A European point of view. The Water Framework Directive: Integrating Coastal Systems and River Basins

Nicholas Murray*, Carles Ibáñez Martí**, Pierluigi Viaroli***

* LaguNet, Italy
**Unitat d'Ecosistemes Aquàtics (UEA-IRTA), Sant Carles de la Ràpita (Delta de l'Ebre), Spain
*** University of Parma, Italy

Life support systems of societies

• Coastal zones play a key role in Earth System functioning providing a significant contribution to the life support systems of most societies. Goods and services derived from coastal systems depend strongly on multiple trans-boundary interactions with the land, atmosphere, open ocean and sea bottom. Human habitation, food production, growing tourism and transportation accelerate the exploitation of the coastal landscape and resources.

• Changes in the hydrologic cycle coupled with changes in land and water management alter fluxes of materials transmitted from river catchments to the coastal zone having a major effect on coastal ecosystems.

Sustainable delivery of goods and services

In order to maintain a sustainable delivery of goods and services for humankind, science needs to better inform society, decision-makers and planners about:

- global changes that are part of natural cycles of change, such as climate, and those due to changes in the global economy/trade and policy.
- regional (trans-boundary and supra-national) changes as a result of regional and national drivers and pressures in the coastal zone.
- regional changes at the river catchment level which affect the downstream coastal zone and the near-shore marine environment.

The EU Water Framework Directive

- In Europe a major effort is already being made in this direction through the implementation of the EU Water Framework Directive.
- The objective of this Directive is to make sure that all European surface waters (rivers, lakes, transitional/coastal) and ground water bodies are effectively protected, and where needs be remediation measures are to be taken, to ensure that water bodies attain good ecological status by 2015.
- Twenty-eight countries with a population of around 450 million people are collaborating towards this common goal.
- Focusing on regional scales within this context, transitional waters and especially coastal lagoons are increasingly recognised as representing a highly diversified series of ecosystems reflecting the wide range of the European climate conditions.

From river basins to coastal systems (thanks to the WFD !)

- What are we studying ?

  Coastal lagoons, marshes, bays, estuaries, deltas... so ESTUARINE SYSTEMS

  WFD = transition and coastal waters

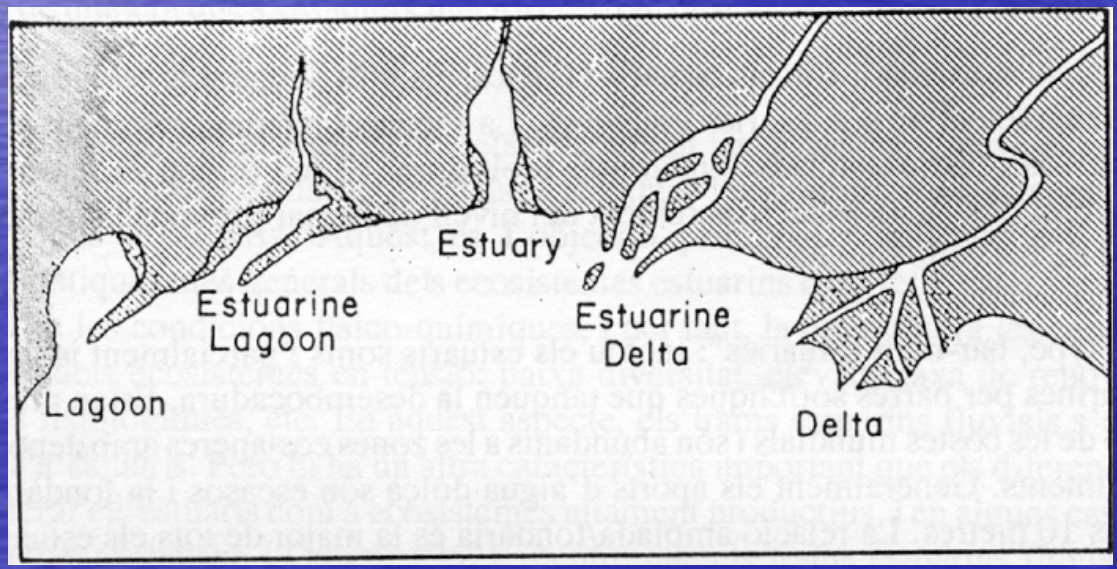
- What are estuarine systems ?

  Coastal areas influenced by tides and mixing of salt and fresh water, and are areas under strong influence of their watersheds

- WFD = achieve a good ecological status of rivers, estuaries and coastal marine waters by 2015

From coastal lagoons to deltas

- Coastal lagoons and deltas are frequent in micro-tidal coasts, such as in the Mediterranean
- Typical estuaries are frequent in tidal coasts, such as in the Atlantic



Information gaps that still need addressing.

- What is the magnitude and speed of change on coastal systems that is being inflicted by change to biogeochemical cycles; can the systems recover and are the result within “acceptable” limits?
- Can we identify what makes systems sensitive/robust?
- Can we assess of the implications of habitat, ecosystem services and land loss on regional and global biogeochemical cycles?
- How close do these losses take the system to thresholds of significant change in regional biogeochemical functions, thus affecting these natural goods and services?
- Can we identify the potential role of different assemblages and habitats in sustaining the integrity of coastal systems and Earth processes?
- Can we delineate the balance between increasing and decreasing sediment loads to the coastal zone due to man and/or climate change, and its impact on coastal evolution especially on wetlands and estuaries?

From science to management and back to science

- Science, i.e. ecological status, biogeochemical cycles and fluxes, climate change, etc.
- Science for management, e.g. assessing environmental flows, sustainable yields, etc.
- Science of management, e.g. modeling human impacts and land uses, resource optimisation
- Management based on science, e.g. wetland restoration, lagoon sustainability,
- Managing competing demands of society – policy and politics

Goal: integrating science in management

The sustainability challenge

GEOMORPHIC SUSTAINABILTY
(relative sea level rise, sediment deficit)

ECOLOGICAL SUSTAINABILITY
(pollution, fragmentation, global warming)

SOCIOECONOMIC SUSTAINABILITY
(overexploitation, land uses, policy)

Goal : integrating the three levels of sustainability

Research subjects: from ICZM to IRBM

- Integrated Coastal Zone Management and Integrated River Basin Management can no longer be considered independent science or management areas
- There is both a scientific and a socio-political need to improve knowledge and management of coastal zones through a common approach
- Modeling the interactions between basin and coastal processes for a better understanding should be a priority for Policy and Decision makers

Goal: defining common methodological approaches integrating river basins and coastal zones

Regional/national lagoon observational networks

What mechanisms can we develop and build upon to provide policy makers with soundly based, timely and focused scientific information needed to attempt to answer these questions?

One major component is that of the use of regional/national observational networks.

The development of such networks allows a more focused response to major policy, science and management needs such as the implementation of the EU Framework Water Directive or the assessment of the impact of coastal lagoon ecosystems to local, regional and global anthropogenic pressures, as well as providing science products and information to international programmes LOICZ II, ELOISE and C-GTOS (FAO).

Network objectives

- Common research approaches and subjects
- Establish a monitoring network
- Common projects
- Information and formation exchange
- Contribute to the implementation of the WFD in coastal areas

Southern European Arc Lagoon Observational Networks

•That such networks can effectively be developed can be seen through the examples of the French (**PNEC and le Réseau de Suivi Lagunaire-RSL**), Italian (**LaguNet**), Greek (**ElNet**), Portuguese (**PlaNet**), and the newly founded Spanish network (**RedMarismas**) as well as the EU project **DITTY**.

•These networks are starting to make a significant scientific contribution in the understanding of many aspects of river basin-coastal lagoon functioning and are also, in some cases, developing as Early Warning System (LaguNet) for onset of rapid proliferation of Algal species of potential risk to aquaculture and human health.

•Some of the networks have provided regional estimates of C,N,P fluxes to LOICZ global assessment of land-coastal interactions, others are actively contributing to the implementation of the WFD.

Possible Common Activities

• **EU Water Framework Directive:** Due to the specific nature of transitional waters and lagoon systems information for the implementation of the Directive is needed in order to enable comparable classification of these systems.

• **Early Warning System**. Consider developing a data-protocol identifying supporting observations as part of an Early Warning System. Information to be transmitted to local and regional Authorities, stakeholders and science research groups etc

• **Data provider service to International Programmes.** There is a clear request for data from international programmes such as LOICZ II and C-GTOS to provide expertise, skills and data for global information systems and assessments.

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