

The Many Faces of EBM

Despite the widely accepted need for ecosystem-based management (EBM) of coastal and marine systems, many still struggle with how to put these principles into practice. A new analysis examines how to proceed with EBM under a broad range of initial conditions.

EBM is sometimes thought to be complicated and expensive to implement, laden with prohibitive data requirements, and untested in long-term applications. A recent assessment by scientists from the California Current Ecosystem-based Management Initiative addresses these concerns by considering two case studies – Puget Sound, Washington, USA and Raja Ampat, Indonesia. Through these real-world examples that span realistic ends of the management spectrum in terms of data availability, governance, and time, the authors show that EBM is feasible from a range of starting points and that for any given starting point there are numerous productive paths towards EBM.



How are such approaches being applied?

Seven basic steps for applying an EBM process, using the Integrated Ecosystem Assessment (IEA) framework developed by the National Oceanic and Atmospheric Administration (NOAA).

- **Scoping** - identifying goals, objectives, and constraints
- **Defining indicators** – selecting what to measure so that managers and scientists can track trends and compare them to the objectives
- **Setting thresholds** - assessing the indicator limits and quantities to be achieved that reflect desired ecosystem ‘health’
- **Risk analysis** - testing the probable intensity and frequency of threats to the ecosystem, as well as ability of the ecosystem to recover
- **Management strategy assessment** - developing and assessing options for various likely outcomes of decisions and their effect on indicators
- **Monitoring** – tracking the successes or failures of management decisions
- **Evaluation** - determining if ecosystem protection goals were achieved and making changes where necessary

Raja Ampat, Indonesia

Setting: Although human population density is low, this marine ecosystem faces a number of pressures including overexploitation, destructive fishing practices, land-based pollution, pearl farming, agriculture, tourism, and logging.

Set-up: Through a partnership that includes stakeholders, government, academia and NGOs, an EBM plan has emerged for coastal and marine resources. This endeavor has led to an influx of capital that has allowed a rapid accumulation of knowledge sufficient to support an ecosystem-based approach to management.

Progress: Non-traditional knowledge sources – such as archives, museums and libraries – were combed to reconstruct historical Raja Ampat ecosystems and help set ecosystem goals. Collection of new scientific data – including dive transects, community interviews, and oceanographic monitoring – allowed scientists to model and evaluate different management strategies. Monitoring of both ecosystem conditions as well as human use patterns is now widespread with dedicated funding from NGOs.

Puget Sound, Washington State

Setting: Some 3.5 million people live within the Puget Sound watershed, posing numerous threats and impacts ranging from water quality and habitat loss to shipping and shoreline development.

Set-up: One of the most sophisticated EBM processes underway in the U.S. is coordinated by the Puget Sound Partnership, a state agency whose task is to work with local, state, tribal and federal governments, businesses, and citizens to restore the natural and human components of Puget Sound by 2020.

Progress: Existing scientific information, feedback from workshops on threats and potential strategies, and input from various scientists and policy makers all fed into the scoping process. A unique set of tools use this information to help identify indicators to inform ecosystem goals set by the Partnership. In turn, project leaders are developing an adaptive management framework that includes existing monitoring plans from major portions of the ecosystem. Importantly, a number of gaps in monitoring have been identified, and strategies for addressing those gaps are being outlined. More formal treatment of monitoring and evaluation approaches will be addressed in subsequent iterations of the IEA as the ecosystem modules and full models are developed.