Where Have All the Species Gone?

Jane's son David was just learning to write. He was too young to read environmental textbooks. But he knew that elephants in Africa were being "*pocht*" (that is, killed by poachers).

The message starts in preschool or kindergarten, and it doesn't stop. "Just imagine what it will be like for you and your children to live in a world without elephants, giraffes, tigers, or monkeys,"[1] says a biology text.

The idea that all these animals will completely disappear is nonsense. But by exploiting our children's natural sympathy for animals, these books build up an impression that the world will soon be devoid of most of the animals that our children love.

The children's book *Earthcycles and Ecosystem,* written in 1991, says: "By the year 2000, one of every five species on Earth will have become extinct. People are largely to blame."[2]

Earthcycles and Ecosystems is not a textbook, but the texts march to the same drumbeat:

- "Extinction rates are estimated to be as high as 100 species per day," says the *Green Team Teachers' Guide* sponsored by BC Environment.[3]

- "Every week, more than 20 kinds of living things disappear from the Earth forever," says *Science Is . . .*, a science supplement.[4]

- "At least one species is lost forever every hour of every day; some estimates say as many as 45 species of plants and animals will die each day," writes Adrienne Mason in *The Green Classroom*, a book for teachers.[5]

- A tenth grade text, *Science: Ideas and Applications*, declares it "alarming . . . that in this century alone, over 200 plant and animal species have become extinct because of human interaction."[6]

People, of course, are responsible for this destruction. People crowd out species, destroying their habitat.

- "Each year more than 8,000 different kinds of plants and animals become extinct because people are cutting down forests, damming rivers and building cities," says the *Kids Ecology Book*.[7]

- "Humans disrupt the web of life by destroying habitat in many ways, such as filling in shoreline, draining marshes and clearing forests." The *Green Team* continues: "Habitat destruction is now the major cause of extinction."[8]

- *Take Action*, endorsed by the World Wildlife Fund, warns that "one species becomes extinct every 15 minutes." One reason is that "their homes are being destroyed by cities that gobble up wild areas like monsters in a video game."[9]

Many other animals are disappearing because of hunting.

- The black rhinoceros is hunted for its horn, which is ground up and used as a potion.

- The African elephant is pursued for its ivory tusks, which are used for jewelry.

- "Daggers made from rhino horns, jewelry fashioned from sea turtle shells, and fur coats made from jaguar skins are just a few of the wildlife products illegally sold each year," says Ranger Rick's *NatureScope*.[10]

While the texts are correct about the dangers to these animals, they do not explain why these animals are hunted to the point of near extinction or how to protect them.

Looking at the Numbers

When children think about endangered species, they think about elephants, giraffes, and other appealing creatures. Yet the sweeping claims about extinction also include very small, often microscopic, animals and plants—insects and fungi. While these are also important for ecosystems, children should know that they account for the major part of these high numbers. And, as we will see, the high numbers are based on a somewhat controversial theory.

The truth is, we don't know how many species are disappearing. We don't even know the number of species that exist. Scholars have identified and named 1.4 million species.[11] In 1980, the *Global 2000* report published in the United States by the President's Council on Environmental Quality estimated that there are between 3 and 10 million species.[12] But in 1991, Paul R. Ehrlich and Edward O. Wilson said that there may be one hundred million species![13]

The numbers have grown because there may be many more insect and other arthropod species than previously thought. But as Dennis Murphy, director of the Center for Conservation Biology at Stanford University, admits, "Nobody knows how many species there are."[14] Since scientists are uncertain about how many species there are, they are also unsure about how many species are disappearing.

In 1980, the *Global 2000* report predicted that "at least 500,000 to 600,000 species" would become extinct in the next 20 years.[15] In 1993, Julian Simon and Aaron Wildavsky reviewed the source of these figures.[16]

- They found that the *Global 2000* Report based its predictions on estimates by Norman Myers in his 1979 book, *The Sinking Ark*. But Myers did not provide any basis for this estimate.

- They concluded that "pure guesswork" is the basis of a figure—one hundred species a day—that many people have treated as a "scientific statement."[17]

Scientists have been trying to figure out if there is a reliable way to predict how many species will be lost when habitat disappears. A famous series of studies actually attempted to measure how many species were lost when habitat was destroyed. And these were some studies! (Frankly, it was difficult for the two of us, Michael and Jane, to believe the descriptions of this process. Yet these studies have been described in several recent books, most notably *Noah's Choice*, by Charles C. Mann and Mark L. Plummer.)

In the 1960s, several biologists, including Edward O. Wilson, decided to test out the relationship between species loss and habitat loss by actually destroying the habitat on some small islands. Before and after, they would count the number of species that had disappeared. So they hired exterminators to destroy living things on small mangrove islands (little islands usually smaller than a house) off the

southern coast of Florida. The exterminators built scaffolding around the islands, draped them with nylon, and pelted them with methyl bromide and tear gas.[18] After they had done their deed, scientists did their counting. Based on these studies (and some others in which the researchers actually used chain saws to chop off portions of little islands),[19] the scientists began to estimate what percentage of species will disappear in an area if a certain percentage of habitat is lost. E. O. Wilson presents this rule of thumb: if 90 percent of a habitat is destroyed, 50 percent of the species are lost.[20]

But, the results of all these studies are so variable that it is not clear that this rule of thumb is valid even for islands. And, it may not apply at all to forests and other places that aren't cut off by water. Professor Lawrence Slobodkin, writing in the journal *Nature*, concluded that the many studies have shown that the theory is "useless for explaining or predicting actual cases."[21] Others defend the theory, but predicting future extinctions on the basis of this evidence is scientifically risky.

A Brighter Picture

When it comes to *actual* extinctions that we know about, the picture is brighter. It is true that some species and subspecies have disappeared during the past few centuries, from the dodo bird in the seventeenth century to the Bali tiger in the twentieth, and many bird species on the Hawaiian Islands have become extinct. But for the most part the recorded losses have not been on the massive scale claimed in our children's texts.

- Puerto Rico was almost completely stripped of its forest at the turn of the century. "Yet it did not suffer massive extinctions," writes Charles Mann. Only seven of the island's 60 species of birds disappeared.[22] Ariel Lugo, a scientist who has studied Puerto Rico for a decade, explains that crops provided cover for the birds and the forest regrew rapidly.

- During the nineteenth century, forests were extensively logged east of the Mississippi and around the Great Lakes. Only five birds became extinct, say Charles C. Mann and Mark L. Plummer in their book *Noah's Choice*. They were: the ivory-billed woodpecker, the passenger pigeon, the Carolina parakeet, the heath hen, and the Bachman's warbler.[23]

- A recent book prepared by the World Conservation Union, *Tropical Deforestation and Species Extinction*, also supports the idea that the rate of extinctions is low. "Despite extensive inquiries we have been unable to obtain conclusive evidence to support the suggestion that massive extinctions have taken place in recent times as Myers and others have suggested," the authors write.[24]

Saving Elephants and Tigers

When it comes to the exotic animals that our children really do care about, such as elephants, tigers, and rhinos, textbooks usually blame hunting. Yes, this is the immediate cause, but not the full story.

Consider the African elephant. Late in the 1980s, many people became worried about these giant creatures. In several African countries, governments had created national parks but could not keep away poachers, who wanted the elephant's ivory tusks. Since elephants can cause enormous damage (they can tear down trees and destroy a year's crop of corn in a night), many people living near elephants were letting poachers kill them, especially if the poachers gave rewards.

International conservation groups such as the World Wildlife Fund pushed for an international ban on trade in ivory. That ban was adopted in 1989, but elephant numbers continued to fall in some countries. In others, including Zimbabwe, Botswana, Namibia, and

South Africa, elephant populations were increasing, not falling. But international conservation groups ignored this fact.

Elephant populations were going up in these countries for a number of reasons, including effective law enforcement. In addition, in parts of Zimbabwe, elephants were being protected because local villagers had a sort of "ownership" of the nearby elephants.

They received the benefits when elephants were legally hunted, and do so today. Villagers receive meat from the elephant plus proceeds from the sale of elephant hides and from hunters' payments for tusks, as well as from other hunter fees. Even though elephants can be very destructive, villagers who profit from the elephants will protect them from poachers. (This "ownership" does not mean that wild animals must be domesticated like cattle and sheep in order to save them.)

In Kenya, in contrast, where many elephants are kept in large national parks, the poaching goes on—in spite of the ban on the ivory trade. The chief reason is that no one who benefits directly from the herd through the kind of "ownership" found in parts of Zimbabwe. Thus, the people who live near elephants are not eager to help park rangers protect the herds for the future.[25]

So, too, with the tiger in Asia. Many Asians want tiger pelts and tiger bones (which they make into potions), and are willing to pay handsomely for them. Governments, under pressure from environmentalists, are attempting to protect the tigers by setting up reserves and trying to keep out poachers. But they have been unsuccessful.[26] If villagers received benefits when the tigers were killed, tigers would more likely be protected.

Today, as things stand, the only way to derive income from the tigers is to kill them illegally. Legal hunting and selling are not the problem, despite what the textbooks say. The problem is that no one has a personal incentive to protect the tigers, so poaching occurs.

Wildlife preservation is a complex issue, involving the loss of habitat, the effects of introduced species, and other problems.

Protecting wildlife today sometimes requires active human intervention. Without such management, wild animals can sometimes destroy their own environment. What is missing in our children's texts is a recognition that animals will become extinct in the wild if no one has an incentive to protect them.

What People Are Doing to Help

Overall, however, there is good news about endangered species. As human population grows, so does the ability of people to develop ways to protect wild animals and plants. Around the world, individuals, environmental organizations, and governments are trying to save endangered species.

- The Nature Conservancy and the World Wildlife Fund have sponsored the debt-for-nature swaps discussed in Chapter 9. These reduce countries' debts in return for protection of animal or plant habitat.

- The Nature Conservancy purchases land all over the world in order to protect endangered species.[27]

- As we saw in Chapter 9, pharmaceutical companies have begun to work with organizations in tropical countries to identify and preserve plants that may become the basis for medicines.

- Many zoos and animal centers are trying to save species in danger of extinction through captive breeding. For example, the Exotic Wildlife Association, an international organization of game ranchers, owns 19,000 animals that belong to species that are threatened or endangered in the wild.[28]

Talking to Your Children

Now you can answer questions that your children may ask about endangered species.

- How many species are becoming extinct?

  No one knows. The very high numbers (ten thousand a year, for example) are based on guesses about how many species there are. These numbers include not only familiar animals like the rhinoceros and the tiger but also countless species of insects, spiders, and fungi. These are important to ecosystems but children are probably most concerned about larger animals. Some of these, like the rhinoceros and some kinds of tigers, could become extinct in the wild.

- What are people doing to protect endangered species?

  Around the world many people and organizations are protecting endangered wildlife. Governments have set aside parks, and groups like the Nature Conservancy purchase land that has endangered species on it. Zoos and universities conduct captive breeding programs to assure the continuation of some endangered animal species.

- Will the African elephant and the black rhinoceros disappear?

  They will probably not become extinct, as long as there are organizations and zoos that will protect some of them. They may become extinct in the wild, however, unless some way is found for people who live near these animals to benefit from protecting them.

Activities for Parents and Children

Here are some activities to inform your children about programs that help save animals all over the world. Perhaps your children will want to get involved in some of them.

Visit a Zoo

Take your children to a zoo and ask the zookeeper to tell your children about its programs to breed endangered animals and reintroduce them into the wild. Perhaps the zookeeper can explain some of the difficulties in reintroducing animals into the wild. If this zoo doesn't have such programs, he or she can undoubtedly tell them about places that do. Ask the zookeeper how your children might get involved by volunteering their time to help animals.

The African Elephant

Children are rarely told that elephants are thriving in Zimbabwe and nearby countries. As this chapter indicates, elephants in these countries thrive because villagers have a stake in taking care of the herds. They do not actually "own" or domesticate the elephants, but they act like owners because they benefit by making sure that elephants continue to thrive.

Talk to your children about how people might act differently toward the elephant if they received the meat and hide from an elephant that is killed—and sometimes cash as well. Would they allow poachers to wipe out the elephant? Probably not.

You could also talk to children about ownership of other animals such as cows and chickens. Why, you can ask, don't we worry about the possible extinction of cows and chickens the way we worry about the possible extinction of elephants and tigers? After all, millions of people use these animals for food every day.

The answer, of course, is that animals become extinct when they have no owners with a stake in their future. While it would be diffi-

cult for wild animals to have "owners," they will be protected if people living near them have a stake in their future.

You may wish to share the story of successful wildlife conservation programs in Africa by introducing older children to *The Myth of Wild Africa* by Jonathan S. Adams and Thomas O. McShane (W. W. Norton, 1992).

Noah and the Ark

Read your children the story of Noah and the Ark from the Bible (Genesis: 6-9) or a Bible storybook. This story illustrates how one good man and his family saved them from catastrophe, making sure that the offspring of the animals would continue to populate the earth. Talk with your children about modern-day "Arks" created by people who take on the responsibility of stewardship. These include zoos, nature centres, wildlife refuges, and ranches that specialize in game. They include organizations such as the Nature Conservancy, which protects endangered species by creating preserves. Their actions are not the same as protecting animals in the wild, but they make an important contribution.

Notes

1 Kenneth Miller and Joseph Levine, *Biology* (Englewood Cliffs, NJ: Prentice Hall, 2nd ed., 1993), 1065.
2 Beth Savan, *Earthcycles and Ecosystems* (Toronto: Kids Can, 1991), 31.
3 Green Team, *Green Team Teachers' Guide "Eco Education Program"* (Victoria: BC Environment, March 1996), 13.
4 Susan V. Bosak, *Science Is* . . . (Richmond Hill/Markham, ON: Scholastic Canada/Communication Project, 2nd ed., 1991), 356.
5 Adrienne Mason, *The Green Classroom* (Markham, ON: Pembroke, 1991), 51.

6 H. Murray Lang, Editor, *Science—Ideas and Applications* (Toronto: John Wiley and Sons, 1998), 43.
7 Roma Dehr and Ronald M. Bazar, *The Kids Ecology Book* (Vancouver: Earth Beat, 1991), 45.
8 Green Team, 14.
9 Ann Love and Jane Drake, *Take Action* (Toronto: Kids Can, 1992), 6–8.
10 Judy Braus, ed., *Endangered Species: Wild & Rare*, Ranger Rick's *NatureScope* Series, National Wildlife Federation, Washington, DC, 1989, 34.
11 Paul R. Ehrlich and Edward O. Wilson, "Biodiversity Studies: Science and Policy," *Science*, Vol. 253, 16 August 1991, 758–62 at 758.
12 U.S. Council on Environmental Quality and Department of State, *The Global 2000 Report to the President,* Vol. 2, 331.
13 Ehrlich and Wilson, 759.
14 Quoted in Charles C. Mann, "Extinction: Are Ecologists Crying Wolf?" *Science*, Vol. 253, August 16, 1991, 736–38, at 738.
15 U.S. Council on Environmental Quality and Department of State, *The Global 2000 Report to the President,* Vol. 2, 331.
16 Julian L. Simon and Aaron Wildavsky, *Assessing the Empirical Basis of the "Biodiversity Crisis,"* Competitive Enterprise Institute, Washington, DC, May 1993.
17 Simon and Wildavsky, 7.
18 Charles C. Mann and Mark L. Plummer, *Noah's Choice: The Future of Endangered Species* (New York: Alfred A. Knopf, 1995, 60.
19 Mann and Plummer, 61.
20 Quoted in Mann, 737.
21 Lawrence B.Slobodkin, "Islands of Peril and Pleasure," *Nature*, Vol. 381, May 16, 1996, 205.
22 Mann, 738.
23 Mann and Plummer, 75–6.

24 T. C. Whitmore and J. A. Sayer, eds., *Tropical Deforestation and Species Extinction* (New York Chapman and Hall, 1992), quoted in Simon and Wildavsky, 9.
25 Randy T. Simmons and Urs P. Kreuter, "Herd Mentality," *Policy Review*, Fall 1989, 46–9.
26 Eugene Linden, "Tigers on the Brink," *Time*, March 28, 1994, 44–51.
27 Information from The Nature Conservancy, 815 North Lynn Street, Arlington, VA, 22209.
28 Ike C. Sugg, "To Save an Endangered Species, Own One," *Wall Street Journal*, August 31, 1992.