Easements, Kerr on Environmental Groups and Political Organization

22/Summer 1996 • McKibben on Text, Civility, Conservation and Community, Eastside Forest Restoration Forum, Grazing and Forest Health, debut of Landscape Stories department, Friends of the Boundary Waters Wilderness, Private Lands in Ecological Reserves, Public Institutions Twisting the Ear of Congress, Laura Westra's Ecosystem Integrity and the Fish Wars, Caribou Commons Wilderness Proposal for Manitoba

24/Winter 1996/97 • SOLD OUT (but photocopies of articles available). Opposing Wilderness Deconstruction: Gary Snyder, Dave Foreman, George Sessions, Don Waller, Michael McCloskey respond to attacks on wilderness. The Aldo Leopold Foundation, Grand Fir Mosaic, eastern old-growth report, environmental leadership. Andy Robinson on grassroots fundraising, Edward Grumbine on Using Biodiversity as a Justification for Nature Protection, Rick Bass on the Yaak Valley, Bill McCormick on Reproductive Sanity, and portrait of a Blunt-nosed Leopard Lizard

25/Spring 1997 • Perceiving the Diversity of Life: David Abram's Returning to Our Animal Senses, Stephanie Kaza on Shedding Stereotypes, Jerry Mander on Technologies of Globalization, Christopher Manes's Contact and the Solid Earth, Connie Barlow Re-Stories Biodiversity by Way of Science, Imperiled Freshwater Clams, WildWaters Project, eastern old-growth report, American Sycamore, Kathleen Dean Moore's Traveling the Logging Road, Mollie Matteson's Wolf Re-story-ation, Maxine McCloskey on Protected Areas on the High Seas

26/Summer 1997 • Doug Peacock on the Yellowstone Bison Slaughter, Reed Noss on Endangered Major Ecosystems of the United States, Dave Foreman challenges biologists, Hugh Iltis challenges abiologists, Virginia Abernethy explains How Population Growth Discourages Environmentally Sound Behavior. Gaian Ecology and Environmentalism, The Bottom Line on Option Nine, Eastern Old Growth Report, How Government Tax Subsidies Destroy Habitat, Geology in Reserve Design, part 2 of NPS Prescribed Fires in the Post-Yellowstone Era

27/Fall 1997 • SOLD OUT (but photocopies of articles available). Bill McKibben discusses Job and Wilderness, Anne LaBastille values Silence, Allen Cooperrider and David Johnston discuss Changes in the Desert, Donald Worster on The Wilderness of History, Nancy Smith on Forever Wild Easements in New England, George Wuerthner on Subdivisions and Extractive Industries, More Threatened Eastern Old Growth, part 2, the Precautionary Principle, North and South Carolina's Jocasse Gorges, Effects of Climate Change on Butterflies, the Northern Right Whale, Integrating Conservation and Community in the San Juan Mtns., Las Vegas Leopard Frog

28/Winter 1997/98 • ***Overpopulation Issue*** explores the factors of the I=PAT model: Gretchen Daily & Paul Ehrlich on Population Extinction and the Biodiversity Crisis, Stephanie Mills revisits nulliparity, Alexandra Morton on the impacts of salmon farming, Sandy Irvine punctures pro-natalist myths, William Catton Jr. on carrying capacity, Virginia Abernethy considers premodern population planning, Stephanie Kaza on affluence and the costs of consumption, Kirkpatrick Sale criticizes the Technological Imperative, McKibben addresses overpopulation One (Child) Family at a Time, Interview with Stuart Pimm, Resources for Population Publications & Overpopulation Action, Spotlight on Ebola Virus

29/Spring 1998 • Interview with David Brower, Anthony Ricciardi on the Exotic Species Problem and Freshwater Conservation, George Wuerthner explores the Myths We Live By, forum on ballot initiatives, John Clark & Alexis Lathem consider Electric Restructuring, Paul Faulstich on Geophilia, critiques of motorized wreckreation, Mitch Friedman's Earth in the Balance Sheet, Anne Woiwode on Pittman Robinson, Peter Friederici's Tracks, Eastern Old Growth, Connie Barlow's Abstainers

30/Summer 1998 • ***Wildlands Philanthropy*** tradition discussed by Robin Winks, John Davis on Private Wealth Protecting Public Values, Doug Tompkins on Philanthropy, Cultural Decadence, & Wild Nature, Sweet Water Trust saves wildlands in New England, A Time Line of Land Protection in the US, Rupert Cutler on Land Trusts and Wildlands Protection, profiles of conservation heroes Howard Zahniser, Ernie Dickerman, & Mardy Murie, Michael Frome recollects the wilderness wars, David Carle explores early conservation activism and National Parks, and Barry Lopez on The Language of Animals

31/Fall 1998 • ***Agriculture & Biodiversity*** examined by Paul Shepard, Catherine Badgley, Wes Jackson, and Frieda Knobloch, Scott Russell Sanders on Landscape and Imagination, Amy Seidl addresses exotics, Steve Trombulak on the Language of Despoilment, George Wuerthner & Andy Kerr on livestock grazing, **Rewilding** paper by Michael Soulé & Reed Noss, Gary Nabhan critiques the Terminals of Seduction, Noss asks whether conservation biology needs natural history, Y2Y part 2, profile of Dan Luten

32/Winter 1998/99 • ***A Wilderness Revival*** perspectives from Bill Meadows on the American Heart, Juri Peepre on Canada, Jamie Sayen on the Northern Appalachians, and John Elder on the edge of wilderness, Louisa Willcox on grizzlies, politics from Carl Pope, Ken Rait's Heritage Forests, Jim Jontz's Big Wilderness Legislative Strategy, Debbie Sease & Melanie Griffin's stormy political forecast, Mike Matz's Domino Theory, Wilderness campaign updates from Oregon, California, Nevada, Grand Canyon, New Mexico, Colorado, and Utah, NREPA, focal species paper by Brian Miller et al.

33/Spring 1999 • ***Coming Home to the Wild*** Flo Shepard, Paul Rezendes, Glendon Brunk, and Kelpie Wilson imagine rewilding ourselves, Paul Martin and David Burney suggest we Bring Back the Elephants! and Connie Barlow discusses Rewilding for Evolution, Freeman House on restoring salmon, John Davis on Anchoring the Millennial Ark, Chris Genovali exposes risks to Canada's Great Bear Rainforest, Madsen and Peepre on saving Yukon's rivers, Bryan Bird on roads and snags, George Wuerthner on population growth, Brock Evans uses wild language, and John Terborgh and Michael Soulé's "Why We Need Megareserves: Large-scale Networks and How to Design Them"

34/Summer 1999 • ***Carnivore Ecology and Recovery*** "The Role of Top Carnivores in Regulating Terrestrial Ecosystems" by Terborgh et al., Todd Wilkinson on the Yellowstone Grizzlies Delisting Dilemma, Wolves for Oregon, Carnivores Rewilding Texas, fire ecologist Tim Ingalsbee suggests we Learn from the Burn, David Orr continues the Not-So-Great Wilderness Debate, Tom Fleischner on Revitalizing Natural History, Jim Northup remembers Wildlands Philanthropist Joseph Battell, the Continuing Story of the American Chestnut

35/Fall 1999 • Nina Leopold Bradley, David Ehrenfeld, Terry Tempest Williams, and Curt Meine celebrate Leopold's legacy, wildlands philanthropy saves forests in Washington & California, Thomas Vale dispels the Myth of the Humanized Landscape, articles on Indigenous Knowledge and Conservation Policy in Papua New Guinea and threats to northwest Siberia's cultural & biological diversity, Janisse Ray takes us to the Land of the Longleaf, Robert Hunter Jones critiques NPS fire policy at Crater Lake, State of the Southern Rockies and the Grand Canyon Ecoregions, Sizing Up Sprawl

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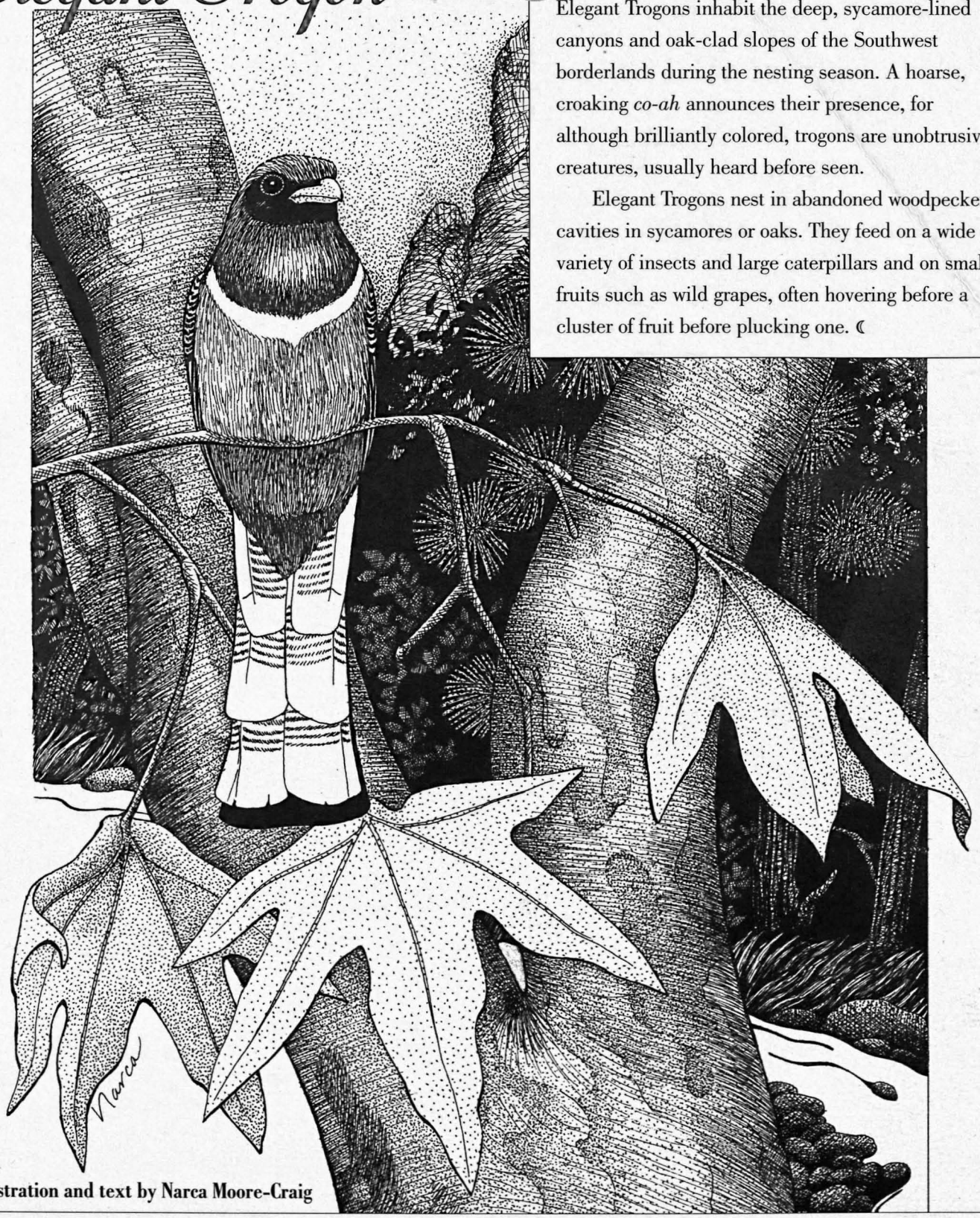

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