

ECOLOGICAL CONCEPTUAL MODELS

Ecological conceptual models describe key ecological attributes, their interrelationships, and the effects of human activities on these attributes and relationships in ecosystems at risk. ["A conceptual model describes links among the resources at risk; the physical, chemical, and biological attributes of the ecosystem; and human and natural causes of change." (NRC 1990)]. Hypotheses on ecosystem structure and function and the effects of anthropogenic stressors are the underlying basis for these models. By depicting cause-effect relationships regarding environmental changes, conceptual models help explain and justify ecological restoration and/or rehabilitation goals, objectives, and strategies. By focusing on these causal links, conceptual models help develop specific, testable hypotheses to explain why particular effects should or should not occur, to synthesize ideas and knowledge, identify supporting scientific information needs, identify logical errors, and develop ecological indicators of ecosystem "health" (which can be used to evaluate restoration actions) (NRC 1986).

A wide variety of conceptual models exists. In all approaches, the conceptual model should begin with a qualitative description of causal links in the system (NRC 1990). Conceptual models can be used over various ecological and spatial scales. Conceptual models may incorporate disparate elements (e.g., natural history information, subjective judgment, ecological theory, and numerical models) (NRC 1990). Most conceptual models are flow-type diagrams; however, matrices are also used to depict cause-effect relationships. Supporting descriptive text should accompany whatever diagrams are used. Deciding what tools to use depends on the objectives, available technical knowledge, the degree of precision required, and other factors (NRC 1990).

References:

National Research Council (NRC). 1986. Ecological Knowledge and Environmental Problem Solving. National Academy of Sciences. Washington, D.C.

National Research Council (NRC). 1990. Managing Troubled Waters: The Role of Marine Environmental Monitoring. National Academy of Sciences. Washington, D.C.