



William H. Schlesinger is president of the Cary Institute of Ecosystem Studies in Millbrook, NY. E-mail: [schlesingerw@caryinstitute.org](mailto:schlesingerw@caryinstitute.org).

## Translational Ecology

ECOLOGY IS WELL INTO ITS SECOND CENTURY AS AN ORGANIZED SCIENTIFIC DISCIPLINE, RICH WITH observations, experiments, and a general understanding of how the natural world works. Today's environmental scientists have a powerful array of tools and techniques to measure and monitor the environment and to interpret vast and diverse data. Yet despite producing an enormous amount of new information, ecologists are often unable to convey knowledge effectively to the public and to policy-makers. Unless the discoveries of ecological science are rapidly translated into meaningful actions, they will remain quietly archived while the biosphere degrades.

Global warming, the Gulf of Mexico oil disaster, invasive species—these are but a few of the issues concerning environmental scientists and, increasingly, the public. What is needed is a new partnership between scientists and advocacy groups that conveys ecological information accurately and in ways that stakeholders (including policy-makers, resource managers, public health officials, and the general public) can understand. Just as physicians use “translational medicine” to connect the patient to new basic research, “translational ecology” should connect end-users of environmental science to the field research carried out by scientists who study the basis of environmental problems. Translational ecology requires constant two-way communication between stakeholders and scientists. It should continually alert scientists to aspects of the environment in need of study to produce new data, while clearly synthesizing what is already known from field studies and its relevance to policy. The partnership's purpose should be to ensure that all stakeholders know the implications of scientific discoveries and understand their impact on alternative ecological diagnoses.

Good examples of translational ecology involve interdisciplinary teams of scientists, engineers, public health experts, and members of the end-user community. A recent study of the environmental impacts of mountain-top-removal mining involved a collaboration between ecologists and public health experts.\* Earth Justice and other nonprofit groups used this material to convince the U.S. Environmental Protection Agency (EPA) to issue new guidelines that will severely limit most such mining practices. In earlier years, research by wetland ecologists helped the EPA outline how to recognize and delineate wetlands, based on soil characteristics. Other scientists are now working with advocacy groups to help policy-makers understand the implications of human perturbations of the global nitrogen cycle. And we can be sure that scientific analysis of the impacts of deep-water petroleum extraction will also be forthcoming—in this case, unfortunately, as a retrospective.

Translational medicine grew from the recognition that basic research findings were not moving effectively into the development of drugs and treatments. To overcome this problem, in 2006 the U.S. National Institutes of Health established a Consortium for Transforming Clinical and Translational Research, which grants Clinical and Translational Science Awards. These awards have recently been increased to over \$250 million for the next 5 years, expanding the consortium to 55 institutions nationwide. Translational ecology should similarly connect the end-users of environmental science with the major funders of environmental research.

This week, the Ecological Society of America concludes its annual meeting in Pittsburgh. The world's largest international organization of ecologists can play a critical role in spurring translational ecology. It has drawn together more than 3000 scientists, policy-makers, and citizens to explore the causes and consequences of this year's theme, global warming. Many of the sessions call for ecologists to take charge and improve science education and literacy, so that issues related to global warming are not misunderstood. Connecting ecology to stakeholders in these and other ways should enhance the understanding and application of ecological concepts, ensuring that scientific rigor is brought to bear on the world's many environmental challenges.

— William H. Schlesinger

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\*M. A. Palmer *et al.*, *Science* **327**, 148 (2010).

