

## In Search of a Lifeline

**S**everal recent studies have independently come to a consistent and deeply troubling conclusion: The diversity of life on our planet is declining rapidly, and in the absence of well-targeted conservation efforts, that trend will surely accelerate in the decades ahead. Loss of habitat, invasive species, global warming, pollution, overexploitation, disease, and perhaps other unidentified stressors present a massive threat to global biodiversity. The world's ecosystems provide services whose estimated value is in the trillions of dollars annually. The loss of a significant fraction of these services would have far-reaching biological and economic consequences. Preventing that outcome will require a global response that far exceeds current actions.

This past December, results from the first global assessment of amphibians were reported in *Science* (Stuart *et al.*, 3 December 2004, p. 1783). The findings were chilling: More than 43% of all amphibians are in decline, 34 species are reported extinct, and another 113 species have almost or completely disappeared since 1980. Nearly one-third of amphibians worldwide are threatened. Also in December, a Stanford University group reported that 21% of bird species are extinction-prone and 6.5% are functionally extinct. Other studies show that 23% of mammals are threatened. These results are consistent with a comprehensive analysis of biodiversity in the United States, completed 5 years ago by NatureServe and The Nature Conservancy, indicating that one-third of plant and animal species are at risk of extinction. Beyond species, the recent Millennium Ecosystem Assessment paints a bleak picture of human impacts on the world's ecosystems. The assessment found that about 60% of the ecosystem services that support life are being degraded or used unsustainably.

These data are disconcerting at best and alarming at worst, but equally troubling is the reality that governments throughout the world are poorly equipped to address these declines. That's the dilemma of global change: Political processes are slow to recognize and respond to challenges that play out over decades. In some policy areas, dramatic one-time events of less consequence focus government attention and lead to aggressive action. Species and ecosystems are declining rapidly in the context of natural history, but relatively slowly in terms of human history. Hence, governments are slow to respond.

Although the United States has often led in addressing past environmental challenges, today it lags behind other countries in formulating environmental policies to protect species. The United States has not ratified the Convention on Biological Diversity developed at the Rio Earth Summit in 1992, nor is it a party to the Kyoto accords. And even if the world were united behind the Convention on Biological Diversity, its provisions alone are insufficient to stem the rapid decline in global biodiversity. What new approaches might make it possible to attack these issues more aggressively, and what form should they take?

Scientists must work harder to inform political leaders about the urgency of environmental challenges, aid them in developing solutions, and urge them to respond. However, placing the future of life on Earth in the hands of governments alone is a risky strategy.

Lasting societal change usually depends on actions by one or more of these institutions: governments, nongovernmental organizations, corporations, and universities. We may need to depend more heavily on the latter three sectors of society by exploring an unprecedented partnership among them. The objective would be to identify ways of working collaboratively to stem biodiversity decline. Academic scientists already team with nongovernmental organizations in directed efforts; more of the same could greatly expand the global database on biodiversity loss and build our international capacity to deal with the growing environmental challenge. Corporate participation in such partnerships adds an especially valuable element: the possibility of enhancing the innovative efforts already under way by harnessing the power of the marketplace. Measuring the value of ecosystems and the services they provide to human societies has already begun to demonstrate to policy-makers the importance of biodiversity and of building conservation values into planning processes and the price of commercial products. Ultimately, we must engage the tremendous power of individual action and consumer choice through information and economic incentives. Otherwise, the decline in Earth's biodiversity will continue with each tick of the clock.

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