Wilderness

From Scenery to Nature

Dave Foreman

1995

Contents

TWO SCENES, ONLY MONTHS APART:

October 31, 1994. President Bill Clinton lifts his pen from the California Desert Protection Act and the acreage of the National Wilderness Preservation System soars to over 100 million acres, nearly half of which is outside Alaska, and the acreage of the National Park System jumps to almost 90 million acres, over one-third outside Alaska. American Wilderness Areas and National Parks—the world's finest nature reserve system—are a legacy of citizen conservationists from Barrow to Key West, of courageous federal agency employees, and of farsighted elected officials. One hundred million acres is more than I thought we would ever protect when I enlisted in the wilderness wars (and I'm far from a hoary old war-horse like Dave Brower or Ed Waybum — I've only been fighting for a quarter of a century).

February 14, 1995. *The New York Times* reports on a National Biological Service study done by three distinguished biologists. Reed Noss, editor of the widely-cited scientific journal *Conservation Biology* and one the report's authors, says, "We're not just losing single species here and there, we're losing entire assemblages of species and their habitats. "The comprehensive review shows that ecosystems covering half the area of the 48 states are endangered or threatened. The Longleaf Pine Ecosystem, for example, once the dominant vegetation of the coastal plain from Virginia to Texas and covering more than 60 million acres, remains only in dabs and scraps covering less than 2 percent of its original sprawl. Ninety-nine percent of the native grassland of California has been lost. There has been a 90 percent loss of riparian ecosystems in Arizona and New Mexico. Of the various natural ecosystem types in the United States, 58 have declined by 85 percent or more and 38 by 70 to 84 percent [See Reed's article "What Do Endangered Ecosystems Mean to The Wildlands Project?" in this issue.]

The dissonance between these two events is as jarring as chain saws in the forest, dirt bikes in the desert, the exploding of harpoons in the polar sea.

How have we lost so much while we have protected so much?

The answer Ues in the goals, arguments, and process used to establish Wilderness Areas and National Parks over the last century.

In his epochal study. *National Parks: The American Experience* (University of Nebraska Press, 1979), Alfred Runte discusses the arguments crafted to support establishment of the early National Parks. Foremost was what Runte terms *monumentalism* — the preservation of inspirational scenic grandeur like the Grand Canyon or Yosemite Valley and the protection of the curiosities of nature like Yellowstone's hot pots and geysers. Later proposals for National Parks had to measure up to the scenic quality of Mt. Rainier or Crater Lake. Even the heavily glaciated Olympic Mountains were denied National Park designation for many years because they weren't deemed up to snuff. Then, after the icy mountains were grudgingly accepted as National Park material, the National Park Service and even some conservation groups bristled over including the lush temperate rainforests of the Hoh and Quinalt valleys in the new Park, seeing them as mere trees unworthy of National Park designation. National Park status was only for the "crown jewels" of American nature, an award akin to the Congressional Medal

of Honor. If a substandard area became a National Park, it would tarnish the *idea* of National Parks as well as diminish all other National Parks. (In our slightly more enlightened age, the stupendous conifers are the most celebrated feature of Olympic National Park.)

A second argument for new National Parks, Runte explains, was based on *"worthless lands."* Areas proposed for protection, conservationists argued, were unsuitable for agriculture, mining, grazing, logging, and other make-a-buck uses. Yellowstone could be set aside because no one in his right mind would try to grow corn there; no one wanted to mine the glaciers of Mt. Rainier or log the sheer cliffs of the Grand Canyon. The worthless-lands argument often led Park advocates to agree to boundaries gerrymandered around economically valuable forests eyed by timber interests, or simply to avoid proposing timbered lands altogether. Where Parks were designated over industry objections (such as Kings Canyon National Park which was coveted as a reservoir site by Central Valley irrigators), protection prevailed only because of the dogged efforts of the Sierra Club and allied groups. Such campaigns took decades.

When the great conservationist Aldo Leopold and fellow rangers called for protecting Wilderness Areas on the National Forests in the 1920s and '30s, they adapted the monumentalism and worthless-lands arguments with success. The Forest Service's enthusiasm for Leopold's wilderness idea was, in fact, partly an attempt to head off the Park Service's raid on the more scenic chunks of the National Forests. "Why transfer this land to the Park Service?" the Forest Service asked. "We have our own system to recognize and protect the crown jewels of American scenery!" Wilderness advocates also reiterated the *utilitarian* arguments used decades earlier for land protection. The Adirondack Preserve in New York, for example, had been set aside to protect the watershed for booming New York City. The first Forest Reserves in the West had been established to protect watersheds above towns and agricultural regions. Such utilitarian arguments became standard for Wilderness Area advocacy in the twentieth century.

The most common argument for designating Wilderness Areas, though, touted their *recreational* values. Leopold, who railed against "Ford dust"in the backcountry, feared that growing automobile access to the National Forests would supplant the pioneer skills of early foresters. "Wilderness areas are first of all a series of sanctuaries for the primitive arts of wilderness travel, especially canoeing and packing," said Leopold. He defined Wilderness Areas as scenic roadless areas suitable for pack trips of two weeks' duration without crossing a road. Bob Marshall in the 1930s elaborated on the recreation arguments. Wilderness Areas were reservoirs of freedom and inspiration for those willing to hike the trails and climb the peaks. John Muir, of course, had used similar recreation arguments for the first National Parks.

In the final analysis, most areas in the National Wilderness Preservation System and the National Park System were (and are) decreed because they had friends. Conservationists know that the way to protect an area is to develop a constituency for it. We create those advocates by getting them into the area. Members of a Sierra Club group or individual hikers discover a wild place on public land. They hike the

trails, run the rivers, climb the peaks, camp near its lakes. They photograph the area and show slides to others to persuade tliem to write letters in its support. We back-country recreationists fall in love with wild places tliat appeal to our sense of natural beauty. Conservationists also know the many political compromises made in establishing boundaries by chopping off areas coveted by industry for lumber, forage, minerals, oil & gas, irrigation water, and other natural resources — "worthless" lands coming back to haunt us.

The character of the National Wilderness Preservation and National Park Systems is formed by these monumental, worthless, utilitarian, and recreational arguments. Wilderness Areas and National Parks are generally scenic, have rough terrain that prevented easy resource exploitation or lack valuable natural resources (timber and minerals especially), and are popular for non-motorized recreation.

So, in 1995, despite the protection of nearly 50 million acres of Wilderness Areas and about 30 million acres of National Parks in the United States outside of Alaska, we see true wilderness — biological diversity with integrity — in precipitous decline. In 1992, The Wildlands Project cited some of these losses in its mission statement:

- Wide-ranging, large carnivores like Grizzly Bear, Gray Wolf, Mountain Lion, Lynx, Wolverine, and Jaguar have been exterminated from many parts of their pre-European settlement ranges and are in decline elsewhere.
- Populations of many songbirds are crashing.
- Waterfowl and shorebird populations are approaching record lows.
- Native forests have been extensively cleared and degraded, leaving only remnants of most forest types — such as the grand California redwoods and the low-elevation coniferous forests of the Pacific Northwest. Forest types with significant natural acreages, such as those of the Northern Rockies, face imminent destruction.
- Tallgrass and Shortgrass Prairies, once the habitat of the most spectacular large mammal concentrations on the continent, have been almost entirely converted to agriculture or other human uses.

It is important to note, however, that *ecological integrity* has always been at least a minor goal and secondary justification in Wilderness Area and National Park advocacy. At the Sierra Club Biennial Wilderness Conferences from 1949 to 1973, scientists and others presented ecological arguments for wilderness preservation and discussed the scientific values of Wilderness Areas and National Parks. In the 1920s and 30s, the Ecological Society of America and the American Society of Mammalogists developed proposals for ecological reserves on the public lands. The eminent ecologist Victor Shelford was an early proponent of protected wildlands big enough to sustain populations of large carnivores.

Some of this country's greatest conservationists have been scientists, too. One of the many hats John Muir wore was that of a scientist. Aldo Leopold was a pioneer in the sciences of wildlife management and ecology, and argued for Wilderness Areas as ecological baselines. Bob Marshall had a Ph.D. in plant physiology. Olaus Murie, long-time president of The Wilderness Society, was an early wildlife ecologist and one of the first to defend the wolf.

Moreover, not all National Parks were protected primarily for their scenery. Mt. McKinley National Park was set aside in 1917 not for its stunning mountain but as a wildlife reserve. Everglades National Park, finally established in 1947, was specifically protected as a wilderness ecosystem. Even the Forest Service used ecosystem representation to recommend areas for Wilderness in the Second Roadless Area Review and Evaluation (RARE II) in 1977-79.

Somehow, though, professional biologists and advocates for wilderness preservation drifted apart — never far apart, but far enough so that the United States Forest Service lumped its wilderness program under the division of recreation.

That drifting apart was brought to an abrupt halt when the most important — and most depressing — scientific discovery of the twentieth century was revealed some fifteen years ago. During the 1970s, field biologists had grown increasingly alarmed at population losses in a myriad of species and by the loss of ecosystems of all kinds around the world. Tropical rainforests were falling to saw and torch. Coral reefs were dying from god knows what. Ocean fish stocks were crashing. Elephants, rhinos, Gorillas, Tigers, and other charismatic megafauna were being slaughtered. Frogs everywhere were vanishing. These staggering losses were in oceans and on the highest peaks; they were in deserts and in rivers, in tropical rainforests and Arctic tundra alike.

A few scientists — like Michael Soule, later founder of the Society for Conservation Biology, and Harvard's famed entomologist E.O. Wilson — put these disturbing anecdotes and bits of data together. They knew, through studies of the fossil record, that in the 500 million years or so of terrestrial evolution there had been five great extinction events — the hard punctuations in the equilibrium. The last occurred 65 million years ago at the end of the Cretaceous when dinosaurs became extinct. Wilson and company calculated that the current rate of extinction was one thousand to ten thousand times the background rate of extinction in the fossil record. That discovery hit with all the subtlety of an asteroid striking Earth:

RIGHT NOW, TODAY, LIFE FACES THE SIXTH GREAT EXTINCTION EVENT IN EARTH HISTORY.

The cause is just as disturbing: eating, manufacturing, traveling, warring, and breeding by five and a half billion human beings.

The crisis we face is biological meltdown.

Wilson warns that one-third of all species on Earth could become extinct in 40 years. Soulé says that the only large mammals that will be left after the turn of the century will be those we consciously choose to protect; that for all practical purposes "the evolution of new species of large vertebrates has come to a screeching halt."

That 1980 realization shook the daylights out of biology and conservation. Biology could no longer be removed from activism, if scientists wished their research subjects to survive. Conservation could no longer be about protecting outdoor museums and art galleries, and setting aside backpacking parks and open-air zoos. Biologists and conservationists began to understand that species can't be brought back from the brink of extinction one by one. Nature reserves had to protect entire ecosystems, guarding the flow and dance of evolution.

A new branch of applied biology was launched. Conservation biology, Michael Soulé declared, is a *crisis* discipline.

Conservation biologists immediately turned their attention to nature reserves. Why hadn't National Parks, Wilderness Areas, and other reserves prevented the extinction crisis? How could reserves be better designed and managed in the future to protect biological diversity? Looking back, we see that four lines of scientific inquiry led to the sort of reserve design now proposed by The Wildlands Project and our allies.

Conservation biologists first drew on an obscure comer of population biology called *island biogeography* for insights. In the 1960s, E.O. Wilson and Robert MacArthur studied colonization and extinction rates in oceanic islands like the Hawaiian chain. They hoped to devise a mathematical formula for the number of species an island can hold, based on factors such as the island's size and its distance from mainland.

They also looked at continental islands. Oceanic islands have never been connected to the continents. Hawaii, for example, is a group of volcanic peaks rising from the sea floor. Any plants or animals had to get there from somewhere else. But continental islands, like Borneo or Vancouver or Ireland, were once part of nearby continents. When the glaciers melted 10,000 years ago and the sea level rose, these high spots were cut off from the rest of the continents and became islands. Over the years, continental islands invariably lose species of plants and animals that remain on their parent continents, a process called *relaxation.* On continental islands, island biogeographers tried to develop formulas for the rate of species loss and for future colonization, and to determine whether equilibrium would someday be reached.

Certain generalities jumped out at the researchers. The first species to vanish from continental islands are the big guys. Tigers. Elephants. Bears. The larger the island, the slower the rate at which species disappear. The farther an island is from the mainland, the more species it loses; the closer, the fewer. An isolated island loses more species than one in an archipelago.

In 1985, as Soule, David Ehrenfeld, Jared Diamond, William Conway, Peter Brussard, and other top biologists were forming the Society for Conservation Biology, ecol-

ogist William Newmark looked at a map of the western United States and realized that its National Parks were also islands. As the sea of development had swept over North America, National Parks had become islands of natural habitat. Did island biogeography apply?

Newmark found that the smaller the National Park and the more isolated it was from other wildlands, the more species it had lost. The first species to go had been the large, wideranging critters — Gray Wolf, Grizzly Bear, Wolverine. Faunal relaxation had occurred, *and was still occurring.* Newmark predicted that all National Parks would continue to lose species. Even Yellowstone National Park isn't big enough to maintain viable populations of all the large wide-ranging mammals. Only the complex of National Parks in the Canadian, Rockies is substantial enough to ensure their survival.

While Newmark was applying island biogeography to National Parks, Reed Noss and Larry Harris at the University of Florida were using the *metapopulation* concept to design reserves for the Florida Panther, an Endangered subspecies, and the Florida Black Bear, a Threatened subspecies. Metapopulations are populations of subpopulations. A small isolated population of bears or Panthers faces genetic and stochastic threats. With few members of the population, inbreeding is likely, and this can lead to all kinds of genetic weirdness. Also a small population is more vulnerable than a large one to local extinction *(winking out* in ecological jargon). If the animals are isolated, their habitat can't be recolonized by members of the species from another population. But if habitats are connected so that animals can move between them — even as little as one horny adolescent every ten years —then inbreeding is usually avoided, and a habitat whose population winks out can be recolonized by dispersers from a nearby population.

Noss and Harris designed a nature reserve system for Florida consisting of core reserves surrounded by buffer zones and linked by habitat corridors. Florida is the fastest growing state in the nation. When the Noss proposal, calling for 60 percent of Florida to be protected in such a nature reserve network, was published in 1985, it was considered...well, impractical. But over the last decade this visionary application of conservation biology has been refined by the State of Florida, and now state agencies and The Nature Conservancy are using the refinement to set priorities for land acquisition and protection of key areas.

In 1994 the Florida Game and Fresh Water Fish Commission published a 239 page document. *Closing the Gaps In Florida's Wildlife Habitat Conservation System.* Using GIS computer mapping technology, *Closing the Gaps* identified Biodiversity Hot Spots for Florida. The study looked in detail at range occurrences and habitat needs for 33 sensitive species ranging from the Florida Panther to the Pine Barrens Treefrog, and at 25,000 known locations of rare plants, animals, and natural communities. Existing conservation lands in Florida cover 6.95 million acres. The hot spots — called Strategic Habitat Conservation Areas — encompass another 4.82 million acres. Florida is working with private landowners to protect identified areas and has appropriated $3.2

billion to purchase Strategic Habitat Conservation Areas by the year 2000. Once a new Ph.D.'s pie-in-the-sky, a conservation biology-based reserve system is now the master plan for land protection in Florida.

While metapopulation dynamics and island biogeography theory were being applied to nature reserve design, biologists were beginning to recognize tlie value of large carnivores to their ecosystems. Previously, scientists had tended to see wolves and Wolverines and Jaguars as relatively unimportant species perched on top of the food chain. They really didn't have that much influence on the overall functioning of the natural system, biologists thought. Until the 1930s, in fact, the National Park Service used guns, traps, and poison to exterminate Gray Wolves and Mountain Lions from Yellowstone and other Parks (tliey succeeded with the wolf). Early in his career, even Aldo Leopold beat the drum for killing predators.

Today, biologists know that lions and bears and wolves are ecologically essential, in addition to being important for a sense of wildness in the landscape. For example, the eastern United States is overrun with White-tailed Deer. Their predation on trees is preventing forest regeneration and altering species composition, according to University of Wisconsin botanists Don Waller, Steve Solheim, and William Alverson. If allowed to return, wolves and Mountain Lions would scatter deer from their concentrated wintering yards and reduce their numbers, thereby allowing the forest to return to more natural patterns of succession and species composition.

Large herds of Elk are overgrazing Yellowstone National Park. Conservation biologists hope that the recent réintroduction of the Gray Wolf will control Elk numbers and keep large herds from loafing in open grasslands.

Michael Soulé has shown that native songbirds survive in suburban San Diego canyons where Coyotes remain; they disappear when Coyotes disappear. Coyotes eat foxes and prowling house cats. Foxes and cats eat quail, cactus wrens, gnatcatchers, and their nestlings. Michael Soulé calls this phenomenon of increasing mid-sized carnivores because of decreasing large carnivores *mesopredator release.*

In the East, David Wilcove, staff ecologist for the Environmental Defense Fund, has found that songbirds are victims of the extirpation of wolves and Cougars. Neotropical migrant songbirds such as warblers, thrushes, and flycatchers winter in Central America and breed in the United States and Canada. The adverse effects of forest fragmentation on songbird populations are well documented; but Wilcove has shown that songbird declines are partly due to the absence of large carnivores in the East. Cougars and Gray Wolves don't eat warblers or their eggs, but raccoons, foxes, and possums do, and the Cougars and wolves eat these midsize predators. When the big guys were hunted out, the populations of the middling guys exploded — with dire results for the birds. Soule's mesopredator release rears its ugly head again.

On the Great Plains, the tiny Swift Fox is Endangered. Why? Because the wolf is gone. Swift Foxes scavenged on wolf kills but wolves didn't bother their little cousins. Coyotes, however, eat Swift Foxes. Wolves eat Coyotes. Get rid of the wolf and Swift Foxes don't have wolf kills to clean up, and abundant Coyotes eat up the foxes.

John Terborgh of Duke University (in my tnind the dean of tropical ecology) is currently studying the ecological effects of eliminating large carnivores from tropical forests. He tells us that large carnivores are major regulators of prey species numbers — the opposite of once- upon-a-time ecological orthodoxy. He has also fotuid that the removal or population decline of large carnivores can alter plant species composition, particularly the balance between large - and small-seeded plants, due to increased plant predation by animals normally preyed upon by large carnivores.

In addition to being critical players in various eat-or-be-eaten schemes, large carnivores are valuable as *umbrella species.* Simply put, if enough habitat is protected to maintain viable populations of top predators like Wolverines or Harpy Eagles, then most of the other species in the region will also be protected. Those that aren't, such as rare plants with very restricted habitats, can usually be protected with vest-pocket preserves of the old Nature Conservancy variety.

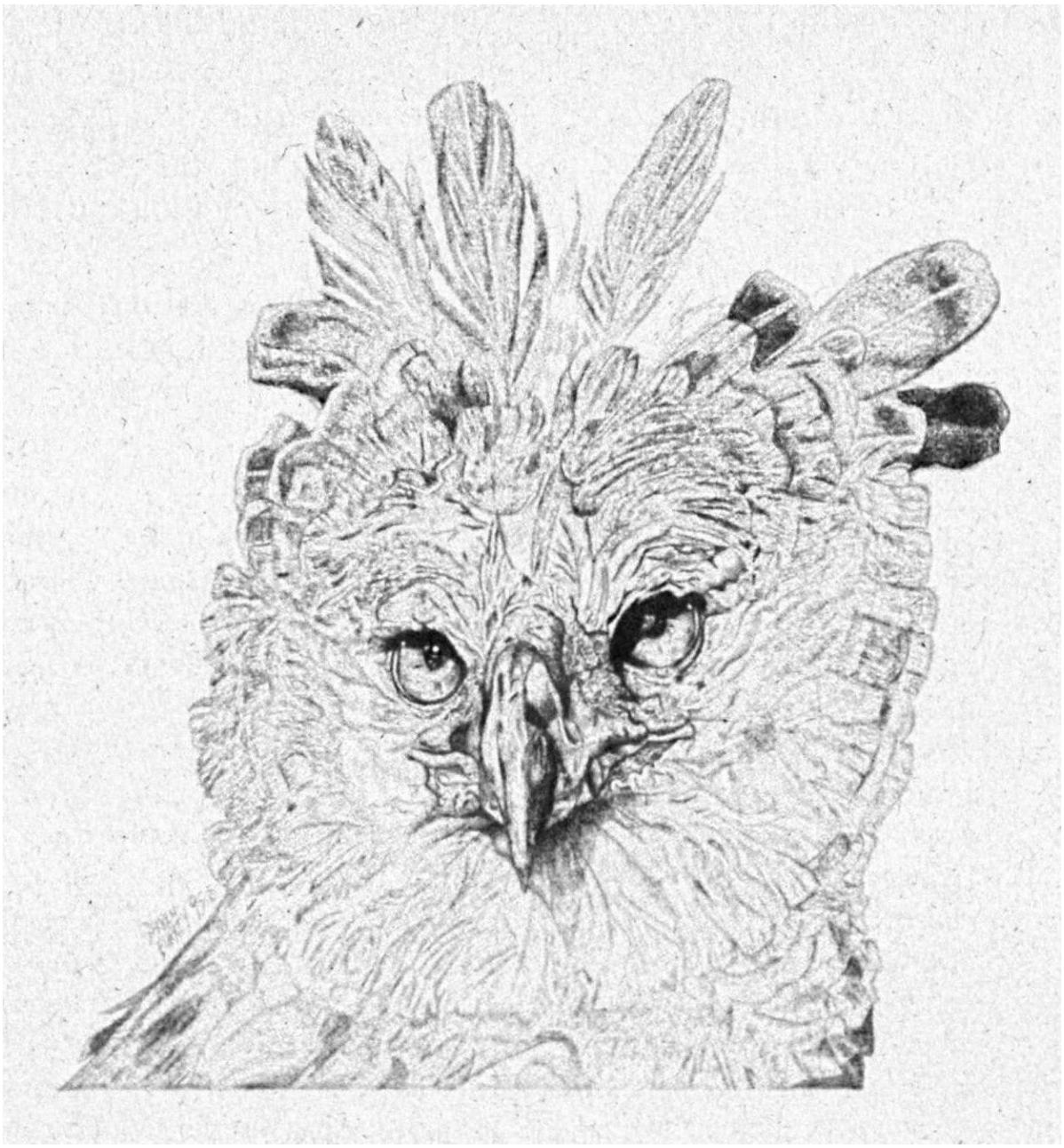
A final piece in conservation biology's bigpicture puzzle is the importance of natural disturbances. Caribbean forests are adapted to periodic hurricanes. Many plant conuniuiities in North America evolved with wildfire. Floods are crucial to new trees sprouting in riparian forests. To be viable, habitats must be large enough to absorb major natural disturbances (types of *stochastic events* in ecologist lingo). When Yellowstone burned in 1988, there was a great hue and cry over the imagined destruction; but ecologists tell us that the fire was natural and beneficial. Because Yellowstone National Park covers two million acres and is surrounded by several million acres more of National Forest Wilderness Areas and roadless areas, the extensive fires affected only a portion of the total reserve area.

Things didn't turn out so well when The Nature Conservancy's Cathedral Pines Preserve in Connecticut was hammered by tornadoes in 1989. In this tiny patch of remnant old-growth White Pine forest (with some trees 150 feet tall), 70 percent of the trees were knocked flat, devastating the entire forest patch. Had the tornadoes ripped through an old- growth forest of hundreds of thousands of acres, they instead would have played a positive role by opening up small sections to new forest growth.

These four areas of recent ecological research — island biogeography, metapopulation theory, large carnivore ecology, and natural disturbance dynamics — are the foundation for The Wildlands Project. We used insights from these four fields to set our goals for protecting Nature in a reserve network. For a conservation strategy to succeed, it must have clearly defined goals. These goals should be scientifically justifiable and they should be visionary and ideahstic. Reed Noss, science director for the Project, set out the four fundamental goals of The Wildlands Project in 1992:

1. Represent, in a system of protected areas, all native ecosystem types and serai stages across their natural range of variation.

2. Maintain viable populations of all native species in natural patterns of abundance and distribution.



Harpy Eagle *by Darren Burkey*

3. Maintain ecological and evolutionary processes, such as disturbance regimes, hydrological processes, nutrient cycles, and biotic interactions, including predation.

4. Design and manage the system to be responsive to short-term and long-term environmental change and to maintain the evolutionary potential of lineages.

With the criteria embodied in these goals, we can look closely at existing Wilderness Areas and National Parks and answer our original question — why has the world's greatest nature reserve system failed to prevent biological meltdown in the United States?

As we have seen, Wilderness Areas and National Parks are generally islands of wild habitat in a matrix of human-altered landscapes. By fragmenting wildlife habitat, we imperil species from Grizzlies to warblers who need large, intact ecosystems. Because they have been chosen largely for their scenic and recreational values, and to minimize resource conflicts with extractive industries, Wilderness Areas and National Parks are often "rock and ice" — high elevation, arid, or rough areas which are beautiful and are popular for backpacking, but which also are *relatively* unproductive habitats. For the most part, the richer deep forests, rolling grasslands, and fertile river valleys on which a disproportionate number of rare and Endangered species depend have passed into private ownership or, if public, have been "released" for development and resource exploitation. To make matters worse, the elimination of large carnivores, suppression of natural fire, and livestock grazing have degraded even the largest and most remote Wilderness Areas and National Parks in the lower 48 states.

To achieve TWP's four reserve design goals, we must go beyond current National Park, Wildlife Refuge, and Wilderness Area systems. Our ecological model for nature reserves consists of large Wilderness cores, buffer zones, and biological corridors. The core Wilderness Areas would be strictly managed to protect and, where necessary, to restore native biological diversity and natural processes. Traditional wilderness recreation is entirely compatible, so long as ecological considerations come first. Biological corridors would provide secure routes between core reserves for the dispersal of wide-ranging species, for genetic exchange between populations, and for migration of plants and animals in response to climate change. Surrounding the core reserves, buffer zones would allow increasing levels of compatible human activity away from the cores. Active intervention or protective management, depending on the area, would aid in the restoration of extirpated species and natural conditions.

Admittedly, there has been some debate among scientists about reserve design. Some aspects of corridors have been criticized. Several "scientists" representing the anti-conservation wise use/militia movement have misstated these controversies, ignoring the general consensus that has emerged among reputable scientists on all sides of these discussions.

This emerging consensus has been summarized in several forms during the last five years. In 1990 with the Conservation Strategy for the Nortlieni Spotted Owl, Jack Ward Thomas, now

Chief of the Forest Service, set forth five reserve design principles "widely accepted among specialists in the fields of ecology and conservation biology." In 1992, Reed Noss updated those five and added an important sixth principle:

1. Species well distributed across their native range are less susceptible to extinction than species confined to small portions of their range.

2. Large blocks of habitat containing large populations of a target species are superior to small blocks of habitat containing small populations.

3. Blocks of habitat close together are better than blocks far apart.

4. Habitat in contiguous blocks is better than fragmented habitat.

5. Interconnected blocks of habitat are better than isolated blocks; corridors or linkages function better when habitat within them resembles that preferred by target species.

6. Blocks of habitat that are roadless or otherwise inaccessible to humans are better than roaded and accessible habitat blocks. ,

Based on his studies of faunal extinctions in fragmented chaparral habitats in San Diego County, Michael Soule summarized some reserve design principles in a very understandable way for us layfolk:

A. Bigger is better.

B. Single large is usually better than several small.

C. Large native carnivores are better than none.

D. Intact habitat is better than artificially disturbed.

E. Connected habitat is usually better than fragmented.

In a 1995 report for the World Wildlife Fund, *Maintaining Ecological Integrity in Representative Reserve Networks,* Noss added several more fundamental principles:

- Ecosystems are not only more complex than we think, but more complex than we *can* think (Egler 1977).

- The less data or more uncertainty involved, the more conservative a conservation plan must be (i.e., the more protection it must offer).

- Natural is not an absolute, but a relative concept.

- In order to be comprehensive, biodiversity conservation must be concerned with multiple levels of biological organization and with many different spatial and temporal scales.

- Conservation biology is interdisciplinary, but biology must determine the bottom line (for instance, where conflicts with socio-economic objectives occur).
- Conservation strategy must not treat all species as equal but must focus on species and habitats threatened by human activities (Diamond 1976).
- Ecosystem boundaries should be determined by reference to ecology, not politics.
- Because conservation value varies across a regional landscape, zoning is a useful approach to land-use planning and reserve network design.
- Ecosystem health and integrity depend on the maintenance of ecological processes.
- Human disturbances that mimic or simulate natural disturbances are less likely to threaten ecological integrity than are disturbances radically different from the natural regime.
- Ecosystem management requires cooperation among agencies and landowners and coordination of inventory, research, monitoring, and management activities.
- Management must be adaptive.
- Natural areas have a critical role to play as benchmarks or control areas for management experiments, and as refugia from which areas being restored can be recolonized by native species.

Now what? Where do we go with all this?

Conservation biology has shown us the crisis we face (and it *is* a crisis despite the sugary "What, me worry?" attitude of Eco-Pollyannas like Gregg Easterbrook); conservation biology has developed the theory supporting the protection of biological diversity; and conservation biology has set out a new model of how nature reserves should be designed. It is up to citizen conservationists to apply conservation biology to specific land use decisions and Wilderness Area proposals. We have the political expertise, the love for the land, and the ability to mobilize support that an ambitious Nature protection campaign demands.

There is wide agreement among conservation biologists that existing Wilderness Areas, National Parks, and other federal and state reserves are the building blocks for an ecological reserve network (see my companion article in this issue). Inspired by Noss's and Soule's work, conservationists in the Northern Rockies, led by the Alliance for the Wild Rockies, applied conservation biology principles there as early as 1990. Biologists like pioneer Grizzly Bear researcher John Craighead and conservationists

Illustration by Kurt Seaberg

like former Wilderness Society head Stewart Brandborg reckoned that if Yellowstone is not large enough to maintain viable populations of Grizzlies and Wolverines , then we need to link Yellowstone with the big Wilderness Areas of central Idaho, the Glacier National Park/Bob Marshall Wilderness complex in northern Montana, and on into Canada's Banff/Jasper National Park complex. Maintaining metapopulations of wide-ranging species means landscape connectivity must be protected throughout the entire Northern Rockies. The Northern Rockies Ecosystem Protection Act (NREPA), which would designate 20 million acres of new Wilderness Areas in the United States and protect corridors between areas, has been introduced into Congress and drew over 60 cosponsors in 1994. The proposal is now being refined by scientists and conservationists in Canada and the United States for a Yellowstone to Yukon reserve system. Scores of grassroots wilderness groups have helped advance the legislation. The Sierra Club was the first major national conservation organization to endorse NREPA.

Other conservation groups are using conservation biology to develop alternative proposals for the next generation of National Forest Management Plans. They are seeking to identify biological hot spots including habitat for sensitive species, remaining natural forest, and travel corridors for wide-ranging species. With such maps they will argue for expanding existing Wilderness Areas into ecologically rich habitats and for protecting wildlife linkages. In many areas roads need to be closed in sensitive ecosystems, once- present species like wolves and Mountain Lions reintroduced, and damaged watersheds restored. The Southern Rockies Ecosystem Project is coordinat-

ing several groups in a comprehensive conservation biology approach to new National Forest Plans in Colorado. The Southern Appalachian Forest Coalition is developing a conservation biology management strategy for all National Forests in its region. SREP and SAFC are the best examples of regional coalitions working from conservation biology principles.

One of the central messages of conservation biology is that ecosystems and wildlife ranges do not follow political boundaries. Many nature reserves will need to cross international borders. The best application of this so far is in Central America where a consortium of government agencies, scientists, and private groups are working with Wildlife Conservation hiternational to link existing National Parks and other reserves from Panama to Mexico's Yucatan. This proposed nature reserve network, called *Paseo Pantera* (Path of the Panther), would allow Jaguars and Mountain Lions to move between core reserves throughout Central America. [See *Wild Earth's* first special issue on TWP.]

To the north, the Canadian Parks and Wilderness Society and World Wildlife Fund Canada are incorporating conservation biology in their Endangered Spaces campaign throughout Canada. In every province and territory, scientists and activists are working to identify core reserves and connecting corridors based on the needs of large carnivores, biological hot spots, and "enduring features" on the landscape. The Canadians are working with conservationists in Alaska and the northern part of the lower 48 states on cross-border reserves and linkages.

National conservation groups in the United States like the Sierra Qub, Wilderness Society, Defenders of Wildlife, World Wildlife Fund, and American Wildlands have been influenced by The Wildlands Project and are seeking to incorporate conservation biology into their work. The Sierra Club's Ecoregions Campaign could become a promising initiative for bringing conservation biology to conservation policy. Early this year the Sierra Club brought together Noss and Soule with Club activists and public opinion, political, and marketing experts to explore how to "sell" biodiversity to politicians and the public.

In fifteen years, conservation biology has wrought a revolution. The goal for nature reserves has moved beyond protecting scenery to protecting all Nature — the diversity of genes, species, ecosystems, and natural processes. No longer are conservationists content with protecting remnant and isolated roadless areas; more and more biologists have come to agree with Reed Noss, who says, "Wilderness recovery, I firmly believe, is the most important task of our generation. " Recycling, living more simply, and protecting human health through pollution control are all important. But it is only by encouraging wilderness recovery that we can learn humility and respect; that we can come home, at last. And that the grand dance of life will continue in all its beauty, integrity, and evolutionary potential.

Dave Foreman is the chairman of The Wildlands Project, publisher of Wild Earth, *and a member of the Sierra Club board of directors.*

Dave Foreman
Wilderness
From Scenery to Nature
1995

Wild Earth 5, no. 4 (Winter 1995/96).
<environmentandsociety.org/mml/wild-earth-5-no-4>
A shorter version of this article originally appeared in *Sierra.*