

Actions of individuals key to saving biodiversity-and ourselves

11 August 2008

Even if you don't like the outdoors, you're probably pretty fond of air, clean water and food. That makes you a fan of biodiversity, because those essentials for life-human and otherwise-are maintained as a direct result of the Earth's biodiversity, the abundance and variety of species and populations on the planet. Preserving a substantial amount of biodiversity is critical to a healthy future for us, but how best to do that has been a subject of ongoing debate.

A multi-pronged approach is the only way humanity can pull it off, according to Stanford biologists Paul Ehrlich and Robert Pringle. In an article to be published next week in the online early edition of the *Proceedings of the National Academy of Sciences*, they argue that it is going to require not just governments but everyone to pitch in, on the individual level and in small groups.

But the good news, Ehrlich said, is that everyone can. While many people have gotten the impression that only government-level action can have a significant impact, many small effective efforts are already under way. What is needed, he said, is for these small-scale efforts to be implemented more broadly and scaled up dramatically.

Only through tackling the state of the environment on all fronts and with a variety of approaches will we be able to call a halt to environmental degradation, global climate disruption and the ongoing mass extinction of species, the authors say. If we fail, we will have a world of dirtier air, scarce or undrinkable water and inadequate supplies of food.

Even as small an action as choosing to eat less beef or pork results in less of a resource drain. The more people who make that choice, the less the environment will be negatively affected. Other actions in the "hopeful portfolio" that Ehrlich, the Bing Professor of Population Studies, and Pringle,

a graduate student in biology, present are "stabilizing the size of the human population and reducing its consumption" and taking a series of steps "to ensure the efficacy and permanence of conservation areas."

Making human-dominated landscapes hospitable to biodiversity through such modest actions as "maintaining living hedges around agricultural plots and preserving remnant trees in pasture" can often buttress the biodiversity in these areas.

Ehrlich and Pringle liken each action to a wedge. Even though a particular action might start out small, as more people participate and the size of the effort grows, so does the effect. And just as many hands make work lighter, many wedges combine to have a significant effect of keeping down the rates of species extinction and destruction of habitats, thereby preserving biodiversity.

The authors also recommend other "wedges," such as reclaiming degraded land, reintroducing species to areas where they lived before human activity drove them out or killed them off, and educating people everywhere about the values of biodiversity. They note that increasing coverage of biodiversity on the Internet has vast potential for educating and prompting people to take action.

The researchers were optimistic about efforts like The Natural Capital Project, a joint effort of Stanford, the Nature Conservancy and World Wildlife Fund to align financial and conservation incentives and integrate the ecosystem-service values into land-use decisions.

As an example of ecosystem services in action, they cited the conservation of the Catskill watershed, which to date has spared the city of New York the \$8 billion it would cost to build a water-filtration plant. Like any ecosystem, the watershed is only able to function properly (in this

case, as a natural filtration system) if most parts of the complex system are present—that is, if the biodiversity of the watershed is largely preserved. they know what it is, the authors say. Source: Stanford University

But Ehrlich and Pringle said there is still a lot of work to be done in changing people's attitudes. Venezuelan President Hugo Chavez's plan to move 100,000 people into a brand new city being carved out of the forest in the vicinity of a national park, to alleviate overcrowding in Caracas, is a prime example. But Chavez is hardly alone in his lack of appreciation for preservation.

Noting that the typical mammalian species persists for about a million years, according to the fossil record, the writers observe that humans, who have been around for about the last 200,000 years, are in the equivalent of "mid-adolescence." Ehrlich and Pringle say that it is a "fitting coincidence, because Homo sapiens is now behaving in ways reminiscent of a spoiled teenager," mistreating its life-support systems, "mindless of the consequences."

Under business-as-usual, they continue, the loss of species and populations, which supply critical ecosystem services to humanity, will accelerate. Despite uncertainties, "we know where biodiversity will go from here: up in smoke; toward the poles and under water; into crops and livestock; onto the table and into yet more human biomass; into fuel tanks; into furniture, pet stores, and home remedies for impotence; out of the way of more cities and suburbs; into distant memory and history books." In short, Ehrlich said, "The support system for civilization will be destroyed, and the world as we now know it will disappear."

To avoid that dismal fate, Ehrlich and Pringle call for an exodus of academicians (including themselves) from the ivory tower. Noting that "academic ecological papers are often tinselled with one or two sentences about the applied significance of the science, which accomplishes little," they say that researchers have to begin promoting among themselves the importance of outreach work. Funding agencies that require applicants to explain the "broader impacts" of their research need to push for researchers to communicate those societal benefits of the work to society. People cannot do the right thing unless

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