



# Brother, Can You Spare a Species?

By Jeffrey K. McKee, Ph.D.

*Through the animal and vegetable kingdoms Nature has scattered the seeds of life abroad with the most profuse and liberal hand; but has been comparatively sparing in the room and the nourishment necessary to rear them.* Thomas Robert Malthus, 1798.

It should be clear that there is a human “population connection” to extinctions of other living beings. This tacit assumption pervades the scientific and popular conservation literature, yet relatively little has been written about how our population growth inevitably leads to the decline of Earth’s creatures.

With this in mind, I set out to chronicle the rise of our ancestors’ populations in relation to declines in global biodiversity—the sum of plants, animals, and even microbes. It turns out that we’ve had detrimental effects on other species for nearly 2 million years. Human population growth continues to affect biodiversity in a profound way today. The emerging global scenario compelled me to write a book, *Sparing Nature*, playing on the above words from Malthus.

My extensive academic pursuits in paleoanthropology helped me put today’s quandaries into perspective. One can see a global

pattern of mammalian biodiversity decline that began long ago with the emerging reproductive success of our early ancestors in Africa. As humans spread to new continents, a clear pattern of environmental effect began, with mammals large and small seeing their final days. Even when our ancestors had only the most primitive of technology, and relied on resourceful foraging, life as the planet knew it was slowly overcome in the wake of human expansion.

Extinctions of other animals accelerated over the past 10,000 years, as agriculture and human expansion went hand-in-hand. Oddly enough, the general health and longevity of early agriculturists declined. Thus, it wasn’t the agricultural revolution alone that catapulted our species to ever-greater numbers. It was the juggernaut of exponential growth that propelled us along—a specter that haunts us today. Meanwhile, as we took over the land and cultivated a limited array of domesticated plants and animals, a much greater number of life forms got pushed aside. Our greatest success in overcoming the sparing limits of nature—managing the production of our own food—did not come without a price to nature itself.

Today our planet not only faces the possibility of a sixth mass extinction—like the one that killed off most of the dinosaurs 65 million years ago—but finds itself with a novel cause. No longer do we need extraterrestrial bombardments of asteroids to explain the demise of countless species. The majority of extinctions can be soundly attributed to the expansion and habits of one very successful species: *Homo sapiens*.

Why does it matter? We need those other species to maintain a healthy global

environment. Agriculture may give us our food, but the rest of nature gives us our atmosphere, climate, soil, and all the ingredients for a sustainable planet. The loss of too much biodiversity weakens ecosystems, sometimes to the point of collapse. That in turn leaves us dangling perilously in uncharted ecological territory, with our own sustainability in question.

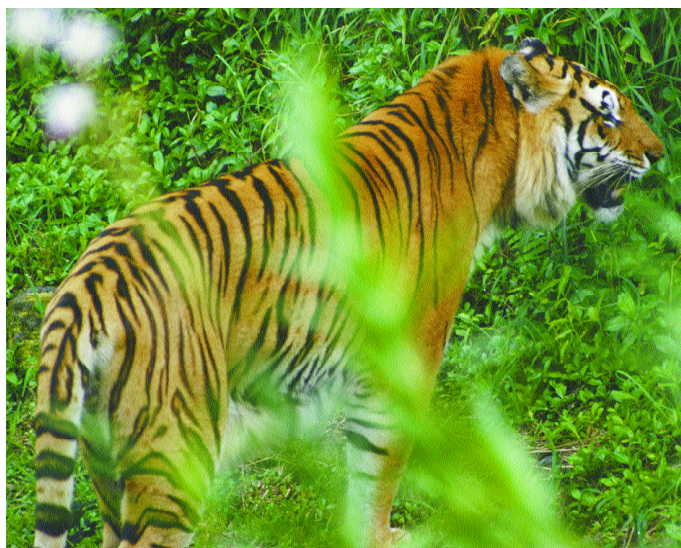
It can be argued that we must stop human population growth, and probably reduce our numbers, if we want a sustainable planet with functioning ecosystems. An alternative argument is that if we lived more responsibly, even in large numbers, there would be enough breathing room for other species as long as we took adequate conservation measures. Increasingly, scientists have

the other hand—and this is the thrust of my argument—without abating the growth of the human population, all conservation efforts will come to naught. We have thousands, indeed millions, of years of observation to make the case that our growth will continue to worsen a dire situation, even if we were to live like our more resourceful ancestors. But are past trends relevant to understanding our current situation in this age of advanced technology?

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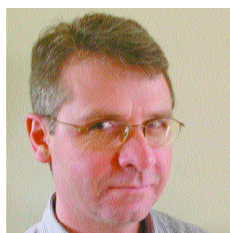
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had to acknowledge that we are reaching—or have reached—our limits as a population, no matter how we live. For a few scholars it boils down to a choice of priorities: conservation measures or population control?

The purpose of *Sparing Nature* is to show that these priorities are one and the same. Without conservation ethics and actions, Earth's biodiversity faces a grave threat. On

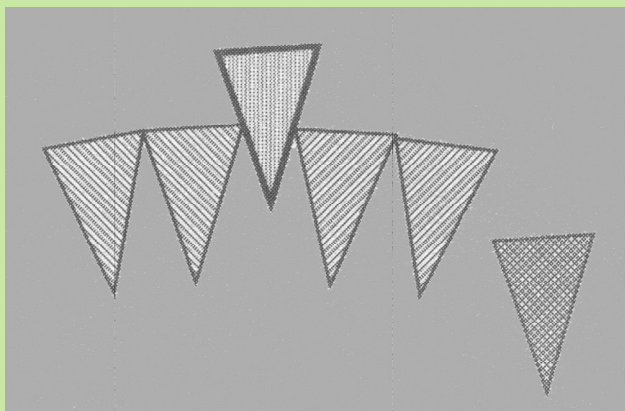
The incredible size of the human population today, unprecedented among mammals, has huge ecological implications. My colleagues and I recently compiled a global database to test the effects of contemporary population density on biodiversity.<sup>1</sup> We demonstrated that once one accounts for the size and nature of a country, human



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population is the strongest correlate of the proportion of threatened mammal and bird species. Our mathematical model accounts for 87 percent of the variability in threatened species per country. Given the complexities involved in both ecological systems and human dynamics, this is a high percentage of predictability, and puts a substantial component of the blame for species threats on human population density.

### Darwin's Wedge Analogy



*In Darwin's wedge analogy, as one species is driven into an ecosystem, others may be forced aside and into extinction.*

Charles Darwin provided an apt analogy for the process of extinction when he wrote: "The face of Nature may be compared to a yielding surface, with ten thousand sharp wedges packed close together and driven inwards by incessant blows, sometimes one wedge being struck, and then another with greater force." As each wedge is driven in, another falls off. Normally the wedges are thought of in terms of variants within a species, with natural selection delivering the blows to ensure placement of the "fittest" wedge. But the process can be thought of on a different level, with the wedges being more successful species taking the place of others in an ever-changing world of limited capacity.

*Source: Sparing Nature, J.K. McKee, page 36.*

We took the analysis further and projected our mathematical model into the future, based on U.S. Census Bureau projections for each country. All else being equal, the average country should expect a 14 percent increase in the number of threatened species by 2050—due to the effects of population increase alone.

Of course, all else is not equal. There are gross disparities, country by country, in how resources are consumed. Conventional wisdom assumes that greater consuming countries have a greater effect on other species. Yet per capita Gross National Product, an appropriate measure of consumption, has virtually no correlation to threatened species.<sup>2</sup> In countries rich and poor, human population density is still the better predictor of current threats to wildlife.

Certainly there are pearls in the conventional wisdom that human behavior is partly to blame for the demise of natural ecosystems. For example, it could be argued that patterns of consumption in countries such as the United States have indirect effects on the wildlife elsewhere. Thus conservation measures, conventional and unconventional, are still urgent tasks. But there are common-sense observations, in addition to our research, that clearly show how human population size matters. As our numbers grow, people's needs for agricultural land and energy resources grow. Whether it be the Wolong Nature Reserve in China, where giant pandas share land with a human population that has grown 70 percent in just two decades,<sup>3</sup> or the Arctic National Wildlife Refuge, where our need for energy has launched a national debate, one thing becomes clear: priorities change as our needs grow. Lands once thought sacrosanct for nature are eyed by an additional 200,000 people every day. Something has to give way.





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I'll be the first to admit that mathematical models do not encompass the complexities of ecological systems or the intricacies of the human endeavor. But the purpose of making scientific predictions is not to be proven correct in the ensuing decades. Rather, it is to provide knowledge on which to make informed decisions. By analogy, if a corporation projects a downward spiral based on market trends, it doesn't just sit by and wait for bankruptcy. The management must use the data to alter courses of action and turn a profit.

For life to prosper on Earth, the management—the human population—must

make some tough decisions. We all have an investment in the productivity of natural ecosystems. But the Earth is like a corporation that is top-heavy in overpaid executives without enough laborers to produce a profitable product. Turning a blind eye, fudging the numbers, or implementing unsustainable quick fixes does not constitute adequate solutions. The corporation must be restructured.

As I argue in *Sparing Nature*: "The greatest and most effective conservation measure to save Earth's biodiversity is to halt the growth of the human population, and perhaps reduce our numbers."<sup>4</sup> The time is now to restructure the balance of numbers. Even by the most conservative estimates, every day we lose at least 21 more species—forever. Each loss potentially triggers a cascade of effects on the environments in which each plant or animal played an integral part. Sooner or later, extinctions affect the elements of nature upon which we rely.

The endeavors of Population Connection, and population activists everywhere, not only affect the quality of human life, but are critical to the existence of life itself for many species large and small. Action, or inaction, on overpopulation will have consequences for thousands of years.

## Footnotes

<sup>1</sup>J.K. McKee, P.W. Sciulli, C.D. Foose, and T.A. Waite. 2004. Forecasting Biodiversity Threats Due to Human Population Growth. *Biological Conservation* 115(1): 161-164.

<sup>2</sup>J.K. McKee. 2003. Reawakening Malthus: Empirical Support for the Smail Scenario. *American Journal of Physical Anthropology* 122(4): 371-374.

<sup>3</sup>J. Liu, M. Linderman, Z. Ouyang, L. An, J. Yang, and H. Zhang. 2001. "Ecological degradation in protected area: The case of Wolong nature Reserve for giant pandas," *Science* 292: 98-100.

<sup>4</sup>J.K. McKee. 2003. *Sparing Nature: The Conflict Between Human Population Growth and Earth's Biodiversity*. Piscataway: Rutgers University Press, p. x.