Procurement of synoptic data on an extensive basis will require thoughtful standardization of observations and other simple techniques.

Systems Analysis of Ecosystem Components and Processes

In the past two decades numerous computer-oriented mathematical methods have been developed in industry and government for the analysis of complex systems. Many of these methods and tools have direct applications in analyzing complex biological systems, and especially ecosystems. Systems analysis has already been demonstrated to be a successful adjunct to conventional field and laboratory methods in ecology.

Systems analysis should be applied to IBP studies in at least three major ways:

(1) An early step will involve development of methods to examine existing data on ecosystem processes in a sensitivity analysis aimed to reveal the relative importance of certain factors; this analysis will aid in allocation of resources for research activities in integrated ecosystem studies.

(2) Computer techniques will permit rapid organization and analysis of data derived in total-system studies, especially those phases involving intensive use of recording equipment.

(3) Systems methods will be applied in analysis and integration of results from studies in the United States and elsewhere, designed to test and develop ecological theories.

A major task will be to train ecologists in the use of computers and mathematical methods in systems analysis. When possible, systems analysts should be members of each interdisciplinary team. The IBP should make available systems analysts to consult with investigators working on single processes or components or synoptic data to insure that the data obtained can be utilized in composite analyses.