

BioScience

Publisher

American Institute of Biological Sciences
1401 Wilson Blvd., Arlington, VA 22209

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Editorial and business address: *BioScience*, American Institute of Biological Sciences, 1401 Wilson Blvd., Arlington, VA 22209; (703/527-6776).

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Opinion

AN ECOLOGY OF THE LANDSCAPE

Ideas in profusion flow daily through our lives. Being alert for that rare idea whose significance may mushroom in the future is not only an opportunity, but a responsibility. Here is my candidate for the decade.

What do the following have in common? Dust-bowl sediments from the western plains bury eastern prairies, introduced species run rampant through native ecosystems, habitat destruction upriver causes widespread flooding downriver, and acid rain originating from distant emissions wipes out Canadian fish. Or closer to home: a forest showers an adjacent pasture with seeds, fire from a fire-prone ecosystem sweeps through a residential area, wetland drainage decimates nearby wild-life populations, and heat from a surrounding desert desiccates an oasis. In each case, two or more ecosystems are linked and interacting. An action here and now has an effect there and then. Each case involves at least two portions of a landscape, which in turn is a specific heterogeneous land area extending in similar form for kilometers.

What theory explains the spatial heterogeneity of energy, nutrients, water, plants, and animals at the level of a landscape, the setting in which we live? Alas, none. Within landscapes, from suburbia to wilderness, scientists study relatively homogeneous ecosystems (i.e., landscape elements), such as a marsh, a woodlot, an agricultural field, or a housing development.

Landscape ecology, in contrast, focuses on (1) the spatial relationships among landscape elements or ecosystems, (2) the flows of energy, mineral nutrients, and species among the elements, and (3) the ecological dynamics of the landscape mosaic through time. Like a cell or a vertebrate, the landscape therefore exhibits three characteristics, structure, functioning, and change, and indeed represents a challenging research frontier.

An ecology of the landscape is nascent and timely. The field will be developed by basic biologists and ecologists, as well as geographers, foresters, planners and landscape designers, social scientists, wildlife biologists, agriculturalists, and others. Important principles will be drawn from each field, but a central body of landscape ecology theory is likely to emerge concurrently. Such theory may suggest novel solutions to critical environmental problems.

I feel the pulse of landscape ecology quickening. This embryonic area of study apparently has its origins in central Europe. Today universities in several European countries offer programs of study in the field, and a few have an established chair in landscape ecology. In 1981, an international congress was held by the 600-member Netherlands Society for Landscape Ecology, and in 1982, the sixth international symposium on problems in landscape ecology was held in Czechoslovakia. Also in 1982, an International Association for Landscape Ecology was formally established, with officers in Eastern Europe, Western Europe, and North America.

Yet, hardly a handful of North American ecologists and geographers has participated in and followed these developments abroad. The glimmerings of interest in the United States are evident, however, as seen in an April 1983 National Science Foundation-funded workshop on landscape ecology held at Allerton Park, Illinois. This emergence of the landscape ecology idea in North America promises original and powerful approaches, quite different from, but complementary to, both the pioneering and current approaches in Europe. I believe a new area of study today must be idea-oriented, not nation- or language-oriented. Thus sustained efforts will be needed to maintain a synergism among scholars with these new North American perspectives and the developments abroad in the field.

A richness of empirical studies, emergent theory, and applications lies ahead. With principles waiting for the curious, and with an expected short lag period between research and the amelioration of environmental and human societal problems, let the young in spirit, looking to the future, "Think Landscape."

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