

INTEGRATED ECOSYSTEM ASSESSMENTS: A TOOL FOR BRIDGING SCIENCE AND ECOSYSTEM MANAGEMENT

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Humans use and are affected by the ecosystems of which they are a part in multiple ways. Those responsible for managing ecosystems for the benefit of society are often limited in their responsibility or focus to a single sector or subset of the goals established for each of those multiple uses. Even worse, the goals for each use may be unknown or so vague that it is difficult to determine if success is achieved. As a result, managers struggle to balance goals for the non-human components of ecosystems in the face of desired multiple uses of the system. The difficulties are exacerbated by the lack of comprehensive, holistic, integrated science examining or predicting the ecosystem changes that may result from multiple use coupled with natural variation. In short, we lack scientifically based measures of ecosystem health that can be used to predict the effects of one manager's decision on decisions made by other managers.

Integrated Ecosystem Assessments (IEAs) formally bridge science and management, applying the best existing scientific information to provide an improved scientific basis for managing competing uses for the holistic benefit of an ecosystem. They can drive a paradigm shift from considering impacts of a single use in isolation (e.g., changing land use, ocean and coastal uses, or fisheries) to considering how a collection of proposed uses will affect each other. This talk applies an IEA framework to a hypothetical ecosystem to demonstrate its utility in addressing how three competing human uses will affect the system's health.

The process begins with identifying an overarching question, in this case: *What is the likelihood that Ecosystem X will remain healthy, (assuming it is healthy)? If it is not healthy, what is needed to make it healthy?* Implementation involves: 1) documenting the status and trends of ecosystem and cultural resource conditions; 2) relating those trends to their environmental and economic causes and consequences; 3) delivering ecological forecasts and scenario developments under changing ecosystem conditions as well as different management actions; and 4) reviewing means, including costs and benefits, to implement those alternatives. The IEA approach provides, for the first time, basic decision making tools to support an ecosystem approach to management. It facilitates analysis of the role of upland uses in maintaining or improving coastal ecosystem function, the delivery of goods and services, and the health of high priority, at-risk species. A successful IEA is responsive to policy-relevant questions, based on peer

review and public participation, broadly integrated and synthetic, based on high-quality existing information, and predictive. It is a process and a product that results in managers and regulators having the scientific know-how and political will to restore and maintain coastal ecosystems so that they support desired functions and uses.

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