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# Indicators for Assessing and Monitoring Integrated Coastal Zone Management in the Balearic Islands

Tracking the Path to Sustainability in the Coastal Zone

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# Outline

## Introduction and Background

- The coastal zone: Complexity, problems and threats
- Integrated Coastal Zone Management (ICZM)

## The Project

3. The proposal: Indicators for assessing and monitoring ICZM in the Balearic Islands
- Discussion of indicator tables



# 1. The coastal zone: Complexity, problems, threats

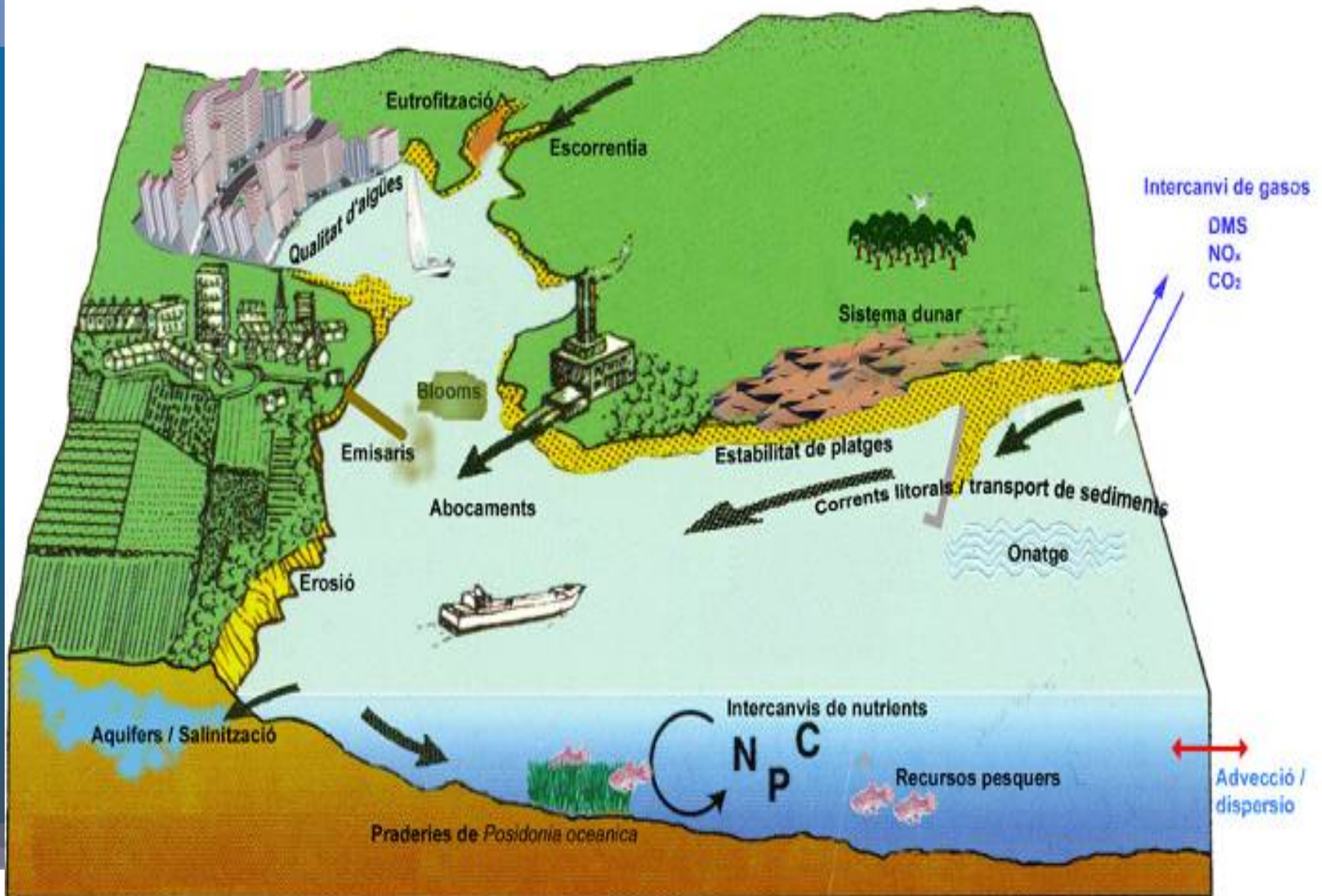
## What do we understand by Coastal Zone?

- It is a dynamic, fragile and complex area where a diversity of forces, processes and pressures are in place, all inter-related: waves, currents, sediment transport, bio-geochemical fluxes, biodiversity, socio-economic, cultural and institutional processes.
- In small islands, the coastal zone is really the whole island.
- The coastal zone has a unique biodiversity in terms of flora and fauna: unique and scarce.
- The coastal zone is of high economic, social, cultural and recreational importance.
- A large number of administrations and institutions have competencies in the coastal zone.



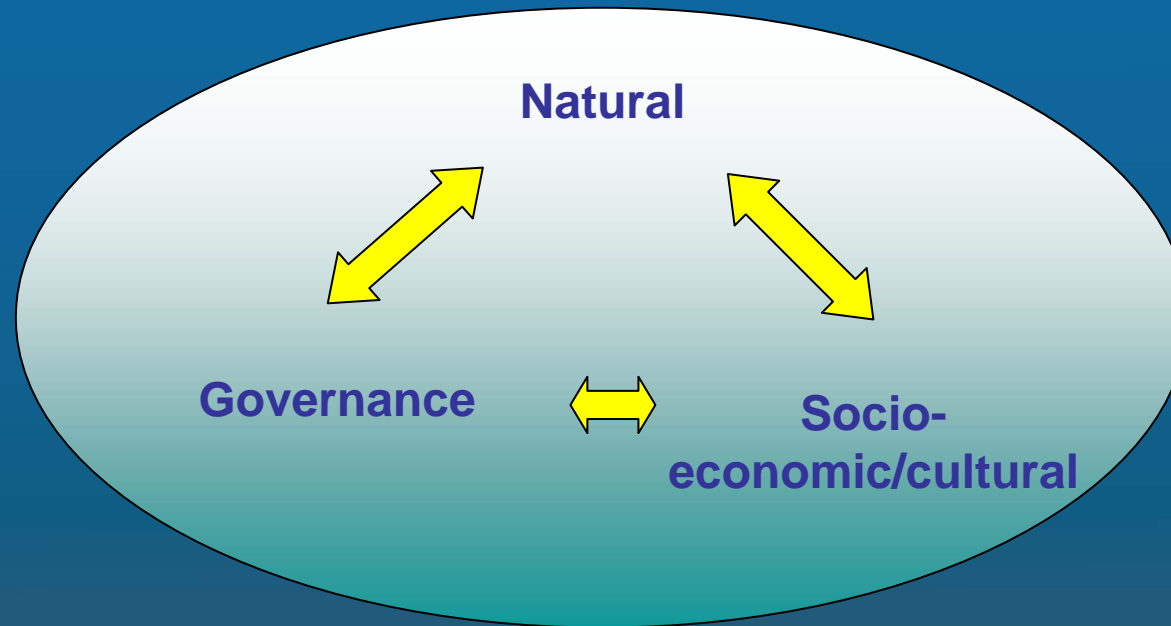


# 1. The coastal zone: Complexity, problems, threats



# 1. The coastal zone: Complexity, problems, threats

Three interdependent systems



Multiple-resources, multiple-users,  
interacting in a very complex system





# 1. The coastal zone: Complexity, problems, threats

## Ecosystem services and functions

- Regulation of gases
- Regulation of climate
- Erosion control
- Nutrient recycling
- Recycling of contaminants
- Seawater treatment
- Food production
- Genetic resources
- Recreation/tourism
- Cultural values



# 1. The coastal zone: Complexity, problems, threats

## Impacts (some examples from Balearic Islands)

- Deterioration of seawater quality
- Algal blooms
- Deterioration of sanitary conditions of seawater for swimming
- Proliferation of invasive species
- Deterioration of *Posidonia oceanica* meadows
- Loss of fishing areas
- Beach erosion
- Sand dune loss





## 2. Integrated Coastal Zone Management

"A continuous and dynamic process by which decisions are made for the sustainable use, development, and protection of coastal and marine resources" (Cicin-Sain and Knecht 1998).

"The process is designed to overcome the fragmentation inherent in both the sectoral management approach and the splits in jurisdiction among levels of government at the land-water interface" (ibid).





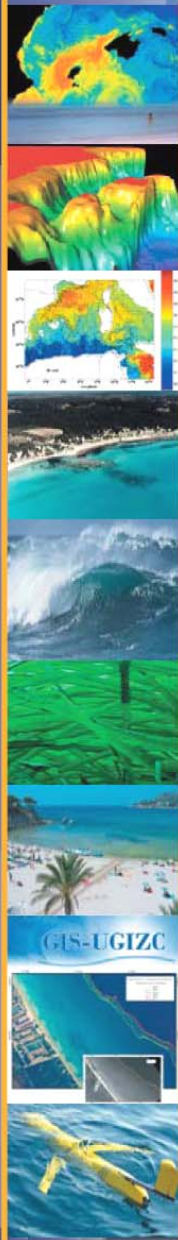
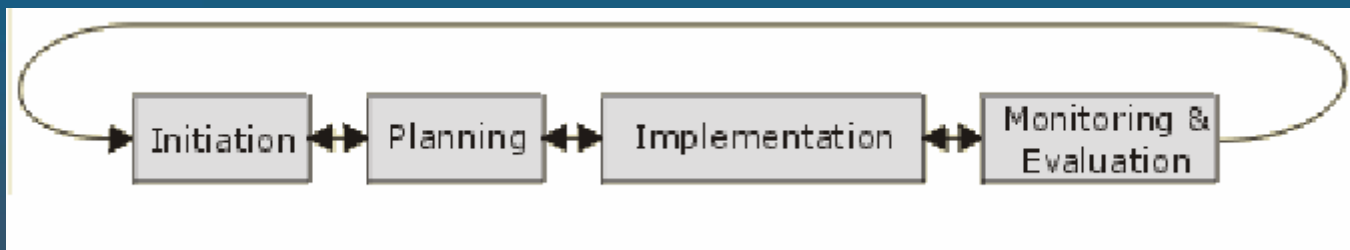
## 2. Integrated Coastal Zone Management

### Integration

- Intersectoral integration
- Intergovernmental integration
- Spatial integration
- Science-management integration
- International integration



### The Process



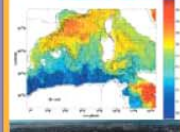
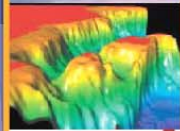
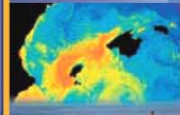
## 2. Integrated Coastal Zone Management

### Evolution in Europe

- 60s and 70s: USA, Australia, Regional Seas Programme
- 1972: UN Conference on the Human Environment
- 1992: UN Conference on Environment and Development

### Chapter 17, Agenda 21





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## Agenda 21 – Chapter 17 PROTECTION OF THE OCEANS, ALL KINDS OF SEAS, INCLUDING ENCLOSED AND SEMI-ENCLOSED SEAS, AND COASTAL AREAS AND THE PROTECTION, RATIONAL USE AND DEVELOPMENT OF THEIR LIVING RESOURCES

17.1. The marine environment - including the oceans and all seas and adjacent coastal areas - forms an integrated whole that is an essential component of the global life-support system and a positive asset that presents opportunities for sustainable development. International law, as reflected in the provisions of the United Nations Convention on the Law of the Sea 1/, 2/ referred to in this chapter of Agenda 21, sets forth rights and obligations of States and provides the international basis upon which to pursue the protection and sustainable development of the marine and coastal environment and its resources. This requires new approaches to marine and coastal area management and development, at the national, subregional, regional and global levels, approaches that are integrated in content and are precautionary and anticipatory in ambit, as reflected in the following programme areas: 3/

- a. Integrated management and sustainable development of coastal areas, including exclusive economic zones;
- b. Marine environmental protection;
- c. Sustainable use and conservation of marine living resources of the high seas;
- d. Sustainable use and conservation of marine living resources under national jurisdiction;
- e. Addressing critical uncertainties for the management of the marine environment and climate change;
- f. Strengthening international, including regional, cooperation and coordination;
- g. Sustainable development of small islands.





## 2. Integrated Coastal Zone Management

- 1996-1999 European Demonstration Programme
- 2002 European Commission ICZM Recommendation 413

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Official Journal of the European Communities

6.6.2002

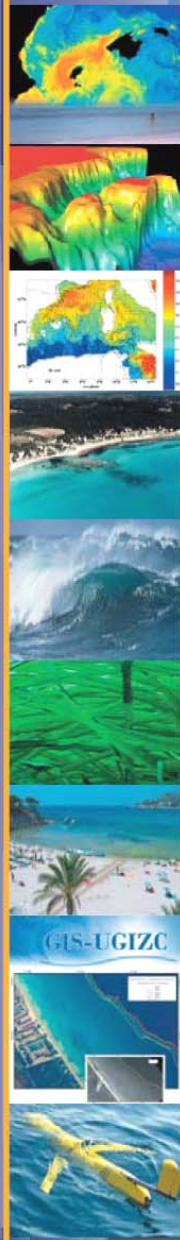
II

(Article 109 publication is not obligatory)

COUNCIL

RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL  
of 30 May 2002  
concerning the implementation of Integrated Coastal Zone Management in Europe  
(2002/413/EC)

- 2005 Protocol for ICZM in the coastal zone of the Mediterranean



## 2. Integrated Coastal Zone Management

### ICZM in Spain

- Ley 22/1988 de Costas
  - Constitutes the basic coastal legislation of Spain
  - Identifies the coastal zone as public territory with significant socio-economic and environmental value
  - Establishes a zone of influence of non urban land-use 500m inland from the public territory
  - Competency passed on to the autonomous communities and local administrations
- To date, unlike in the USA, there is no law that specifically pertains to ICZM in Spain. Rather, there are many overlapping laws that deal with aspects related to ICZM (e.g. urban development, water quality, habitats, protected areas).
- This necessitates even more the application of ICZM as a tool for managing the coastal zone.



## 2. Integrated Coastal Zone Management

### Unidad de Investigación Gestión Integrada de la Zona Costera (UGIZC)

- In response to the recognition of the strong need for science-based ICZM in the Balearic Islands, the Govern de les Illes Balears and the Consejo Superior de Investigaciones Científicas (CSIC) formed the UGIZC in IMEDEA.
- UGIZC is an ambitious joint initiative related to the Government's Strategic Objectives for achieving Sustainability in the Medium (2010) and Long-term (2020) in the Balearic Islands.





### 3. Indicators for Assessing and Monitoring ICZM

#### Background

"[ICZM should] include adequate systems for monitoring and disseminating information to the public about their coastal zone. These systems should collect and provide information in appropriate and compatible formats to decision makers at national, regional and local levels to facilitate integrated management" (2002/413/EC).



### 3. Indicators for Assessing and Monitoring ICZM

#### Background

Spain, 2002: First High Level Forum on Community Strategies for ICZM recommended that indicators be developed to assess both sustainability in the coastal zone and the degree to which ICZM is being implemented → EU Expert Group in Indicators and Data (WG-ID).

Recommendation of the Co-Chairs of the Global Conference on Oceans and Coasts at Rio+10, Paris 2002: "Improve the linkage between science and management through partnerships that enable more effective use and exchange of data and information to the benefit of communities and society as a whole ... through the development of environmental and socio-economic indicators measuring the performance actions related to oceans and coasts.



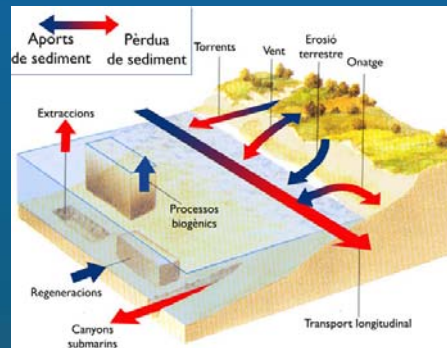
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### 3. Indicators for Assessing and Monitoring ICZM

#### Definition

"[A measurement that] provides a simplified view of a more complex phenomenon, or provides insights about a trend or event that cannot be readily observed. Thus indicators both quantify information and simplify information" (WG-ID 2002).



How does one measure a trend that cannot be readily observed?  
How does one gain a realistic understanding of a complex phenomenon using simplified data?





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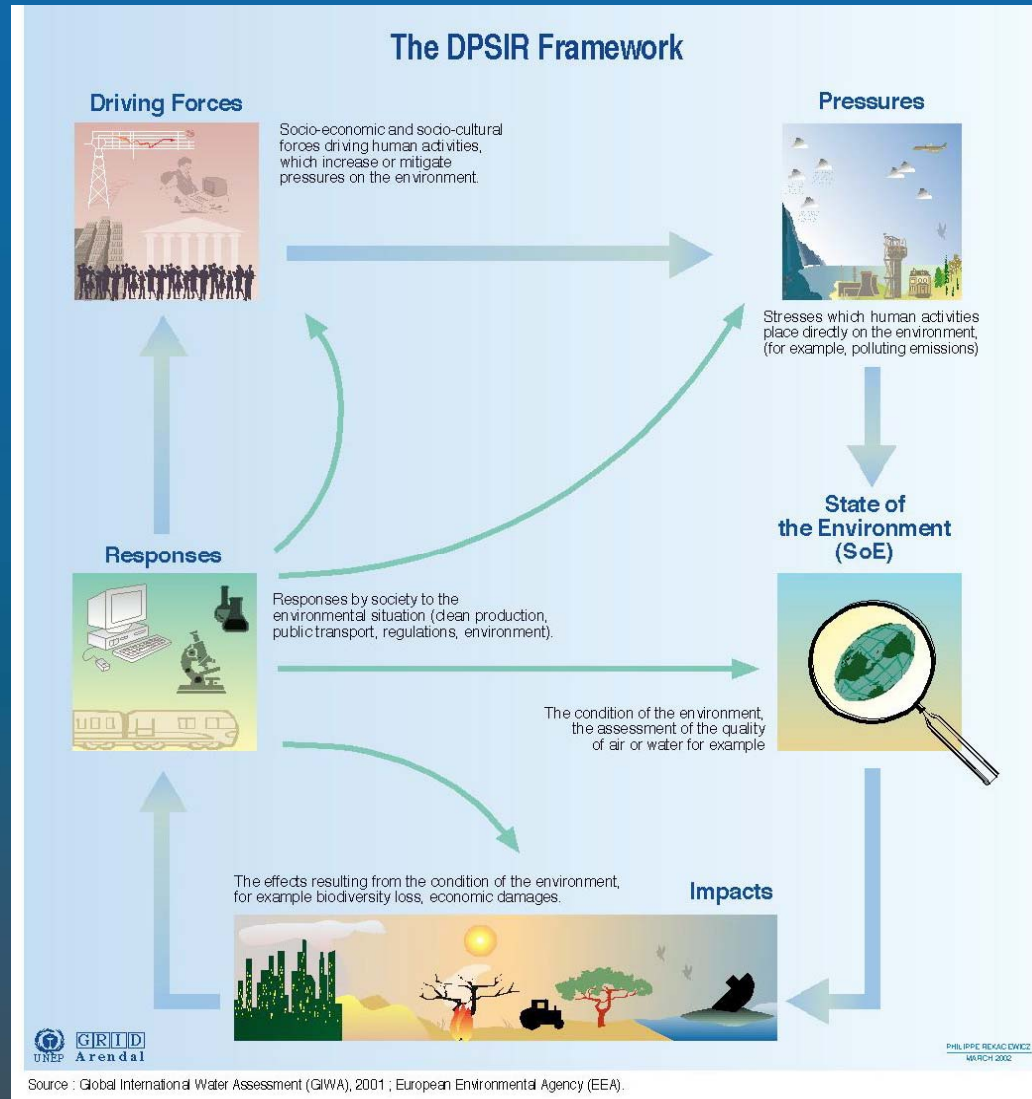
### 3. Indicators for Assessing and Monitoring ICZM

#### The Proposal

- The purpose of this project is to develop a proposal for a list of indicators to monitor and assess ICZM in the Balearic Islands.
- This is being achieved through a full evaluation of international scientific standards and protocols for indicator development and through a participatory, cooperative process in order to tailor such standards to the environmental-socio-economic reality of the Balearic Islands.



# 3. Indicators for Assessing and Monitoring ICZM





### 3. Indicators for Assessing and Monitoring ICZM

#### Logical Approach

- Human activities and the social-economic-cultural system within which they occur result in the drivers and pressures that are largely responsible for degradation of coastal and marine environments.
- In order to achieve sustainability, it is important to influence humans and the social-economic-cultural system in order to alter their behaviour so as to minimize negative impacts on the natural environment and maximize societal benefits derived from natural resources.
- ICZM decision-makers have the capacity to influence and alter human behavior through governance.
- Improvements in the state of marine and coastal environments and decreases in manifestations of negative impacts are indicators of whether alterations in human behaviour influenced by governance have been successful.
- Improvements in the natural environment will result in societal benefits and overall improvement of the quality of life of coastal residents, thus progressing towards the stable balance between human and natural systems that is necessary for sustainability.



**DRIVER/PRESSURE**  
*measured using*  
Socio-economic Indicators

*The social-economic-cultural system drives human activities that result in pressures on coastal and marine environments. These result in impacts that affect the state of the environment. The state of the environment affects the socio-economic system.*

**STATE/IMPACTS**  
*measured using*  
Environmental Indicators

*Governance is society's way of influencing the social-economic-cultural system in order to minimize pressure on coastal and marine environments. Governance drives the ICZM process. The response of the socio-economic system influences governance measures.*

**RESPONSE**  
*measured using*  
Governance Indicators

*Information about the state of coastal and marine environments and the impacts upon them drive the governance system to adapt and evolve to minimize negative impacts and improve the state these environments. Through influencing the social-economic-cultural system, effective governance measures improve the state of the environment.*

**Figure 1: Logical Framework for ICZM Indicator Selection**

### 3. Indicators for Assessing and Monitoring ICZM

#### Indicator Selection

From a scientific perspective, viability entails indicators that possess the following characteristics:

- Readily measurable
- Cost effective
- Concrete (i.e. directly observable and measurable)
- Interpretable
- Grounded in scientific theory
- Sensitive
- Responsive
- Specific

From a management perspective, viability entails:

- Relevance to management objectives
- Clear linkages to the outcomes being monitored
- Development with involvement of all those involved in management
- They must be part of the management process and not an end in themselves

(IOC 2006)





### 3. Indicators for Assessing and Monitoring ICZM

#### Timeline

- ✓ Identify major issues pertaining to each type of indicator (i.e. governance, ecological, socio-economic) and define why each issue is important in the context of the Balearic Islands.
- ✓ Identify a list of specific objectives for addressing each issue identified above.
- ✓ Conduct a full evaluation and review of international standards and works related to ICZM and indicator development.
- ✓ Based on the review above, identify a series of potential indicators and a series of measurements associated with each objective. Specifically, to identify a core list of well-established, internationally accepted indicators that are considered essential to the project, and an additional, extended list of indicators which will be more amenable to adaptation based on further consultation with experts and stakeholders.



### 3. Indicators for Assessing and Monitoring ICZM

#### Timeline

- Consult with indicator experts and stakeholders involved with indicator development and issues related to ICZM to assess the viability of measurements and refine the list of indicators (**in progress**).

#### .....Next Steps.....

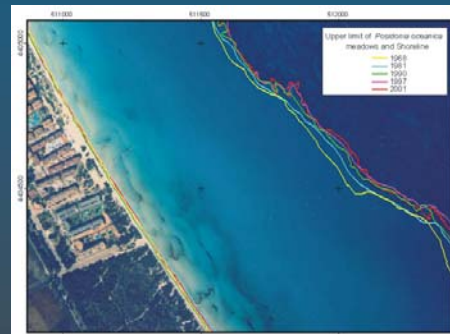
1. Conduct full assessment of the suitability (*idoneidad*) of the individual indicators (based on methodology applied by Govern del Pais Vasco, Annex 12): May – August 2007
2. Further identify specific units of measurement, thresholds, tendencies: May – August 2007
3. Develop an implementation plan for the list of indicators: May – November 2007
4. ?????



### 3. Indicators for Assessing and Monitoring ICZM

#### Major Challenges

- Lack of coordination and cooperation among parties involved in indicator development leads to too much repetition and inefficiency.
- ICZM and indicators are not generic, rather, they are site specific and restricted by political and local realities, and by availability of financial and human resources.
- Identifying viable, consistent data sources.
- Identifying scale of measurements, thresholds and limits, tendencies.
- Finding a balance between reality and comprehensiveness (i.e. balancing sustainability goals and political realities).
- Identifying resources and partners to implement and maintain list of indicators.





## 4. Indicator Tables

- The tables are divided into 3 major categories (A, B, C), representing the three types of indicators (governance, socio-economic, environmental) selected for this proposal.
- In turn, the three types of indicators have been divided into two sub-categories (A/B/C 1 and 2) representing a core list of indicators and an extended list of indicators.
- The core list represents those indicators in each category that are based on an extensive evaluation of the literature and established international standards and therefore considered to be the essential minimum required to achieve the overall objective of assessing and monitoring ICZM in the Balearic Islands.
- The extended list represents additional indicators that could be used to elaborate on any of the objectives listed in the table. This makes the list amenable to adaptation depending on the specific organization or entity wishing to apply the measurements.



## 4. Indicator Tables

### Governance Indicators

“[D]esigned to measure the performance of the responses to mitigate human pressures on the coastal and marine environment. They also measure the progress and quality of the governance process itself, that is, the extent to which a programme in addressing the issue(s) that triggered the development of the programme in the first place” (IOC 2006).

Category	Specific Objective	Indicator (Reference)	Measurement	Spatial Scale	Temporal Scale
Institutions	To establish a network of organizations, at all levels of governance, that supports and facilitates the implementation ICZM.	1. Existence and activity level of organizations supportive of ICZM (IOC 2006)	Qualitative assessment of the following dimensions: <ul style="list-style-type: none"> <li>- The number and characteristics of organizations (government, NGO, community level etc.) active in fields related to ICZM</li> <li>- Description and level of activities carried out by these organizations related to ICZM (participation in meetings, education, field projects, enforcement etc.)</li> <li>- Degree of influence such activities on the advancement of ICZM related activities</li> </ul>	Region Island Municipality	Initial assessment followed by yearly re-evaluations.

## 4. Examples of Indicators

### Socio-economic Indicators

"[D]esigned to capture interactions between human activities and coastal and marine environments. Socio-economic activities in the coastal zone are varied and encompass a number of dimensions including economic, environmental, public health and safety and social" (IOC 2006).

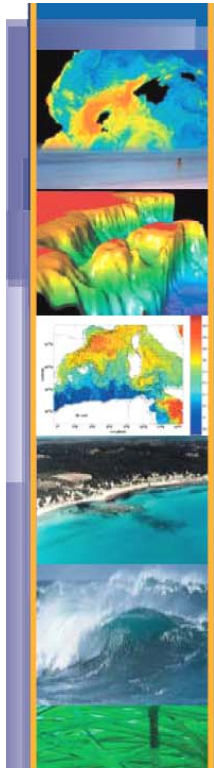
Category (Driver/Pressure)	Specific Objective	Indicator	Measurement	Spatial Scale(s)	Temporal Scale
Tourism	To achieve sustainable levels of tourism in the coastal zone.	17. Evolution of tourism supply (Sarda et al. 2005)	<ul style="list-style-type: none"> <li>- Number of lodging places</li> <li>- Number of hotel rooms</li> <li>- Ratio of spaces in lodging places per 100 residents</li> <li>- Ratio of hotel rooms per 100 residents</li> <li>- Growth in lodging places and hotel rooms</li> </ul>	Region Island Municipality Tourism Zones	1995 – present followed by yearly re- evaluations



## 4. Examples of Indicators

### Environmental Indicators

Environmental indicators measure the condition and trends of the state of the ecosystem, in particular its biological organization, vigour and geological, physical and chemical properties (IOC 2006).



Specific Objective	Indicator (Reference)	Measurement	Spatial Scale	Temporal Scale
Monitor ecosystem health through the identification and use of keystone and indicator species.	39. Keystone and indicator species (EITAC 1999)	<ul style="list-style-type: none"> <li>- Identification of priority species that could serve as indicators of ecosystem health.</li> <li>- Measurement of quality (e.g. contaminant exposure, disease) and abundance of species identified above.</li> </ul>	Geographic Information System (multiple scale options)	Seasonal evaluation of quality after initial evaluation of priority species.