

PART

2

THE DISTRIBUTION OF MATTER AND ENERGY IN TIME AND SPACE

The ecosystem is composed of energy and matter, and these can be classified according to their physical, chemical, and thermal characteristics. There are physical entities such as soil, water, and air present. These are composed of various forms of energy, including potential energy, kinetic energy, chemical energy, and thermal energy.

Volumes have been devoted to the composition of the earth and its atmosphere from physical, chemical, and thermal viewpoints. The analytical ecologist is interested in relating these characteristics to organisms. These relationships are exceedingly complex. They cannot be described in their entirety; indeed, we know very little about the functional relationships between organism and environment, especially for the game birds and animals that are of interest to a significant segment of the public. On the other hand, there is a considerable amount of information available on the physical, chemical, and thermal characteristics of the biosphere, and the analytical ecologist will find it very useful to synthesize this type of information with the functions of an organism, either plant or animal.

The next three chapters describe some of the more basic physical, chemical, and thermal characteristics of the biosphere, providing some insights into the types of relationships that can be analyzed. These chapters deal with the philosophy of analytical ecology, presenting an increasing amount of detail that will be used in more complex models in later chapters. The philosophy of the analytical approach is most important here, however, and students are urged to build simple models describing some of the physical and chemical characteristics of the soil,

water, and the atmosphere. The construction of these models is well suited to the use of small desk-top computing systems. Such models are only the beginning, of course, and students are urged to pursue those models of greatest interest to more meaningful conclusions as their knowledge, abilities, and computing capabilities increase with experience.