

VIEWPOINTS

Relevance of the Population Explosion to Management of Sparsely-Populated Lands

The human population problem has been the subject of considerable investigation. Apparently the optimum carrying capacity for mankind on earth has been exceeded. Problems are occurring that seem to be the result of people making too many demands on the resources of a finite management unit—the earth.

If it were possible to support our present human population with a satisfactory standard of living, there would be little need for concern. But in fact more than 1 billion people on the earth are either undernourished or malnourished.¹ In our own country food is not yet the major problem, but open space is dwindling and parks are crowded; noise, pollution, ugliness, and general unrest are on the increase; and resources are becoming more difficult to acquire without unfortunate consequences. By the year 2000 the U. S. could have another 100,000,000 people if current trends continue.² The demands of these additional people would be magnified by still greater affluence and resource consumption per capita.

What do these trends in our country and the world mean to the manager

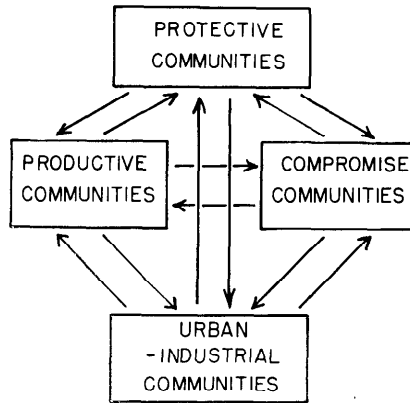


FIG. 1. Four basic communities or environments in the landscape; the arrows suggest interaction. Population pressure will result in the conversion of more of the landscape to productive and urban-industrial communities. Modified after Odum (1969).³

of our sparsely populated lands? This question can be considered by focusing on the concept of landscape diversity.

Diversity in the Landscape

Landscape diversity is the number of different communities in the landscape. To evaluate landscape diversity, it is first necessary to classify communities; several classification systems are possible, but I will use a scheme suggested by Odum³ (Fig. 1). The community types that Odum lists are 1) protective communities, e.g. wilderness, smaller natural areas, parks, wild rivers; 2) compromise or multiple-use communi-

ties, e.g. much of our forest and range land; 3) productive communities, e.g. agricultural land and perhaps strip mines; and 4) urban-industrial communities. Odum suggests that our civilization here in America, and in the world, depends on a certain proportion of all four community types. Obviously the categories are very general and would apply to a large landscape unit, usually not just a single watershed.

Though initially Fig. 1 may appear very general and simplistic, I believe that it deserves serious consideration and it does suggest some practical implications when considered in the context of the population problem. For example, as population pressure increases in the country as a whole, we can expect that urban-industrial communities will increase in the west, on the one hand reducing the amount of productive land, but also demanding more production. To meet this production demand, rangeland will be used much more intensively, converted to agricultural land with irrigation, or consumed by mining activities to provide mineral resources. With more demands for specific resources, compromise multiple-use communities such as rangeland probably will have a lower priority and will give way to productive communities; and protective communities will be either reduced in area or even more crowded to the extent that they can hardly be classified any longer as protective. It seems clear that the trend with more population pressure will be toward urban-industrial and productive communities, with a decline in the compromise and protective communities that are also in demand, but which probably will not have priority.

¹ Ehrlich, P. R. and A. H. Ehrlich. 1970. Population, Resources, Environment: Issues in Human Ecology. W. H. Freeman and Co., San Francisco. 383 p.

² Colorado Institution on Population Problems. 1969. World population growth: the explosion ahead. 555 Petroleum Club Building, Denver, Colorado. (Pamphlet)

³ Odum, Eugene P. 1969. The strategy of ecosystem development. *Science* 164:262-270.

Obviously large land areas need to be considered when looking at land management from this viewpoint. Furthermore, the illogic of resource management on the basis of political boundaries is apparent. Although a general approach, there are definite practical implications. For example, consider the following:

1. As population increases, there will be more demand for the mineral resources and energy reserves in the sparsely populated west, with the destruction of range land and the subsequent, inevitable reclamation problems in an arid environment.
2. More rangeland will be irrigated and cultivated to allow more "efficient" primary production, with the accompanying costly problems of getting already scarce water and then fighting the salinization of not only the land, but the drainage water and ground water as well. Wild rivers will be sacrificed.
3. Costs of maintenance will increase greatly as production is demanded from land that is marginal for that kind of production; some land is best used as range, but population pressure will force the conversion of rangeland into cropland, mines, or suburbia.
4. Forest management will become more dependent on the plantation approach, with fertilization and weed control increasing the chances for eutrophication and less wildlife diversity.
5. Protective communities and compromise communities will be sacrificed in the name of progress to provide resources. Parks will become even more crowded than they are today and hardly will serve their purpose, becoming more like urban communities.
6. With greater population pressure, cost-benefit ratios will be applied more often but will not consider beauty, stability, or diversity in the landscape. Conflicts of interests will become sharper, and solutions to land management problems will become increasingly less satisfactory.

In general, greater population pressure in the United States will create more conflicts for the manager in the sparsely populated west, and more problems for which the solutions are not clear or are very expensive. A general decline in our ability to import re-

sources from the rest of the world will aggravate the problem for the western land manager. The pressures referred to are really not something of the future; they are upon us today and can only get worse as our demand for open space and resources continues to increase.

Of course, it may be an erroneous assumption to maintain that diversity in the landscape should be maintained, but many believe that diversity in the landscape increases the opportunity for stability and a quality life. The problem is to provide so many people with the opportunity to experience and utilize each type of community. Our nation has already sacrificed much of its protective communities in order to produce more in the name of progress and development. Now with greater population pressures, and suffering state and municipal economies, we are literally forced to produce more, this time in the name of humanity, regardless of the impact on landscape diversity and the quality of our environment.

The social problem

The maintenance of a diverse landscape that provides a high quality environment for many people is not so much a technical problem as a social one, involving what appears to be wrong attitudes on the part of the U. S. public. For example, too many people in North America are still operating under the mythical assumption that we have a super-abundance of resources. We are indeed fortunate to have a good resource base, but the resources available to us are limited and we are making sacrifices to utilize them. The resources may be there, but must they all be utilized? If we desire a high quality life for our people in this country, can we really afford to use resources that lead to the destruction of already limited protective communities. If our population continues to increase, there seems to be no alternative.

Another attitude problem with many Americans is their notion that the sparsely populated western lands are still a frontier waiting for development. The "woodsman mentality" suggested by Kollmorgen⁴ still persists and we have headlines in the Wall Street

Journal⁵ that read, "BOOM IN THE BOONDOCKS, COAL MEN RUSH TO BOUNTIFUL WESTERN FIELDS . . ." A mere lack of people does not indicate no development; there are no frontiers on the earth today. Land suitable for production is already in production with few exceptions. Other lands in protective or compromise communities may not be producing what Wall Street economists think essential for development, but these lands are adding to the enjoyment of many people and will do so for many more people in the future if we can preserve them. Certainly new industries can be established in western lands, but if the frontier attitude persists, we will soon appreciate the value of what has been lost. A higher tax base may result from short sighted development, but so do other costly problems, and diversity in the Nation's landscape declines.

If we expect attitudes to change, then people must understand the problems associated with population demand, and they need to understand the necessity for population control. The land manager can facilitate this understanding by talking about the advantages of a stable population as well as the disadvantages of continued population growth. Family planning is an absolute necessity for proper land management, regardless of where a family lives, and land managers or their teachers are not doing their job unless they advocate no more than two children per family at every opportunity and explain why.

Often people admit that a population problem exists, but usually the notion is that nothing can be done. The problem is solvable, but not without the positive help of land managers. People become very complacent if those most directly associated with resource management show little concern. Land managers have made great strides toward solving technical problems; unfortunately our biggest land management problem is a social one. At this stage in the history of our Nation, stewardship of the land should include working toward zero population growth and maintaining maximum diversity in the landscape.—Dennis H. Knight, *University of Wyoming, Laramie*.

⁴ Kollmorgen, Walter M. 1969. The woodsman's assaults on the domain of the cattleman. *Ann. Assn. Amer. Geog.* 59:215-239.

⁵ Ehrlich, Thomas Lindley. 1970. The Wall Street Journal. Wednesday, November 11, p. 24.