

Ecosystem-Based Management Decision Support System Application Information Note



Photo credit: David Gill

EBM - Decision Support System (DSS)

What is ecosystem-based management (EBM)?

"Ecosystem-based management (EBM) regards marine and coastal ecosystems as units with many ecological and social links. These connections can be numerous and complex, with disruptions to any part of an ecosystem - such as changes to habitats or fluctuations in the population of a species - having many knock-on effects."

(UNEP 2011; Fanning et al. (2011) also online has guidance for marine EBM concerning all sections)

What is a decision support system (DSS)?

A decision support system (DSS) is an information system that supports business or organizational decision-making activities. In the case of environmental management, DSSs help managers make better or more efficient decisions and stimulate the implementation of effective measures.

PROGES ISP 5.0

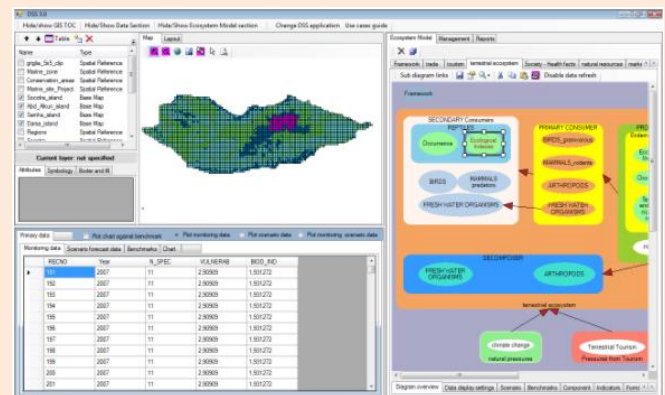
The practical application of EBM still remains a challenging task given the complexities of ecosystems of interest. Utilising easy-to-apply operational methodologies can simplify EBM applications for decision makers and stakeholders involved.

PROGES¹ has developed an innovative approach for implementing EBM applications which is based on a set of guiding methodological steps (the EBM Protocol). This protocol allows the application of EBM in a simplified way using a software package called Integrated Spatial Planning (ISP 5.0).

PROGES ISP 5.0 Software Package

The PROGES ISP 5.0 has been designed for use by non-technical and non-scientific persons, such as administrators and institutional decision-makers. Its intended use is to make the best use of available objective data, context analyses and other technical contributions, integrated with stakeholders/public views and concerns to develop balanced and consistent policies and plans.

The PROGES ISP 5.0 software is a desktop-based application which runs in Microsoft Windows. It provides a user interface which is made up of several components that facilitate: the inputting of geospatial data (e.g. shapefiles); the generation of a system diagram (box and arrow); the inputting of data and indicators; visual assessment (using images); and the generation of reports (Word with text editor).



For more information visit: <http://www.progesconsulting.it/ISP.aspx>

¹PROGES

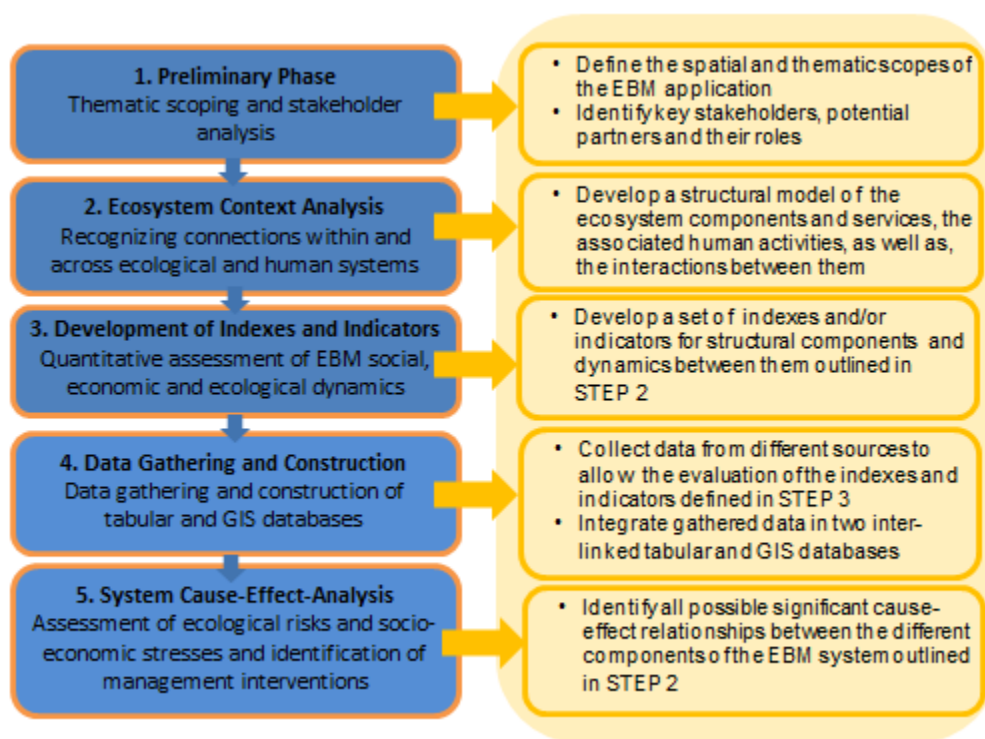
An Italian-based independent consulting firm comprised of an inter-disciplinary, professional experts network, with a strong aptitude for combining intellectual competences with the ability to develop practical solutions in various thematic areas. Visit www.progesconsulting.it for more information.

The EBM Protocol

PROGES ISP 5.0
Methodology



The EBM protocol identifies and quantitatively assesses the relationships between ecosystem components, functions and services and associated human activities. The Protocol is comprised of 5 steps outlined in the diagram below. These steps must be applied sequentially when implementing EBM applications.



Each step of the EBM protocol is characterized by: 1) objectives and rationale; 2) methodology; 3) operational arrangements and 4) main outputs.

The sections that follow, expand on each step of the EBM protocol and offers useful resources for implementation.

For more guidance on implementing the EBM protocol visit <http://bit.ly/PROGESISP>

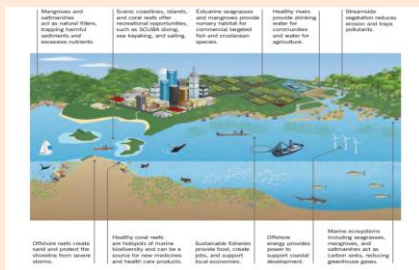
STEP 1: Preliminary Phase

OBJECTIVES

- Define the spatial and thematic scopes of the EBM application.
- Identify key stakeholders, potential partners and their roles in the project.

METHODOLOGY

First, define the ecosystem of interest within a specific coastal zone or a marine protected area. Next, identify the ecological, social and economic components of the system, as well as the interactions between them (including the sectors that impact or are impacted by the ecosystem). Finally, identify key stakeholders and their roles and responsibilities.



METHODOLOGY CONT'D

[Specially designed matrices](#) are available within the software package to guide the process of defining the spatial and thematic scopes. A similar [matrix](#) is also available to guide the stakeholder identification process.

OPERATIONAL ARRANGEMENTS

Conduct meetings with relevant civil society, governmental and non-governmental organizations to gather the information needed to populate the matrices provided.

MAIN OUTPUTS

Tangible

- A [text table](#) illustrating the thematic scope of the EBM application
- A [text table](#) which defines roles and responsibilities of key stakeholders

Intangible

- Documentation of the technical and operational elements needed to guide the implementation of the EBM Protocol.

Read more here: <http://bit.ly/PROGESISP>

STEP 2: Ecosystem Context Analysis

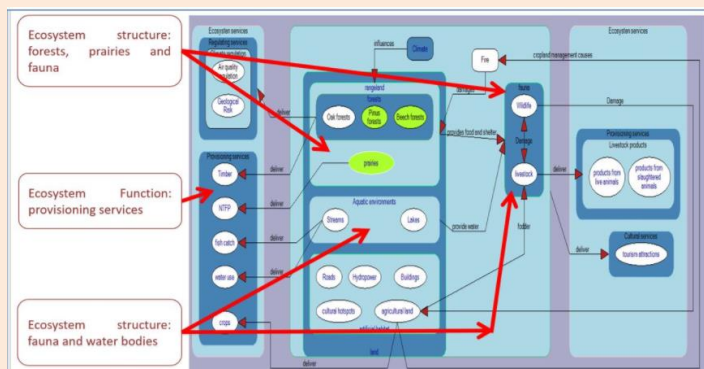
OBJECTIVES

Develop a structural model of the ecosystem components and services, associated human activities, and the interactions between them.

METHODOLOGY

Construct a system diagram (see below) to create a practical representation of the biological, environmental and socio-economic systems.

Read more here: <http://bit.ly/PROGESISP>



OPERATIONAL ARRANGEMENT

The analytical stages of the Ecosystem Context Analysis are typically executed in two consecutive workshops involving the entire EBM planning team. These workshops last 2-3 days depending on the complexity of the ecosystem of interest and are conducted four to six weeks apart.

OUTPUTS

Tangible

- System Matrices: tables listing all structural components of the relevant biophysical and human systems, together with their synthetic descriptions.
- System box-and-arrows Diagram: describe the dynamics (arrows) between the biotic and abiotic components (boxes) of the natural ecosystem, the services that ecosystems provide to sustain life (boxes), and the uses that human society makes of these services (boxes).

Intangible

- Environmental, social and economic stakeholders harmonize their initially different viewpoints, and develop a common understanding and a coherent vocabulary on how to plan and implement the given EBM application

STEP 3: Development of Indexes and Indicators

OBJECTIVES

Develop a set of indexes and indicators for the quantitative assessment of the structural components and dynamics of the EBM reference systems.

METHODOLOGY

Methods and examples for developing effective indexes and indicators to characterize social, economic and environmental dynamics are extensively available in relevant technical and scientific literature.

OPERATIONAL ARRANGEMENTS

Relevant indicators can be developed at a dedicated 2-3 day workshop involving EBM stakeholders and technical sector experts.

OUTPUTS

Tangible

Arrays of indicators attached to each item of the System box-and-arrows Diagram.

Intangible

Scientific, technical, administrative and civil-society stakeholders collaboratively provide a common list of indicators tailored to their context.

Read more here: <http://bit.ly/PROGESISP>

STEP 4: Data gathering and construction of tabular and GIS databases.

OBJECTIVES

- Gather data from different sources to allow the evaluation of the indexes and indicators defined in STEP 3.
- Integrate data into two inter-linked tabular and GIS databases, to be designed and implemented according to relevant technical standards

METHODOLOGY

Data collection should include the establishment of data sharing protocols between the gatekeepers of data and the institution responsible for the implementation of EBM.

OPERATIONAL ARRANGEMENTS

The data procurement process is dependent on actual data needs and the local institutional framework.

OUTPUTS

Tangible

- Tabular and GIS databases to manage the datasets for the indicators of interest.
- Real-time analysis of indicators' spatial distribution and time trends.
- Compilation of data-aware advanced reports.

Intangible

A common template for analyzing EBM social, economic and ecological dynamics

Read more here: <http://bit.ly/PROGESISP>

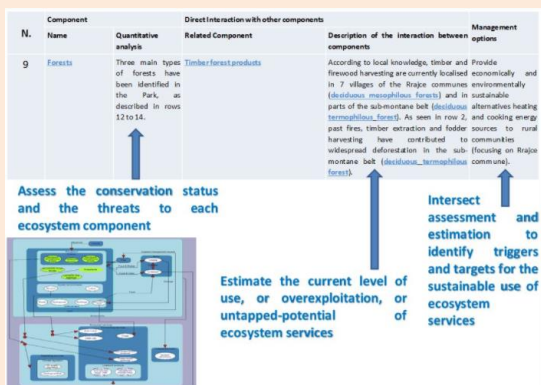
STEP 5: System Cause-Effect-Analysis

OBJECTIVES

Identify in a systematic manner all possible significant cause-effect relationships between the different components of the EBM system.

METHODOLOGY

Systemically analyse all the elements of the boxes-and-arrows system diagram (see below) with the aim of defining an integrated set of management measures coherent with EBM principles. The process is illustrated below:



OPERATIONAL ARRANGEMENTS

The analysis can be executed using the ISP software at a 2-3 day workshop with participation by all stakeholders involved.

OUTPUTS

Tangible

- A quantitative assessment of the conservation status of the biotic and abiotic components of the natural ecosystem; the use of ecosystem services; and livelihood strategies and outcomes.
- An integrated set of simple EBM measures, collectively drafted by stakeholders and derived from (and targeted to) the relevant components of the ecological and human system (or interaction between them).
- A structured indicator framework to monitor the EBM performance.

Intangible

Stakeholders develop a shared understanding of ecological risks and socio-economic stressors.

Read more here: <http://bit.ly/PROGESISP>

Note: This information note specifically promotes PROGES ISP 5.0 within the context of the international funding for this project. Information on several alternative DSS options is readily available from online and other sources.