

Planetary stewardship

Over the next decade or two, society has a narrow window of opportunity to radically redefine our relationship with the planet, so as to reduce risks of dangerous global changes that could otherwise seriously degrade Earth's life-support systems. As current President and President-Elect of the Ecological Society of America (ESA), we call for *planetary stewardship* as a framework for science and society to rapidly reduce anthropogenic damage to the biosphere. Ecologists and the ESA must collaborate with other natural and social scientists – as well as with practitioners, resource harvesters, land managers, decision makers, and other concerned citizens – to explore solutions. Humankind's past actions have already committed the planet to a substantially altered future; the task ahead is to find creative and scientifically defensible actions that minimize risks of further resource or ecosystem degradation and maximize opportunities to sustain and restore natural ecosystems and the services they provide.

Planetary stewardship requires that decision makers and stakeholders be well-informed about how global change is likely to affect households, resources, livelihoods, and quality of life. They must also learn how local actions and reactions to change could feed back to influence the trajectory of planetary change. To provide this information, ecologists must redouble their efforts to understand and forecast ecosystem changes across multiple scales.

The ESA is well positioned to lead this effort because the collective interests and expertise of its 10 000 members encompass a tremendous range of ecological skills and perspectives. These interests range from global biogeochemical cycles to regional and local populations and ecosystems, and include, increasingly, the ways that current and past human cultures have responded to and shaped natural ecosystems and landscapes. More than ever, we must address urgent questions that span these areas and scales of interest. How will responses to climate change by particular species and size classes of plants at particular landscape positions affect hydrology and redistribution of moisture back to the atmosphere? How can indirect effects in food webs trigger surprises as ecosystems respond to change? What types of environmental change did aboriginal human cultures create and endure? What practices did they use to sustain resources and ecosystems, especially through periods of environmental change? What mistakes did they make?

Our collective expertise should be marshaled to hone our forecasts of the ecological consequences of projected environmental changes; to identify the elements and interactions that make ecosystems resilient; and to inform decision makers about likely consequences of mitigation and adaptation measures society must make, both to anticipated changes and to the unexpected.

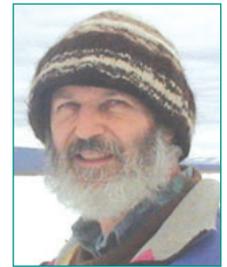
The traditional ecological knowledge community and many ecological researchers share a deep interest in the natural history of organisms and landscapes. This provides an opportunity for sharing the knowledge and practices that have created a "sense of place" that, together with scientific information and approaches, may inform continued stewardship during times of rapid change. Similarly, farmers, ranchers, fishers, reserve managers, and wilderness advocates bring perspectives and understanding of how society might protect and benefit from the services that sustainable, healthy ecosystems provide. Within the next 20 years, it is projected that 80% of the world's population will be living in cities; as a result, there are critical challenges in maintaining a sense of place and of planetary responsibility in our children – to connect neighborhoods or city blocks to the planet. This will require mixing local with worldwide scales of dialogue, knowledge sharing, innovation, and education.

Scientists are often trained to think and communicate in a dispassionate, "values-neutral" style, while other members of society are more openly values-driven, with motives ranging from short-term profit to long-term stewardship. Scientists typically seek general, fundamental principles that will aid understanding and prediction in systems beyond the ones they have studied. Traditional, resource harvesting and urban ecological knowledge, in contrast, are intensely local, supported by familiarity with, and often a commitment to, a specific place. Stewardship on a planetary scale requires that humans profoundly reorient their endeavors – social, economic, scientific, and cultural – to reduce the risk of environmental disasters, increase resilience to inevitable change, and foster a personal commitment to the landscapes and ecosystems we wish our grandchildren to inherit.

Planetary stewardship is bigger than ecology. It requires intense engagement across the sciences, humanities, and engineering. However, ecology brings to this effort a special understanding of the complex cross-scale interactions that underpin Earth's life-support systems. Therefore, ecologists are obliged to be among the leaders who will define society's path to planetary stewardship for the 21st century and beyond.



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