

environmental sciences

Gathered at a meeting of the American Institute of Biological Sciences at the University of Wyoming in Laramie last week

COST ANALYSIS

The price of energy

Systems analysis of energy flows can provide a medium of communication for ecologists which can be understood by engineers, economists and other development-oriented specialists. In this way ecological values can be introduced into resource development, says Dr. H. T. Odum of the University of North Carolina.

Dr. Odum says that natural processes and man's interventions in these processes can be analyzed in terms of the flow of energy within these processes. Man's interventions often create energy deficits in nature to which a dollar value can be attached.

Thus, for example, nature is able to provide sufficient energy for the biodegradation of sewage without incurring irreplaceable losses only to a certain point, a point which now has been exceeded in many water basins in the United States. In these basins, there is, in effect, an energy deficit created by man, a deficit that grows each year. By placing an actual dollar value on such deficits—Dr. Odum suggested \$1.00 for 10,000 kilocalories—it becomes possible for man to measure the real costs of any particular intervention in nature.

ECOLOGY

Politics important

Political ecology rather than the natural ecology is the most important real concern of many natural resource biologists, both in the resource management agencies and in the universities, according to Dr. Daniel H. Henning of the University of New Mexico.

The territorial concept of animal behavior is very much operative among resource biologists, Dr. Henning says. The survival and expansion of either a government agency or a narrow specialization become more important to these biologists than viewing the total ecology of a particular natural resource area. Thus they become bureaucratic administrators, retaining the title of biologist as a kind of halo to justify decisions made on political grounds.

Dr. Henning cited the orientation of most university forestry departments to timber management, rather than to wildlife or social values, as one example.

INTERDISCIPLINARY RESEARCH

Cooperation blocked

Fruitful interaction between biologists and members of other disciplines, or even between biologists in different fields, is not rewarded by the present structures of universities or resource management agencies, according to Dr. Carl H. Reidel of Williams College, a biologist and political scientist.

The result is that the concept of the total ecosystem has little meaning to these biologists. Thus foresters, for example, use persistent pesticides to secure maximum yield of wood products, without regard to the other organisms within the forest ecosystem, he says.

Cross-professional and interagency interaction, although given nominal encouragement, is really a threat to the agencies or professional societies involved and thus does not really occur.

Joint meetings give only lip service to true interdisciplinary efforts: "Occasional cohabitation does not make a family," Dr. Reidel says.

MANPOWER

Redistribution needed

The largest proportion of resource biologists work in sparsely populated areas in the West, whereas the greatest need for the application of conservation principles is in urban areas, says Keith G. Hay, wildlife director for the American Petroleum Institute. "It's not the grizzly bear in Yellowstone Park but the man in the suburbs that is the big problem," Hay says.

Decisions on urban development have had little or no input from ecologists but instead have been almost entirely under the control of developers. "These developers move in and wipe out the whole ecology of an area with, for example, a new housing development," Hay says.

Hay suggests that ecologists, on the other hand, to work effectively in urban areas, will need considerable training in the behavioral sciences.

ECONOMICS

Third-party effects

Interaction between economists and ecologists can be highly fruitful in selecting alternatives for resource management that take into account heretofore unforeseen costs of some particular kind of development, says Dr. John V. Krutilla, an economist with the organization Resources for the Future.

Such costs—which he called third-party effects—have not been taken into account in the narrow and single-purpose goals of agencies or industries, Dr. Krutilla suggests. Ecologists can provide some of the data about these effects to economists who will then have a broader base upon which to recommend alternatives for development, he says.

He cites studies of residential development on flood plains as an example. Because elaborate structures are often built to prevent flooding of these areas, the public—a third party which gains no necessary benefits from the residential areas—must pay a substantial portion of the costs of protection. In addition, the ecology of the flood plain area is disturbed and often harmed, and recreational benefits are lost as well.

Dr. Krutilla warns against an approach that is absolutely prohibitive or absolutely permissive. Rather, he suggests compromises which would take into account the third-party effects.

Those who build on flood plains, for example, might be required to take out flood insurance, and flood-warning systems might in part take the place of expensive dams and levees.