More People, Changed Climate, Lost Land Threaten Many Species

Among those species most clearly in danger are at least 66 mammals, 93 birds, 51 reptiles and amphibians, 96 fishes, 104 insects, spiders, mollusks, and other invertebrates, and 1,057 plants.

Unfortunately, the actual number of species clearly in trouble appears even greater than FWS records indicate. A recent Center for Plant Conservation estimate of plants considered to be at risk of extinction is about 14 percent higher than federal records show; a recent study at Cornell University suggests that 7 additional species of birds—Vermilion flycatcher, caspian tern, spotted owl, loggerhead shrike, snowy plover, Harris's hawk, and Henslow's sparrow—are threatened; and the State of Colorado's list of endangered species includes lynx, wolverine, river otter, and other species that are not yet recognized by FWS as being in jeopardy.

Another indication that the problem is greater than the records now show is the rapid growth of the official list of U.S. endangered and threatened species. Between January 1986 and January 1990, the number of entries rose an astounding 47 percent. There was a 40 percent increase in listings for mammals, one of the groups better known to science. Among invertebrates, many experts believe that only a fraction of actually endangered or recently extinct species has been listed. By the time many of these species are recognized as endangered, it may be too late. Consider, for example, the American burying beetle. It was only recently listed despite the fact that, although once widespread in thirty-two states, it is now found only in two localities.

Species endangerment is the most acute evidence of the overall plight of our wildlife. Typically, as natural landscapes are modified by human activities such as timber cutting, ranching, and farming, the more sensitive species, like black bear and painted woodpecker, begin to decline. Once these species vanish, other wildlife, like bobcat and red-tailed hawk, decrease as more land is converted to agriculture or suburban uses. Finally, when the entire wild landscape has been completely transformed by agricultural, urban, or industrial development, even common, native species, such as white-tailed deer, disappear—leaving only a small number of species, many of which are nonnative survivors such as starlings.

Although there is no comprehensive list of declining "nontargeted" species in the United States, evidence suggests that such a list would be truly alarming. For example, in 1986, American Birds reported that 54 species of nontargeted birds had dropped in numbers over the previous fifteen years, with two-thirds of these having greatly declined over parts of the United States.

Even many species that still seem abundant face a precarious future. For example, 10-12 species of shorebirds (terns, stilts, plovers, sandpipers, etc.) monitored along the East Coast for twelve years have decreased in number an average of 44 percent.

To understand the reasons for the decline of wildlife, one need only examine seventy-eight case studies of U.S. species discussed in the Red Data books for mammals and invertebrates, showing clearly in trouble are at least 66 mammals, 93 birds, 51 reptiles and amphibians, 96 fishes, 104 insects, spiders, mollusks, and other invertebrates, and 1,057 plants.

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Above: Redwoods loom majestically in Humboldt State Park. Commercial timber production has claimed many unprotected great trees. Inset: A black bear cub depends upon abundant forests for survival.

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Vertebrates (International Union for the Conservation of Nature, 1988) and a recent report of the U.S. Government Accounting Office (GAO) on endangered species. Specific threats, in terms of the frequency to which they were reported for the species, were 1) land development for urban, commercial, industrial, or recreational purposes; 2) land conversion for agriculture; 3) changes in natural communities through livestock grazing, control of natural fires, etc.; 4) pollution and pesticides; 5) water development, such as reservoir construction and stream channelization; 6) introduction of predators and pest control; 7) urban sprawl and road development (in the case of insect and plant species); 8) vehicle collisions; and 9) direct human disturbance of nesting and nesting areas. Habitat loss and degradation were primary factors, threatening 5 of the 78 species, and were probably important factors for the remaining 3.

Vanishing Nature

The growing number of U.S. endangered and declining species provides a stern warning that the ecological health of the land continues to worsen. Indeed, most of our natural ecosystems are in trouble. Among these critically endangered or nearly extinct are:

- Tall-grass prairie: only isolated vestiges remain of more than 140 million acres that once extended from the eastern Dakotas to central Oklahoma. Today, as a result of extensive agriculture, many native animal and plant species have been lost or are endangered.
- California grassland: most of the San Joaquin Valley has also been converted for agriculture, which, along with urban development, continues to encroach on what remains of its natural habitats. Species such as the San Joaquin kit fox, giant kangaroo rat, and blunt-nosed leopard lizard, already on the endangered species list, continue to decline.
- Hawaiian forest and associated shrub, bog, and moss-lichen habitats: these areas are being devasated by land development. As of January 1989, 58 species of Hawaiian native wildlife appeared on the federally endangered species list.
- Wetlands: well over 50 percent of our wetlands (a category of ecosystems that includes fresh and salt marshes, swamps, prairies, and riparian habitats) in the coterminous United States have declined since the presentment period, from an estimated 215 million acres to under 190 million acres today. About half of our endangered animals and almost a third of our endangered plants are believed to depend on wetlands. Riparian habitats, especially in the arid West, have been hit hardest, with 70 to 90 percent of them lost or severely degraded. Most ecosystems that are not rapidly clearing or threatened with clearing and threatened with encroachment are nonetheless losing the ability to support many native species and natural communities. Our eastern forests, covering nearly 30 percent of the total land mass, retain only marginal lands for retaining species such as cougar, fisher, red wolf, gray wolf, and caribou. Many specific natural communities within this larger ecosystem are home to numerous endangered species. Florida longleaf pine communities, for example, which are being destroyed or severely damaged by logging, grazing, control of natural fires, and land development, provide habitat for 5 mammals, 3 birds, 9 amphibians and reptiles, 6 invertebrates, and 37 plants that are known or suspected to be endangered.
- About 40 percent of the United States has been converted for agricultural and livestock use and for commercial timber production. Five percent has been mostly transformed for urban, industrial, and commercial purposes. These areas can only support a fraction of their native wildlife. Another 35 percent of the land, while modified primarily by livestock grazing and rural development, can still support much wildlife, although not the more sensitive species or many of those dependent on unspoiled local conditions. The remaining 50 percent of the United States, consisting of marshes, tundra, desert, parks, wildlife refuges, and similar areas, can support most, and in a few instances all, native species. However, nearly 60 percent of these more pristine environments are in Alaska. With the exception of some in Alaska, even our largest national parks and wildlife refuges cannot preserve complete animal and plant communities. They are simply too small. Twelve major national park areas in the West have already lost an average of 24 percent of their native mammalian and avian species, according to studies by ecologist William Newmark. The degree of loss correlates with park size (e.g., a 4 percent loss for Grand Teton National Park, the largest park area, versus a 43 percent loss for Lassen Volcano National Park, one of the smallest). These losses are attributed to habitat destruction and the elimination of wildlife on lands adjacent to the parks.
- While much of nature has been lost, what can be said about the future of what remains—habitat areas that, while perhaps modified, nevertheless continue to support much wildlife? Since the 1960s, agricultural lands (cropland, pasture, and range) have gained at the expense of natural habitats in some areas, while, in other areas, such lands have been converted to urban or recreational uses or back to natural habitats. Overall, areas that have remained relatively constant. Urban areas have expanded during the same time approximately 1 million acres per year. Unfortunately, the ecological effects of urban sprawl extend well into the countryside as new roads, recreational areas, summer homes, reservoirs, and other facilities are built and as timber, mineral, and rural energy resources are more heavily exploited.
- Denaturing the situation is a human population increase of about 2 million persons a year. In twenty years, the U.S. population is expected to be more than 280 million. How will these new people distribute themselves over the land? What natural resources will they use?

Climatic changes—the result of human pollution of the global atmosphere—should also increase our alarm. If the planet warms 5 to 5.5 degrees Fahrenheit into the next century (the average of a range of recent estimates by atmospheric scientists), we could expect a climatic shift of 155 miles toward the poles and 1.64 feet up a mountain. Wildlife, which is adapted to certain climatic conditions, would encounter two major problems. The climate shift may happen so quickly that many species will not have the time to migrate successfully. Given that much of the landscape has already been converted to agricultural and urban uses, even species that can move fast enough may not find suitable areas to colonize. Under these conditions, losses of wildlife could be massive.

Can We Save Our Wildlife?

The U.S. Endangered Species Act of 1983 recognizes that declining wildlife is "a consequence of economic growth and development sustained by inadequate concern and conservation" and that it is U.S. policy to conserve endangered wildlife and the ecosystems...
upon which they depend.

Despite this resolve, most wildlife and ecosystems continue to falter. Why? A primary reason is that our society has grossly under-estimated the task of conservation. Some well-documented recovery operations are undertaken for the more "charismatic" species such as California condor and black-footed ferret, and while "game" species such as deer are managed to offset habitat loss, few Americans know of the thousands of other species that are declining and facing extinction. If we truly are to "conserve wildlife," we must keep the land in good enough condition for the existence of all 500 species of mammals, 1,000 birds, 600 amphibians and reptiles, 2,200 fish, 90,000 insects, 20,000 clams, snails, spiders, and other invertebrates, 20,000 plants, a great number of subspecies and (plant) varieties, and a wide range of simpler forms of life such as fungi and algae.

To do this, a broad diversity of habitats must be preserved. Much of our wildlife is dependent on specific kinds of vegetation, forest growth, topography, aquatic conditions, contiguous habitat, or local resources. The second fundamental need is enough habitat. Adequate habitat gives wildlife populations an opportunity to avoid extinctions due to chance events or genetic problems. Estimates vary as to how many animals are needed for a "viable" population, but one study calculated as 426 individuals for elk and 5,012 for grizzly bear. For large animals such as these, preserving hundreds to thousands of square miles of habitat is crucial. Most efforts at protecting endangered wildlife focus on the needs of an individual species, and on controlling or removing distant threats, yet few successes are evident.

Of hundreds of endangered species that have been identified, the brown pelican and the American alligator have fully recovered. The species approach has only marginally helped those that have continued to lose habitat and in producing thousands of species whose ecological needs are poorly known. According to the case studies pre-

sented in the GAO endangered species report, more than $215 million was spent for 18 species over a 3-year period. Many see this as a show of support, but may not go far enough to the point of recovery.

A second approach to wildlife conservation depends on the preservation of distinct types of natural communities. For example, preser-

vation of a talus-grazing community in Iowa requires both the open grassland and the frigid orchard, along with hawksmoths, which serve to pollinate it, and other local nonthreatened species. While this approach often works for species that are associated with clearly defined natural communities of limited acreage, it serves far less to protect the myriad species dependent on a combination of dispersed communities or on large blocks of habitat. Moreover, protection of all natural communities on a one-by-

one basis is very difficult. An average state may contain more than 300 types of terrestrial and aquatic communities, according to Bill Crumpacker of the University of Colorado. While the species and community ap-

proaches have been somewhat effective in slowing the decline of America's wildlife and habitats, they have not-and cannot be ex-
pected to-prevent it. To do so requires pre-

serving the broader landscape. Only in this way can we provide for the needs of all spec-

ies and for a complete mosaic of natural communities that, over time, have room to shift with disturbances such as fire, floods, storms, earthquakes, and climatic change. In short, wildlife and nature preser-

vists require an ecologically intact American landscape.

The idea of preserving the land as a whole is not new. It is, for example, embodied in the "biophysical reserve" concept of the United Nation's Man and the Biosphere Program. The biophysical reserve is one where people live and work but where their activities do not destroy the land's ecological fabric. Such reserves should be species-typical to the area. Some 275 bi-

ophysical reserves have been established in more than 100 different countries, those are far from live up to the ideal. Saving wildlife means ap-

plying that ideal broadly over the landscape.

No Net Loss of Habitat

A bold new idea was born at the National Wildlife Policy Conference in 1989 that of braking further destruction of wetland habitat through a clear policy of "no net loss." Presi-

dent George Bush, aware that wetlands are continuing to disappear at a rate of a half million acres a year, adopted that policy as a national goal. Congress has already approved legislation to help with implementation.

The pledge of "no net loss" for wetlands potentially sets a new direction for American conservation—along with the historic decision to create our first national parks, forests, and wildlife refuges. It provides a crucial perspec-

tive on the ongoing need to protect valuable natural resources in ways that now means drawing the line habitat de-

struction. Earth Day 1990 is the time to ad-

vocate a "net loss" policy for all habitats. A "no-net-loss" policy is as human oriented as it is moral defense to other species. History suggests that environ-

dental defies are to be an environment for an own making, reflecting our strength and creativity, and a desire for the natural world—its beauty, mystery, delights, and challenges. A look at the American land-

scape reveals a wounding imbalance in favor of the man-made environment, dramatically confounded ecologically by the decline of species and the decay of natural ecosystems. This is a human tragedy in the making.

The loss of wildlife and habitats has a direct human in impact in that we provide national resources for humans. Wild plants, for exam-

ple, are an important source of new crops, pharmaceuticals, fibers, and petroleum sub-

stances, and many insects serve as vital crop pollinators or as control agents for weeds and de-

structive insects. Much of the world's bio-
diversity—and potential benefits thereof—is concentrated in tropical regions, which stand to lose 4,000-6,000 species per year by the end of the century as a result of deforesta-

tion alone. Perhaps most importantly, natural ecosystems serve as stabilizers of climate, as purifiers of water and air, and as buffers against storms, sea surges, and other natural phenomena.

Enacting a policy of "no net loss" of habitat would create more efficient use of land. It would also bring about much needed economic change, supporting novel transportation and energy use systems and advances in telecommunications, recycling, urban planning and architecture, and the applied science of restoration ecology. A major benefit would be reduction in our country's contribution to atmospheric carbon dioxide (more than 20 percent of the world's total, primarily through fossil fuel combus-

tion), the buildup of which threatens the global climate. While a "no-net-loss-of-habitat" policy for

"Whenever wetlands must give way to farming or development, they will be replaced or ex-

panded elsewhere," promised President George Bush. Will that promise be kept?

The United States could guarantee a more liv-

able and sustainable twenty-first century for Americans, if it could also serve as an impor-
tant model for other nations in curbing world, wide land degradation (through deforestation, overgrazing, and overcropping) and its con-

sequences—worsening droughts and floods, famine, reduced agricultural productivity, declining living standards, and swelling num-

bers of environmental refugees. These events are threatening the lives and well-being of over a billion people in the developing world.

"No net loss" must be applied as quickly as possible to:

• habitats essential to endangered and declin-

ing populations of wildlife, or what biologists commonly refer to as "critical habitat." An endangered green and brown hermit turtles, for ex-

ample, cannot wait a decade, since what re-

mains of their breeding areas along the Florida coast would surely be lost to beachfront development by that time;

• threatened natural community types such as wetlands, talus grasslands, and elfin forests. These ecosystems have been reduced or are declining at such rates that there is no time to spare; and,

• large landscape ecosystems that are still natural enough to serve as restoration areas for complete communities of native animals and plants, including those that have been re-

ationally extirpated. Examples of such areas include the Baxter State Park region in Maine's Great Smokies region in the southeast, the Black Hills region of the Dakota, and the North Coast region of Alaska and Oregon. Large natural ecosystems, now rare, are virt-

ually impossible to reestablish once they are lost.

Most threatened ecosystems will need to be expanded and/or restored in order to secure them. Most other ecosystems land themselves to some conversion from one type to another. Examples are old-field communities and early to mid-mid-successional forests. In such cases there is flexibility in allowing some loss, with the earmarking of degraded lands and open space to make up the difference.

"No net loss of habitat" would seem to be little more than a pipe dream if it were not for the fact that, in a significant number of places, Americans are already working toward that goal! Local communities such as Sanibel, Florida, and Boulder, Colorado, have de-

veloped comprehensive land-use plans that heavily favor wildlife and habitat. Means for conservation include: voluntary constraints on development, encouraged by incentives such as tax breaks; financing of public-land acquisi-

tion and conservation easements through dedicated sales taxes, lottery, income tax credits, and land trust donations to local government incentives (87 percent of the American public is "will-

ing to pay taxes that are dedicated to preserve habitat areas," according to research done by the Presidential Commission on the American Outdoors), and careful land-development planning and design.

Planning actions that bring the goal of "no net loss" within reach are exemplified in:

• Adirondack Park of New York, a 6,000-acre area roughly the size of Vermont, home to 32,000 human residents and to nearly 500 species of birds, mammals and plants.

• New Jersey Pinelands, a 1.1 million acre area covering 40 percent of the state and pro-

viding habitat for about 54 species of threat-

end or endangered plants. More than fifty municipalities exist within this area.

• The California Desert Conservation area of 25 million acres, covering about 25 percent of California. It includes more than a hundred communities and habitat for 635 vertebrates, of which 22 are endangered or threatened.

What lessons of habitat protection can be learned from these and similarly managed areas? First, critical to the entire process is a public consensus that the land as a whole should be preserved. When citizens see that major landscape values are at stake, they act to protect. Second, cooperative agreements among federal, state, and local governments, and private landowners are essential. Finally, an overall landscape management plan is needed to direct and master development and ensure that protection and restoration of wild-

life habitat areas receive top priority.

A good start for many of us is not far from the front porch, such as at Topokoonca Creek. This is a "habitat by learning about the local wildlife and its needs and by being involved in the political process in an attempt to protect the "no net loss." Though sure to be tough, what could be a nobler challenge?

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