

Animals & Society Institute



ENDANGERED SPECIES: SAVING THEM AND OURSELVES

POLICY PAPER

A targeted approach
to protecting imperiled
animals and preserving
global diversity

Linda Riebel



Animals and Society Institute



Endangered Species: Saving Them and Ourselves

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Please note that this Policy Paper was published in 2012 and some of the content may be outdated.

Linda Riebel

The Animals and Society Institute is an independent research and educational organization that advances the status of animals in public policy and promotes the study of human-animal relationships. We are a think tank as well as a producer of educational resources, publications and events. Our objectives are to promote new and stricter animal protection laws, stop the cycle of violence between animal cruelty and human abuse, and learn more about our complex relationships with animals.

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1. Executive Summary

For many reasons, ranging from climate change and habitat loss to overpopulation and consumer choices, thousands of animal species are now at various levels of risk of disappearing. The rate of extinctions for both plants and animals is estimated to be 1,000 to 10,000 the natural rate (according to the Center for Biological Diversity and the International Union for the Conservation of Nature, respectively). Since human activities are the sources of many of these threats, extinctions reflect a wide range of human follies and miscalculations.

To arrest this trend, changes in human consumption patterns, reproduction, cultural attitudes, energy sources, economic expectations, and more, are required. In practical terms, a complete approach requires programs as diverse as reducing meat consumption in wealthy nations and making solar ovens available to impoverished people in poorer nations. Since many of these changes are desirable for other reasons (such as reducing overpopulation and the prospect of wars over increasingly scarce resources), partnering with entities that tackle these problems could be a useful part of the campaign to save endangered species.

The problems described are global in scope, but this paper emphasizes causes and recommendations pertinent to the United States. Further, since saving species is ultimately inseparable from saving livable habitats, it will also emphasize climate change and preserving land and ecosystems.

Special attention is given to some key causes (climate change, overpopulation, industrial agriculture, meat) and selected solutions (preserving ecosystems, education, technology). I argue that a range of solutions is needed; that they work together to create conditions favorable to species survival; and that some can work independently. (No global directing body is required or feasible, though an overall vision is desirable.) The kinds of programs encouraged in this report may be broad or focused, short-term or long-term, and come from individuals, NGOs, governments, community groups, and more – in short, from every locus of human endeavor. While focused projects are the bread and butter of conservation, the overall movement must be broad and inclusive. Saving one species at a time is little help if its habitat is destroyed, and saving habitats is of limited help while climate change continues unchecked.

2. The Problem

2.1 Background

Today the global degradation of ecosystems and the use of animals for a variety of human purposes contribute to what has been called “the sixth extinction” – that is, a wave of losses so massive that it resembles the long-ago widespread extinctions chronicled by paleontologists.¹

The role of humans in the extermination of species remains controversial in some cases but is clear in others. There is little doubt that island nations such as Mauritius (former home of the dodo) and New Zealand (of the moa) suffered extinctions after humans colonized them. The disappearance of large land animals in North America seems to coincide with the spread of early humans. The arrival of Europeans began another age of extinctions:

At least 500 species and subspecies of plants and animals have gone extinct in North America since the 1500s; among them the great auk, the Labrador duck, the heath hen, the Eskimo curlew, the sea mink, Audubon’s bighorn sheep, the West Indian monk seal, and the emerald trout.²

More recently, the passenger pigeon, which once numbered in the millions, is gone; the last wild Carolina parakeet died in 1904, due to habitat destruction, introduced pathogens, and persecution by farmers. And the losses continue today, due in part to systemic factors such as overpopulation and climate change.

There are numerous ways to classify endangered species: by severity of threat as designated by the International Union for the Conservation of Nature (IUCN; see below); by geopolitical region (domestic or overseas); by type of habitat (marine or terrestrial, further broken down into subtypes, such as deepwater vs. nearshore, tropical vs. boreal, etc.); by type of human interface (food, recreation, land use, pet trade, medical); and by time horizon (short-term vs. long-term threats).

Globally, thousands of animal species are presently at some level of risk, according to the IUCN, whose Species Survival Commission (composed of thousands of species experts and partner organizations) prepares the widely used Red List of endangered species. The levels of risk defined

by IUCN are as follows:

Least concern (LC)
 Near threatened (NT)
 Vulnerable (VU)
 Endangered (EN)
 Critically endangered (CR)
 Extinct in the wild (EW)
 Extinct (EX)

In their report of evaluations conducted in 2011, IUCN³ found the following:

	Number of species	Number of species at risk
Mammals	5,494 (total number)	1,134 (25%)
Birds	10,027 (total number)	1,240 (13%)
Fish	9,352 species evaluated	2,011
Reptiles	3,002 species evaluated	664
Amphibians	6,213 species evaluated	1,910

The status of invertebrates is less well understood, partly due to the immense biodiversity of insects: 1 million species have been scientifically described, but there may be as many as 10 million species. Some experts suggest that of all living things, 86 percent of terrestrial and 91 percent of marine species are not yet scientifically described.⁴

Some species that appear to be flourishing are actually living in the shadow of extermination. The chimpanzee, for instance, exists in the wild in several regions of Africa, but the bushmeat trade, regional wars, pet and medical trades, and logging activities threaten them. Another concern is the rising standard of living in some countries; this leads to the “dietary transition,” in which newly prosperous people expect to eat more meat than they or their ancestors previously did.⁵ Clearing land for pasture and crops to feed animals to fill this demand will further limit the land available for wildlife.

Keystone species, such as polar bears and prairie dogs, are those whose presence is vital to their ecosystem’s functioning. If they disappear, the ecosystem may collapse. For instance, sea otters control the sea urchin

population. Without them, urchins increase and over-consume the base of kelp forests, sending these ecosystems (and their denizens) into decline. Keystone species are often “charismatic megafauna,” animals such as whales, wolves, and elephants, who by their appearance, behavior, or cultural meaning, are particularly powerful ambassadors of the animal world and attract interest, action, and funds for conservation.

Most endangered species are less charismatic but still vital to ecosystems and humans. Bees, birds, and bats pollinate many plant species, including food crops. Loss of key pollinators would be catastrophic, all the way up the food chain to humans. Yet in the U.S., bats have been persecuted, birds and insect pollinators impacted by pesticides, and most worrisome, native and cultured bees have been in decline. Colony Collapse Disorder⁶ has become so serious that scientists around the world are working in collaboration to find the causes and solutions. Many causes have been proposed for CCD – mites, pesticides, pathogens, nutritional stress, and shipping hives from one agricultural establishment to another to be used as pollinators. As in many other cases, the combination of many threats at once may be responsible for pushing bees over the edge.

Even species that are not native to the United States are vulnerable to the actions of American citizens and governments. Exotic animals are imported for the pet trade, medical experimentation, and body parts. Our food industries engage in actions that degrade habitats overseas, such as setting up or buying from destructive aquaculture operations in Southeast Asia that grow shrimp for American tables. The oceans themselves are being emptied by unsustainable fishing methods, in what has been called “underwater clear-cutting.”⁷ Activities such as logging and mining are carried out by American corporations and/or for American consumers in ways that damage or destroy vital biodiversity hotspots. Below some of the greatest threats are discussed in more detail.

2.2 Causes

Extinctions have always happened in the course of evolution, but today, anthropogenic (human-caused) threats to animal species are particularly widespread:

- Loss and degradation of habitats
 - Conversion to farmland, ranches, roads, and housing
 - Deforestation

-
- Extractive industries, such as logging and mining
 - Destructive recreational uses, such as off-road vehicles and boating
 - Light pollution and noise pollution, which hamper reproduction
 - Industrial agriculture
 - Chemical pollution from industry, agriculture, pharmaceuticals, etc.
 - Unsustainable direct consumption of species by humans
 - Food (bushmeat trade)
 - Pet trade (primates, snakes, birds, fish, etc.)
 - Medical experimentation (export from native habitats to laboratories)
 - Use of body parts for decoration, display, or questionable remedies (fur, feathers, ivory, gall bladders, horns, etc.)
 - Unsustainable killing
 - Extermination as pests (e.g., prairie dogs)
 - Sport hunting
 - Diseases, some of which have invaded or accelerated due to human activity
 - Competition from introduced or invasive species
 - Climate change
 - Overpopulation

Climate change is an extremely troubling global threat, upsetting the flows of air, water, temperature, and nutrients. The responses of each species' predators, prey, and parasites to these changes further alter the world in which animals are adapted to survive – and broaden the scope of needed solutions. A good example of this is a report from the Center for Biological Diversity.⁸ To save polar bears, arctic foxes, beluga whales, seals, and other denizens of the Arctic, we are exhorted to do all the following:

1. Reduce atmospheric carbon dioxide to 350 parts per million. This entails working on energy efficiency, renewable energy, protecting forests, improving other land uses, and revolutionize transportation and food production.
2. Reduce other greenhouse gases (methane, ozone, black carbon). This requires us to control black carbon from diesel engines, biomass burning and cooking fires, and to reduce methane.

3. Help arctic wildlife survive unavoidable climate change. This involves ending oil and gas development in the Arctic, limiting the increase in shipping in newly ice-free waters, ending the trade and overhunting of endangered species (polar bear, narwhal), and reducing other toxins (such as mercury, pesticides, PCBs) that reach the Arctic by wind and water currents.

4. Political action at all levels. This step calls on citizens to communicate with their elected representatives, get involved in organized action, and “be the change you wish to see” (implementing lifestyle changes such as insulating the home, reducing carbon-intensive travel, and switching to a vegetarian, local-foods, and/or low-meat diet).

This enormous program encompasses a vast array of venues and actions by a large number of actors, which just goes to show how diverse is the array of threats that bring animal species to the brink of extinction. Another report outlines steps needed to help animals face climate change:⁹

Climate change is the largest threat that our natural heritage has ever faced. The effects of climate disruption are already being felt on even our most pristine landscapes. Setting aside areas where development is restricted is no longer enough — we must now actively work to create resilient habitats where plants, animals, and people are able to survive and thrive on a warmer planet.¹⁰

Overpopulation. Human overpopulation is one of the main causes of biodiversity loss.¹¹ The Center for Biological Diversity lists U.S. animals endangered directly or indirectly by overpopulation, including the Florida panther, Atlantic bluefin tuna, loggerhead sea turtle, and San Joaquin kit fox.¹² In fact, overpopulation is at the root of most threats, as 7 billion humans push wildlife off the land, demand a high-energy lifestyle that harms biodiversity, produce food destructively, exhaust and divert water sources, and much more. As I have written elsewhere, “Do we literally intend to eat ourselves out of house and planet?”¹³

Industrial agriculture. America’s food system depends on monoculture (vast fields of a single variety of a single crop), which reduces biodiversity in nature and the number of varieties cultivated.¹⁴ Overuse of pesticides, antibiotics, herbicides, and petroleum-based fertilizers pollute air, land,

and water, compounding the threats that animals face. Factory farms are horrendously cruel to the cows, chickens, and pigs who are confined there¹⁵, and refrigerated trawlers using radar and weighted nets chase ocean fish so relentlessly that the mudtrails caused by their operations can be seen from space.¹⁶

Thus many interlocking issues – overpopulation, climate change, poverty, looming water shortages, draining of the aquifers, diverting of rivers, damaging watersheds, industrialization, and more – mean that even if a species is saved in isolation, its habitat, food web, and ecosystem may remain in danger. We are in what E. O. Wilson calls “nature’s last stand.”¹⁷

2.3 Economic Considerations

Contrary to claims that valuing nature and protecting the environment costs jobs, animals living in nature provide work for millions of people. According to the Association of Fish and Wildlife Agencies, “More than 87 million Americans hunt, fish and enjoy other wildlife-related recreation annually, contributing over \$120 billion to the U.S. economy and supporting nearly three million jobs.”¹⁸ As their advocates point out, their license fees are generally directed toward preserving habitats and animal species (even though they intend to eventually kill individual members of such species). Ecotourists, birdwatchers, and photographers also create economic value.

There is also impressive economic opportunity for people engaged in preserving endangered species: conducting research, raising funds, educating citizens, staffing sanctuaries, implementing species survival plans, directing NGOs, enforcing laws and treaties, devising physical and social inventions, publishing success stories and warnings, leading nature travel, administering government agencies, serving as liaison between home and international field offices, and making policy for philanthropic organizations.

Valuing Nature

It seems obvious that to destroy nature – life on earth – is to destroy ourselves. Unfortunately, not everyone agrees. Formidable dissent is voiced by individuals, corporations, and governments that benefit from current practices, as well as evangelicals eagerly awaiting the end of the

world, and technocrats trusting that a new round of inventions will solve the problems and that domesticated nature will suffice. Other people merely seem unwilling to acknowledge the threats we face. For them, sheer denial is the most obvious (and well-funded) psychological factor enabling destruction. Other defense mechanisms have been suggested in this context: rationalization, dissociation, narcissism, addiction, consumerism, eating disorders, even psychosis.¹⁹

Perhaps putting a dollar value on nature would help convey its importance to those who understand cost only in fiscal terms. Though we must be cautious in further commodifying the natural world²⁰, a convincing case has been made that nature deserves a place in our accounting books. “Ecosystems services” that make possible life on earth include temperature mitigation, pollination, carbon sequestration, water purification, soil generation, recycling of wastes, and more.²¹ Meanwhile, ecosystems rich in biodiversity are more stable, productive, and sustainable.²² Such “natural capital” has been valued at an average of \$38 billion a year.²³ Computer tools now allow policymakers to assess ecosystem services and to identify the entire economic consequences of their decisions.²⁴ Some parties may never care about nature, but if they can be persuaded that their own interests coincide with those of animals and ecosystems, their support for conservation might be secured.

A more concrete example is a comparison of the value of a shark living in its natural habitat and the value that fishers may claim for killing it.²⁵ Through ecotourism, a shark in the wild is “worth” \$200,000 over its estimated 15-year lifespan, whereas a dead shark is worth \$50 for its fins, used in shark fin soup. The latter practice is, of course, further evidence of the threats to wildlife, while the former suggests that an economic argument may have force with some stakeholders. In fact, the island nation the Maldives banned shark fishing in 2010, since ecotourism comprises some 30 percent of their gross domestic product.²⁶ The Bahamas instituted a similar ban in 2011 and Venezuela established both a finning ban and a shark sanctuary in 2012.

Sustainable exploitation (as in managed forestry) is a strategy that has been proposed as a way to balance human needs with nature’s. Lest we place too much faith in such an approach, however, let us recall that determining the sustainable rate of extraction of any resource is a science in its infancy. According to Simmonds,

You can only truly show that something – including a removal rate – is sustainable over time. But the effect that it has in discourse is to give reassurance to policy makers who don't necessarily realize that whatever resource they are seeking to manage is subject to many now rapidly changing forces and that, at best, any nominal sustainability is experimental.... Climate changes (but also other factors) are causing unpredictable change.²⁷

The goal, of course, is for nature and humans to co-exist. This mutual benefit is demonstrated when farmers forego pesticides and mix uses of land for crops and animals, national parks provide recreation, and insurance policies reimburse ranchers for animals lost to reintroduced wolves. Appreciation of species and habitats goes along with respect for nature not as we exploit it, but in the form of many complex ecosystems.

2.4 Ethical Considerations

“For the animal shall not be measured by man. In a world older and more complete than ours they move finished and complete, gifted with extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings; they are other nations, caught with ourselves in the net of life and time, fellow prisoners of the splendour and travail of the earth.”

– Henry Beston, *The Outermost House*, 1928

Should we preserve animals only for our own needs? This is one argument put forward in defense of endangered species and ecosystems: there are plants we may one day need for medicines or animals we could use for researching human diseases. Indeed, this argument may sway some people, but it is really the lowest form of ethics, that of planned self-preservation. Furthermore, our treatment of animals currently used to fill medical purposes is often ethically appalling: keeping intelligent primates caged and isolated for decades, chaining bears so their gall can be extracted, killing rare rhinos to make (purported) aphrodisiacs from their horns. Science permits and defends its cruel exploitation of animals with questionable rationales.²⁸

Significantly, researchers do not “kill” animals in laboratories; the word “sacrifice” is still employed. Behind the sacrifice of animals at the altar of science lies the ancient and tragic belief that somehow, if animals are killed, human beings will be allowed to live.²⁹

A slightly more evolved position is that “we’re all in this together” – a sense that destruction of others may somehow harm ourselves. As a precursor of systems thinking, this has something to recommend it, but can it lead to real influence and action, or does it offer at most vague good will?

Perhaps the position that is at once the most complete and the most compassionate is the belief that animals deserve to live free of human harm, just for their own right.³⁰

Religions are often the proponents of ethics. Christian beliefs span the spectrum from literalist certitude that animals were made for human use, to a sense of responsibility and stewardship. Buddhist traditions value all sentient beings, and the precepts for right action and right livelihood are two of the eight highest Buddhist teachings. In the Jewish faith, the Hebrew phrase “Tikkun olam,” which originated in the classic rabbinic period of the 16th century, means “repairing the world,” and for some people includes caring for animals.³¹ Perhaps most recent is a view that combines spiritual ideals with social conscience – the idea that human moral evolution (over millennia) widens the circle of compassion, including in men’s sense of concern first outlanders, then the slaves of one’s own nation, then women, and ultimately animals.

No position, however, spares us from moral dilemmas. When interests collide, what is the ethical choice, and who decides?³² Prohibiting animal sacrifice can be seen as privileging one culture over another; to some people, even blood sports are a kind of culture. Furthermore, many in the U.S. got rich by exploiting its lands and animals; how can we now forbid others to do the same? Some dilemmas occur as a conflict between two praiseworthy values: We want to protect animals from the bushmeat trade but we also would protect people from hunger.

Fortunately, much progress can be made outside these dilemmas (though facing resistance from entrenched economic interests). We could identify which medical experiments are unnecessary and discontinue or replace them.³³ We can create sanctuaries and pass and enforce laws.

Perhaps the greatest challenge is meat. Even people who are otherwise concerned about the earth and other living beings defend their choice to eat meat, though it is demonstrably the most destructive and cruel legal human activity. The ethical issues are clear: Producing meat diverts grain that could feed people (more than seven times as much grain as

American people consume)³⁴, and causes vast damage to air, water, and soil.³⁵ Says one ethicist, “If we are to ensure adequate food and water for all humans without exceeding the Earth’s capacity to support life, we must find the courage to address directly the morality of eating meat on an increasingly small planet.”³⁶ But since rational arguments in favor of renouncing meat often fail to convince, several authors have taken the reverse approach: questioning the dominant carnivore worldview.³⁷

Cultural and Psychological Obstacles

Obstacles faced by animal activists and conservationists include psychological defense mechanisms and cultural factors such as:

The perception that human needs and animal needs are incompatible

Greed that drives individuals, criminal enterprises, and corporations to destroy ecosystems and exploit their animal inhabitants for personal gain

Poverty that leads some people to eat or traffic in animals

Belief in scientifically unsupported folk remedies that contain animal body parts

Cultural attitudes, such as beliefs that animals don’t feel or think, that “sport” hunting is admirable, that eating meat is necessary for health

Bureaucratic inaction or frank hostility from those charged with upholding laws

Success Stories

In the face of unending bad news and gloomy predictions, it is important to remember that conservation efforts can succeed.³⁸ Przewalski’s horse, for instance, whose population once consisted of only 31 individuals, now numbers about 1,500 in captivity and 400 reintroduced to the home range in Mongolia and China.³⁹ In the U.S., some of those saved from extinction are the bald eagle, black-footed ferret, whooping crane, and peregrine falcon. Some species have experienced such a successful comeback that they have been taken off the endangered species list (“delisted”).

Whole ecosystems are occasionally preserved, such as Palmyra Atoll (a thousand miles south of Hawaii), which was purchased from a private family by the Nature Conservancy in 2000 and turned into a protected marine monument and research center.⁴⁰

Beleaguered, politicized or corrupt bureaucracies charged with protecting nature sometimes simply do not enforce the law. Lawsuits from environmental organizations can prevail against the powerful commercial and political forces arrayed against them when judges enforce legal protections that agencies ignore. Three cases from late 2011 illustrate this: legal protections for more than 750 endangered species of animals and plants, protections that took more than a decade to establish, were made legally binding; a judge upheld protections (originally issued in 2008) for endangered salmon and steelhead; and a federal judge dismissed a state lawsuit intended to overturn protections of Alaska's beluga whales.⁴¹

National governments can take important steps. In 2002, El Hadj Omar Bongo, the president of Gabon, authorized the creation of 13 national parks, covering 10 percent of the nation's land.⁴² American presidents may protect public lands by declaring them national monuments, such as Grand Canyon, Chaco Canyon, and Glacier Bay, as allowed by the 1906 Antiquities Act.⁴³

Popular outcry has been credited with preventing planned destruction. For instance, soybeans were being grown in the Amazon on rainforest land cleared for the purpose. According to the Union of Concerned Scientists,

In just a few years, it grew to become one of the main causes of Amazon deforestation. However, in an even shorter period, the strong response of civil society resulted in a voluntary moratorium on soy expansion into forests, reducing its role as a driver of deforestation.⁴⁴

Ongoing vigilance is needed to protect species and ecosystems that have been preserved and those that remain under siege.

3. Solutions

Parties involved in conservation – either for or against – include governments (legislatures and regulatory agencies), nongovernmental organizations (NGOs), scientists, corporations, foundations, and individuals. A successful movement to save endangered animals must engage all of these.

Top-down solutions involve relatively few actors. A president sets aside land in protected reserves; wealthy individuals buy and protect large tracts of land, as in Chile’s Pumalin Park,⁴⁵ or donate to foundations or even create them.⁴⁶ Corporate leaders decide to halt destruction or to change their business products and practices. Disadvantages: Top-down solutions may be perceived as controlling, subtle colonialism, reducing the rights of nearby people, and an excuse for inaction. *Bottom-up solutions* include grassroots actions by many potential actors, including “retail environmentalism,” encouraging lifestyle changes, organizing and educating many people, donations and memberships, and political action. Disadvantages: Bottom-up action can be slow, costly, and labor-intensive.

Actions and programs intended to preserve endangered animals are as diverse as the causes of the problem. They can be roughly categorized as follows:

- Tackle climate change and overpopulation (It is beyond the scope of this paper to outline these missions in detail)
- Preserve living animals
 - Stop smuggling, poaching, and the trade in animals and body parts
 - Work with farmers and ranchers to reduce competition from animals they consider pests, or compensate them for losses
 - Support Species Survival Plans
 - Support gene banks
- Protect habitats while meeting needs of local humans
 - Sanctuaries, laws, migration corridors, conservation easements
 - Jobs as wildlife rangers or other roles that sustain nature (ecotourism)
 - Prove value of nature to voters and policymakers

- Improve land use practices (smart growth, infill, transit villages to reduce urban sprawl)
- Educate (includes addressing cultural attitudes and behaviors, valuing nature)
 - Lifestyle changes (meat, transportation, sustainable energy)
 - Aggression (war, guns, rituals of manhood)
 - Enlist population to create the political will to value nature
 - Trips into nature to excite appreciation for wildlife
 - Discourage people from wanting exotic pets
- Enact and enforce laws
- Support nonprofits that work to save endangered species through education, advocacy, research, and funding to save endangered species
- Revamp agriculture
 - Reduce use of pesticides, feedlot antibiotics, and other chemicals
 - Support organic farming in relatively small, polyculture farms
 - Reduce use of machinery that uses fossil fuels
 - Re-localize foodsheds
- Create innovations (e.g., fishing methods that generate less bycatch)

Those engaged in this work are typically passionate about it and may disagree with those who take different approaches from their own. For instance, the practice of captive breeding (sometimes followed by re-introduction of animals to former habitats) has been criticized, in that it does not save habitats and gives a false sense of security. To other critics, costly technological procedures such as cross-species surrogacy and *in vitro* fertilization are a waste of resources. But the outcome of some approaches is not yet known: Which ones will turn out to be lifesavers, and which will turn out to be only marginally helpful, or even dead ends? Given the sheer numbers of species at risk and the broad range of factors contributing to that risk, many solutions are needed and many obstacles must be overcome. Sometimes criticizing each other's efforts can be counterproductive. Accordingly, without taking sides in these debates I highlight some of the key overall strategies below.

Preserving Biodiversity Hotspots

Experts overwhelmingly support the movement to protect biodiversity hotspots, where the greatest number of species live in the most compact spaces. This is done by government action, purchase by NGOs,

conservation easements, and providing alternative livelihoods, food, and energy sources for people living nearby.

Laws and Treaties

Laws and treaties exist to protect animals and habitats. Their effectiveness depends on the willingness and ability of governments to enforce them. The most important ones are listed in Appendix B.

The Role of Science and Technology

Although industrialization and “modernization” are major culprits in the present wave of extinctions, the science and technology that characterize them can, in some ways, help preserve endangered animals. Radio collars, photo traps, GPS, and DNA testing help researchers gather and integrate information about the census, habits, territory, genetic make-up, and dietary needs of a species. This information supports practical actions, such as selecting key biodiversity habitats, creating migration corridors, and adding species and their habitats to protected species lists.

High-tech solutions such as assisted breeding can preserve the most critically endangered species. Cryogenic enterprises (sometimes called Noah’s Archives) form the last-resort banks of genetic material of endangered species. One model is the Global Crop Diversity Trust, which has stored seeds of thousands of plants in a remote place in Norway as a last-ditch repository of genetic information.⁴⁷ Animal gene banks include the Frozen Zoo in San Diego;⁴⁸ the United Nations Food and Agricultural Organization has issued guidelines for this form of conservation.⁴⁹

The Internet and social media can support NGOs in communicating, fundraising, and even managing commercial enterprises that benefit a focal species. The informatics project InVEST helps policymakers evaluate the environmental costs of options they are considering.⁵⁰ Improved efficiency in energy production and use will help reduce our dependency on fuels that are destructive to extract, process, and use.⁵¹

Education

Education about endangered species and the factors that threaten them is offered in many venues: schools, print and electronic media, documentaries, public lectures, and more. People learn how they can help: donating to a conservation group, eliminating harmful actions, voting or

taking other political action, and making lifestyle changes. The “anthropocene mass extinction” has even been proposed as an entire science curriculum.⁵²

Education goes beyond verbal information. Direct experience of nature and animals, through treks, visits to zoos, or wilderness adventures, can make it more likely that a person will respond to factual information. Likewise, artifacts of popular culture such as movies (whether documentary like “The March of the Penguins” or stories such as “Free Willy”) prepare people to become receptive by promoting identification with animals and compassion for them.

In recent years, reputable zoos have been transformed into advocates for conservation, educating millions of children and adults every year about the threats to endangered species, and what they can do about it. Furthermore, the Association of Zoos and Aquariums (AZA) and its more than 200 member zoos support thousands of conservation projects in the U.S. and more than 100 other countries, to the tune of \$90 million a year. AZA established Species Survival Plans more than 20 years ago to combine breeding, habitat conservation, public education, and relevant research to keep selected species alive.

Effective Strategies of Persuasion

How effective is education? Social campaigns of many kinds extol the value of public education about an issue, whether it is smoking, AIDS, drunk driving, or seat belt use. The assumption is that once people know the facts, they will make a rational choice and do what is in their best interest. This is not always the case, and appealing to reason is even more challenging if consequences are distant in place and delayed in time. Furthermore, learning about threats to animals (and one’s own responsibility for them) can stimulate guilt or fear, emotions that cause people to avoid the topic or to engage in rationalization or other defense mechanisms. Even when persuasion is effective in altering people’s beliefs, altering their behaviors can be even more challenging.

In response to these difficulties, psychologists and other social scientists have begun to prepare effective messages that draw realistically on diverse motives and personal dynamics, sidestepping or transforming defenses, and framing successful appeals. Such strategies will, at the least, promote identification with other forms of life, associate conservation with people’s own interests, and identify simple actions they can

take to reduce guilt and increase a sense of participation with nature.

Education includes deep cultural change. We need to view nature not as an infinite gold mine or toy store, but as our home and partner. We need to eat less meat and stop using animals for experiments that are in some cases not only cruel but also unnecessary. We need to change our attitude of entitlement and our belief that progress means doing more of what we have been doing.

4. Making the Case: Counter-Arguments and Responses

1. *Extinction of animal species is not an important issue*, compared to war, climate change, overpopulation, increasing disparities in wealth, terrorism, etc.

Response: Biodiversity is valuable for its importance to food webs; possible future uses for humans, such as yet-to-be discovered medicines; and, not least, the ethical evolution of humans as we expand the circle of compassion. Too, some of the actions we take to save animals are the same ones we take to save ourselves (e.g., reduce pesticides, tackle climate change). Human health and wildlife health are interconnected. Pesticides and herbicides bioaccumulate in the ecosystem, reaching the food we eat and the water we drink. Parkinson's disease, for example, has been linked to two herbicides.⁵³ Indicator species (the proverbial canary in the coal mine) warn us of dangers that may eventually overtake ourselves. For instance, endocrine disruptors (chemicals that can be found in many commercial products) are known to contribute to the fall in amphibian numbers⁵⁴ and to contribute to cancer.⁵⁵

2. *Governments can't afford politically or financially to save endangered species.*

Response: There are several reasons we can't afford not to save them. First, saving habitats, which is strongly recommended in this paper, involves protecting air and water, and mitigating climate change, which have direct positive value on the future of life. Second, there may be yet undiscovered uses for plants and animals that could benefit humankind. Third, the seriousness of the climate crisis is becoming clearer to the electorate (despite some entrenched interests). There are precedents for other long-term investments that U.S. governments have made, such as sending humans to the moon, building interstate highways, and creating a national park system.

3. *NGOs can't afford it financially.*

Response: While it is true that conservation and animal rights groups are usually outspent and outmaneuvered by powerful industries and criminals and ignored by thoughtless people, some NGOs have substantial funds. Membership dues, donations, grants, and other income gave The Nature Conservancy almost \$1 billion in 2010,⁵⁶ while in the same year Conservation International also had net assets of more

than \$1 billion.⁵⁷ In some places, biodiversity-rich land is surprisingly affordable.⁵⁸

4. *Extinctions are natural. Nature will evolve new creatures.*

Response: This specious and ill-informed argument rationalizes extinction and inaction. Wildfires are natural – does that mean we allow them to burn down our homes? Microbial diseases are natural – does that mean we decline to seek cures for them? Furthermore, earlier mass extinctions happened over geological time of millions of years. The present one is occurring over hundreds of years, which is not enough time for many species and ecosystems to adapt or evolve. The timeline for the evolution of new creatures may be short for bacteria (hence antibiotic resistance) and some insects, but much longer for vertebrates.⁵⁹ In any case, we can't predict which direction evolution may take; there's no guarantee it will be favorable to humans.

5. *Animals exist for human needs.*

Response: When stated in a Judeo-Christian context, this is part of an anthropocentric emphasis on human dramas and a fundamentalist interpretation of biblical texts. It is difficult to challenge this belief successfully in the minds of those who are protective about their literalist religion. However, other faith groups do understand the threat to animals, do not take scriptures literally, have respect for life, and are working to preserve nature. Speaking their language of “stewardship” and “love of all creation,” conservationists can find common ground. When stated in secular terms, this argument is anthropocentrism at its worst. However, one could gain traction by responding within the terms of this viewpoint, saying, for instance, “Yes, they exist for our benefit, and we need an even greater variety of animals than we thought! Because of unsolved diseases, humans need to preserve rainforests.”

6. *Cultural relativity. We must allow indigenous peoples to hunt, eat or wear animals for “traditional” purposes; religious groups to perform ritual sacrifices; or permit entrepreneurs to turn forest ecosystems into Christmas tree plantations.*

Response: Tribal customs (whether the tribes are indigenous or homegrown) have important functions: to solidify a society, provide life transition rituals, and to pass on knowledge to succeeding generations. But when customs contribute to the destruction of ecosystems and species, they should not pass unchallenged. Since it is unlikely that we can protect all threatened species and ecosystems, saving what

is realistically possible will doubtless involve compromises, such as condoning some carefully managed uses. For example, in Alaska, wild animals who are part of native cultural and religious ceremonies currently may be killed under special treaties and permits.⁶⁰ Cultural traditions could thus constitute one criterion on which priorities are based.

Recommendations

In order to further the solutions outlined above, the movement to reduce further extinctions should support the following guidelines:

- Emphasize the interdependency of nature, human, and climate, preserving intact or compromised ecosystems where possible.
- Support enforcement of existing laws, treaties, and regulations
- Work to improve these laws and/or to pass additional regulatory measures when appropriate
- Be vigilant for destructive amendments or other political game-playing when laws and regulations are being debated and implemented
- Detect and expose de facto bureaucratic stonewalling
- Beware of unintended consequences (e.g., pre-emptive destruction of land features or property in anticipation of expected regulations)
- Raise funds to purchase and protect critical habitats, including migration corridors and future habitats that will be needed as local climates change
- Encourage debt-for-nature swaps
- Encourage local and regional authorities to regulate if national authorities fail
- Intensify educational efforts
- Participate in coalitions, even with unlikely partners
- Draw on the skills of social scientists and use creativity in devising solutions

5. Conclusions

Successful projects have demonstrated that individual endangered species can be saved, typically at great cost. Preserving ecosystems can save many species at once. And although they may be slow and cumbersome, laws, regulations, and treaties can be helpful.

Many of the steps recommended here are congruent with steps that support human survival and well-being and are being pursued by people acting for other causes. Providing clean water sources contributes to conservation by reducing competition between humans and wildlife for water. Where there is real or perceived conflict between human needs and species survival, reasonable adjustments can be envisioned in some cases, though inevitable losses are, unfortunately, also to be expected. It is the task of conservationists, environmentalists, and animal activists to limit the latter as much as possible.

Since humans have (and have used) the power to destroy entire ecosystems and drive species to extinction, one could argue that animal life (even animals in what is presently the wild) depend on humans for their survival.⁶¹ We have had the warning signals⁶²; now it is up to us. Concerning prospects for preserving some of life's wondrous biodiversity, E. O. Wilson asserts,

The problem can be solved. Adequate resources exist. Those who control them have many reasons to achieve that goal, not least their own security. In the end, however, success or failure will come down to an ethical decision, one on which those now living will be defined and judged for all generations to come.⁶³

6. Appendix A: Some of the Organizations Working for Biodiversity

Hundreds of organizations are working to preserve biodiversity on Earth. Here are some of the most prominent and effective ones. *(Note: These organizations have varying policies on hunting, trapping and other forms of wildlife “management” that do not necessarily represent the positions of or endorsement by the Animals and Society Institute.)*

Center for Biological Diversity www.biologicaldiversity.org

CBD combines scientific information, powerful legal actions, negotiating with government agencies, and citizen petitions to generate protection for animals, plants, and ecosystems. Threats to wildlife as diverse as ranching, overpopulation, logging, and off-road vehicles are among the targets of CBD activity.

Conservation International www.conservation.org

CI envisions a healthy world for humans and their cultures, which requires that we preserve our natural resources, including biodiversity. By assessing the value of healthy ecosystems for human life and making rigorously tested information available to decision makers, this international organization’s scientists, policy experts, and field staff work to “make conservation a priority around the world.”

Defenders of Wildlife www.defenders.org

Based in Washington, DC, DoW protects American habitats and wildlife, including endangered species, through such projects as species restoration, coexisting with carnivores, compensating ranchers for animals lost to predators, and offering rewards for information about crimes against protected species such as wolves, bears, lynx, and sea otters.

International Programme on the State of the Ocean

www.stateoftheocean.org

IPSO, which is hosted by the Zoological Society of London, combines expertise from science, communications, legal, and political spheres to identify, predict, and address problems that impact oceans.

International Union for Conservation of Nature www.iucn.org

With more than 1,000 member organizations in 140 countries, 1,000 professional staff in 60 offices, and thousands more volunteer scientists and experts, IUCN states, “Our mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.” IUCN conducts research, develops the Red List of endangered species and other databases such as Protect Planet Ocean, conducts field projects, and supports governments, agencies, and communities to develop laws and policies.

Interpol www.interpol.int

Interpol, representing 188 nations, is the international organization of crime-fighting agencies, which tracks criminals and criminal organizations whose crimes span national borders, working with other agencies to dismantle organizations and assist with capture and prosecution. Its Environmental Crime Programme helps member nations enforce laws and treaties. Illegal logging, trading and smuggling of endangered species, pollution crime, and water crime are some of the practices that Interpol targets.

Jane Goodall Institute www.janegoodall.org

Starting with her groundbreaking research on chimpanzees, Jane Goodall has become an advocate for the great apes, their habitats, the human communities around them, and the future of young people. JGI engages in research, education, and advocacy, while developing creative programs to provide sustainable livelihoods for people who live near protected areas in Africa. Roots & Shoots, JGI's youth membership program, has chapters in 110 countries.

National Wildlife Federation www.nwf.org

NWF, an organization almost 75 years old, has more than 4 million members, supporters, and partners across the U.S. One program, Certified Wildlife Habitat, encourages citizens to make their back yards suitable for wild animals to live. NWF also defends laws and supports tackling the climate crisis and getting kids outdoors as pathways to protecting wildlife.

The Nature Conservancy www.nature.org

TNC protects lands and waters in order to conserve earth's diversity of plants, animals, and ecosystems. Over 500 scientists and other staff members operate in all 50 states and 33 countries. Eschewing confrontation, TNC partners with individuals, corporations, nonprofits, and governments. Purchasing land to protect it and its inhabitants from exploitation is TNC's classic strategy; today's broader approach includes guiding businesses to make wiser decisions, helping indigenous communities protect their homelands, and promoting sustainable land use.

NatureServe www.natureserve.org

A spinoff of The Nature Conservancy originally called the Association for Biodiversity Information, NatureServe provides scientific and technical support for 82 conservation programs and databases in the Western hemisphere. Based in Arlington, Virginia, it has a staff of almost 1,000 scientists and conducts dozens of projects, with an overall goal of providing biodiversity data, assessments of species and ecosystems, and analyses to support conservation.

SaveNature.Org www.savenature.org

SNO raises funds to purchase and protect biodiversity hotspots, especially rainforest and coral reefs, partnering with organizations in the field and with over 150 zoos, aquaria, botanical gardens, and museums nationwide. Through educational programs and special events, SNO raises awareness about and participation in saving nature in this country and abroad. (Disclosure: The author of this policy paper serves on the board of SNO.)

Sierra Club www.sierraclub.org

Founded by John Muir, the Sierra Club is the largest nature membership organization in the U.S. Its programs include nature hikes and treks, getting kids outdoors, advocating for regional and national open space, and defending habitats from development, political attacks, and extractive industries.

Society for Conservation Biology www.conbio.org

SCB consists of a wide variety of conservation professionals: scientists, educators, government staffers, resource managers, policy experts, and more. Its goal is to promote the science of conservation, and it publishes two scientific journals, a quarterly magazine, and a downloadable textbook. SCB's annual conferences bring together conservation professionals from around the world to further its mission of conserving biological diversity.

Traffic www.traffic.org

This organization, founded in 1976, monitors the wildlife trade to protect wild species and their habitats from over-exploitation. Traffic, with about 100 staff members based in dozens of countries, is governed by a steering committee comprised of members of its partner organizations, World Wildlife Fund and International Union for Conservation of Nature, and it collaborates with CITES (Convention on International Trade in Endangered Species).

United Nations Environment Programme www.unep-wcmc.org

UNEP's World Conservation Monitoring Centre assesses biodiversity worldwide, maintains a database, and provides authoritative knowledge for decision makers, especially corporations. Services include support for implementing CITES and other agreements, guidelines for assessing the impact of trade, designing and maintaining the CMS Information Management System, hosting conferences and workshops, and more.

U.S. Fish and Wildlife Service Forensics Laboratory

www.lab.fws.gov

Located in Ashland, Oregon, this is the world's only lab dedicated entirely to solving crimes against wildlife. Using the scientific techniques of forensic examination of physical evidence, the staff connects the victim and the crime scene to the suspect, providing evidence that can be used to bring to trial violators of national and international laws and treaties, including CITES.

Wildlife Conservation Network www.wildnet.org

WCN supports independent conservationists around the world, offering funds and tools to help them and their organizations develop innovative solutions that will allow coexistence of humans and wildlife. WCN connects donors (both large and small) with specific projects, each of which focuses on a particular animal species and celebrates the spirit of “conservation entrepreneurship” by supporting alternative livelihoods to reduce human-animal conflict.

Wildlife Conservation Society www.wcs.org

WCS, with over 200 staff scientists, manages nearly 500 conservation projects in 60 countries and oversees 200 million acres of protected land around the world. Focusing on 350 vulnerable species, WCS urges citizen engagement with elected officials, conducts research on animal populations, provides education, and manages four zoos and an aquarium in New York City.

World Commission on Protected Areas

www.iucn.org/about/union/commissions/wcpa

WCPA, administered by the Programme on Protected Areas of the IUCN, has over 1,600 members from 140 countries. It works to establish and defend Marine Protected Areas, Marine Reserves, and Marine World Heritage Sites.

World Wildlife Fund www.worldwildlife.org

WWF has a huge membership base (1.2 million in the U.S., 5 million globally) and works in 100 countries to protect wild places and animals, promote sustainability, and encourage efficiency in resource use. WWF has identified 19 high-priority biodiversity hotspots as well as over a dozen “flagship species” such as the giant panda. Its scientists, policy makers, and field staff partner with corporations, government agencies, academic institutions, and others.

7. Appendix B: Selected Laws and Treaties

Agenda 21, UN Conference on Environment and Development (UNCED);
<http://www.un.org/esa/dsd/agenda21/index.shtml>

Antiquities Act of 1906, 16 USC 431 – 433

Convention on Biological Diversity (CBD), Rio de Janeiro, 5 June 1992,
1993 Aust TS 32; 31 ILM 818

Convention on International Trade in Endangered Species (CITES),
993 UNTS 243; TIAS No. 8249; 27 UST 1087

Convention on Migratory Species, Bonn, 23 June 1979; Aust TS 1991 No 32;
1459 UNTS 362

Endangered Species Act, 16 USC 1531 – 1544

European Union Wildlife Trade Regulation, Council Regulation (EC)
No 338/1997

Lacey Act of 1900, 16 USC 3371 – 3378

Marine Mammal Protection Act, 16 USC 1361 – 1421h

Migratory Bird Treaty Act of 1918, 16 USC 703 – 712

8. Endnotes

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