

An Hypothesis on the Development of Natural Communities†

ROBERT E. ULANOWICZ

*University of Maryland, Center for Environmental and Estuarine
Studies, Chesapeake Biological Laboratory, Solomons,
Maryland 20688, U.S.A.*

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A knowledge of the flow structure within a natural community is assumed to be sufficient to describe the behavior of far-from-equilibrium, self-organizing systems. This postulate permits the definition of a non-conservative, macroscopic variable quantifying the ascendancy of a natural community. Self-organizing, dissipative systems are hypothesized to develop over time so as to optimize their ascendancy. These assumptions appear to be supported by observed trends in ecosystem development. The theory possibly provides a caricature of development phenomena common to ecosystems, organisms, economic communities, evolution, and a host of other self-organizing phenomena.

1. Introduction

When an ecosystem or other natural community is severely disturbed or obliterated, recovery to the "climax" configuration follows an orderly and sometimes repeatable series of states (succession). The "strategy" of ecological succession is believed by some to be a short-term manifestation of the slower process of the evolution of the biosphere (Odum, 1969). When viewed at the level of a single population, or small subset of populations, the intricacies of succession are exceedingly complex, and it seems impossible to formulate a single hypothesis or index relevant to all situations.

Matters are more encouraging, though, when the community undergoing succession is viewed as a whole. Odum (1969), for example, identifies 24 attributes of the total system which can be used to characterize whether a system is in the early stages of development or approaching the climax stage. However, a multitude of sometimes contradictory criteria does not present a coherent picture of the process of development. Needed is a macroscopic

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