



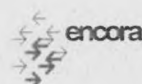
First BeNCoRe Conference:

State of the Art and future of Belgian Coastal
Research

*-BeNCoRe and its relation to the Green Paper on a future
European Maritime Policy-*

Leuven,
26 April 2007

Supported by the European Commission under the sixth
framework Programme Coordinaton Action ENCORA
(FP 6-2004-Global-3-518120)





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Conference organisation

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This publication should be cited as follows:

Claus, S.; Berlamont J. (2007). Background report First BeNCoRe Conference : State of the Art and future of Belgian Coastal Research - BeNCoRe and its relation to the Green Paper on a future European Maritime Policy. 26 April 2007 - Belgian Network For Coastal research

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Preface

The Belgian part of the North Sea covers an area of 3600 km² and has a coastline of 65 kilometers. It represents less than 1 percent of the whole North Sea and about 0.002 percent of 'Old Europe's' coastline. An inventory shows that despite this small area more than 100 research institutes, 40 companies and NGO's and about 16 administrations are involved or have responsibilities for coastal and marine management and research. However the links existing at present between and within the communities of coastal science, policy and practice are weak and suffer from fragmentation. Additionally the responsibilities for integrated coastal zone management are shared between the Federal Ministry and the Flemish Region and there is an extra gap between institutes carrying out coastal research from both Flemish and Walloon Regions.

In order to overcome these difficulties, the Belgian Network for Coastal Research (BeNCoRe) tries to establish an excellent working national network on coastal research. BeNCoRe aims at stimulating and facilitating knowledge exchange between network participants both at national and European level. Most important bottlenecks to be addressed are fragmentation of the coastal communities, communication between science, practice and policy within and between the different regions and lack of multidisciplinary approaches.

During this First BeNCoRe Conference, an introduction and state of the art will be presented on ten coastal thematic issues related to Coastal Engineering and Observation Techniques, the Natural System, Integrated Coastal Zone Management and Marine and Coastal Spatial Planning. Focusing on different aspects of the Green Paper on a Maritime Policy, which will have a considerable impact on the future European policy, we hope to encourage the involvement of Belgian partners and improve the communication between marine science, practice and policy.

I would like to wish you a very interesting and fruitful conference hoping that it will trigger further attention towards the BeNCoRe network. As the name of the conference suggests, this day does not have to be a single event but can be the first of a long series...

Yours sincerely,

Simon Claus
Coordination Officer BeNCoRe

Programme

8.30-9.00: Registration and coffee

9.00-9.25: Prof dr. ir. Jean Berlamont, Coordinator BeNCoRe
Hydraulics Laboratory, KUL
Welcome and introduction; BeNCoRe activities

9.25-9.50: Prof dr. Job Dronkers, Coordinator ENCORA
RIKZ, Den Haag
Role of BeNCoRe in European Network; The Green Paper on a future European Maritime Policy

Session 1: Coastal Engineering and Observation Techniques (Chair: Dr. Marilaure Grégoire – Laboratory of Oceanology, ULg)

09.50-10.15: Prof dr. ir. Jaak Monbaliu
Hydraulics Laboratory, KUL
Sustainable coastal engineering techniques

10.15-10.40: Dr. Alberto Vieira Borges
Chemical Oceanography Unit, ULg
Assessment of field observation techniques

10.40-11.10: Coffee

Session 2: ICZM Implementation and Stakeholder Participation (Chair Rudy Herman – Ministry of Flanders, Department Economy, Science and Innovation)

11.10-11.35: Kathy Belpaeme
Coordination Centre for Integrated Coastal Zone Management in Belgium
ICZM Participation and Implementation

11.35-12.00: Annemie Volckaert
Ecolas n.v.
Social and economic aspects of ICZM; functionality and valuation

12.00-12.25: Nathalie Beenaerts
ECOMAMA, VUB
Capacity building, training and education in ICZM

12.25-13.25: Lunch

Session 3: The Natural System and Human Impact (Chair Prof dr. Magda Vincx - Marine Biology Section, UGent)

13.25-13.50: Prof dr. Jean-Marie Beckers

Geohydrodynamics and Environment Research, ULg
Pollution, prevention, detection and mitigation

13.50-14.15: Dr. ir. Véronique Rousseau

Ecology of Aquatic Systems Unit, ULB
Marine Ecology and Biodiversity

14.15-14.40: Vera Van Lancker

Renard Centre of Marine Geology, UGent
Effect of Development and Use on Eco-morphology and Coastal Habitats

14.40-15.05: Coffee

Session 4: Land-sea interface and Marine Spatial Planning (Chair David Cox - Belgian Science Policy)

15.05-15.30: Ir. Miguel Berteloot

Agency for Maritime and Coastal Services, Coastal Division
Coastal geo-morphological Change and land-sea interface

15.30-15.55: Prof dr. Frank Maes

Maritime Institute, UGent
Marine and Coastal Spatial Planning

15.55-16.30: Discussion, synthesis and conclusions

16.30-18.30: Reception

General Introduction

Simon Claus & Jean Berlamont

Introduction and background of the BeNCoRe network

On 30 April 2003 a first workshop about the possible creation of a Belgian Network for Coastal Research was organised. The following networking activities, where a future BeNCoRe could and should play a role, were considered:

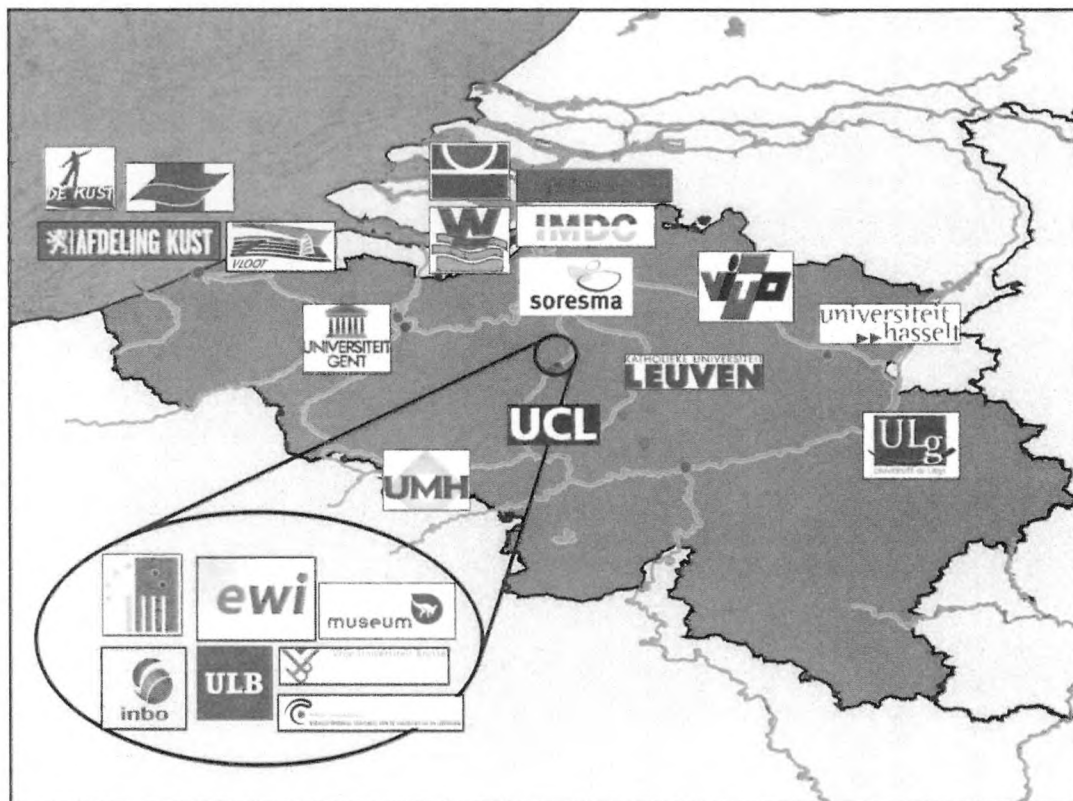
- ❑ Mobility of researchers
- ❑ Linkage of marine science with marine policy
- ❑ Interdisciplinary work
- ❑ Stages and education
- ❑ Share infrastructures
- ❑ Taking a position as a 'Belgian Network' in European matters
- ❑ Interface with Integrated Coastal Zone Management

The Belgian Network had been approved since then and was created as BeNCoRe, the Belgian Network For Coastal Research. This network is since February 2006 part of ENCORA, the European Network For Coastal Research (Coordination Action, funded under FP. 6) and is managed by a coordinator, a secretariat and the BeNCoRe Bureau. The latter executes the daily management of the BeNCoRe network and includes marine scientists from the Flemish region (3), marine scientists from the Walloon region (2), policy makers from the Flemish government (1) and policy makers from the Belgian Federal Science Policy (1). Two to three meetings of the BeNCoRe Bureau are organised every year to discuss the future activities and implementations of the BeNCoRe network. Last year ten Network Ambassadors were appointed by the BeNCoRe Bureau. They kindly agreed on becoming the key contact persons of the Network and were invited to give their 'personal vision' on their theme within Belgium and across Europe during the First BeNCoRe Conference.

The establishment of the European Coordination Action ENCORA (European Network for Coastal Research - FP 6-2004-Global-3-518120) gave BeNCoRe the structural and financial opportunity to extend the network with the creation of a BeNCoRe permanent staffed secretariat hosted in Oostende under the same roof as the data centre of the Flanders Marine Institute (VLIZ). *BeNCoRe Travel Grants* are available for partner institutes. Coastal

researchers, practitioners and decision makers wishing to attend ENCORA activities, ICZM and Coastal Research related events organised across Europe may apply for funding to cover their travel, accommodation and registration costs. This program allows young coastal and marine professionals to develop their personal international network, broaden their field of expertise and familiarize them with international networking and cooperation.

The web-directory: <http://www.bencore.be/> is central for the Belgian Network for Coastal Research. It is, together with the BeNCoRe web news, the most important tool for disseminating information, such as the expertise of the BeNCORE partners and 60 BeNCoRe partner institutes or research groups (see figure).



Partner Institutes of the Belgian Network for Coastal Research

The First BeNCoRe Conference

During the first BeNCoRe Conference, the Network Ambassadors will try to summarize current activities, highlight gaps, discuss the role that BeNCoRe could fulfil and give a 'personal view' on ten coastal and marine themes in Belgium. The ten themes were defined at the European level and are based on the so-called 'Layer Concept', which has been developed for spatial planning in environmentally dynamic regions. The original thematic descriptions can be found at <http://www.encora.eu/networks.php>. For the conference, the ten themes were divided into four different sessions:

- Coastal Engineering and Observation Techniques
- ICZM Implementation and Stakeholder Involvement
- The Natural System and Human Impact
- Land-Sea Interface and Marine and Coastal Spatial Planning

Each of these four sessions will be chaired by one of the members of the BeNCoRe Bureau and will address some issues drafted in the Green Paper on a European Maritime Policy. The European Commission has prepared a consultation process started in June 2006, lasting until the end of June 2007, outlining a European Maritime Policy aimed at '*developing a thriving maritime economy in an environmentally sustainable manner*'. This Green Paper should be seen within the context of EU policy on sustainable development and is the first step towards the establishment of such an all-embracing EU Maritime Policy covering, among others, maritime transport, industry, coastal and marine research, coastal regions, offshore energy, fisheries, socio-economic cohesion and the marine environment. The document is intended to stimulate a broad open debate amongst all stakeholders and at all levels of governance (<http://www.ec.europa.eu/maritimeaffairs/>).

A few ideas and statements from this Green Paper can be found in the introduction of each session and could be used as a basis for discussion of this first BeNCoRe event. Each introduction concludes with the provisional ENCORA Reaction. Possible outcomes or suggestions from this conference will be communicated through ENCORA to the EU. The *First BeNCoRe Conference* is also officially included in the 'EU Green Paper on Maritime Strategy' event calendar.

A special focus of this workshop will be the link between the Belgian marine scientific community and interaction with policy and management. A critical reflection on how to improve this link will be explored. During the last SUMANOS workshop (a cluster project fitting within the SPSPD-II research action), the idea of the creation of a Belgian Marine Forum/Platform as a structural intermediate to overcome the identified communication problems was proposed.

Sharing Expertise for Sustainable Management of our Coasts; Role of BeNCoRE

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Why European coastal networking?

There is a rich capital of coastal knowledge and experience in Europe – such is how best to preserve coastal biodiversity, manage coastal erosion or improve marine water quality. However, information is fragmented over numerous disciplines, many countries, and hundreds of organisations. This hampers the integrated, interdisciplinary approach promoted by the European Union as the way towards sustainability.

What is ENCORA and what is BeNCoRe?

ENCORA is a project supported by the European Commission within the sixth Framework Programme for Research and Development, which aims at developing communication structures that link coastal professionals across Europe and disciplinary divides and fosters interaction between scientists, policy makers, and practitioners. The backbone of ENCORA is formed by National Coastal Networks, established in 18 countries and by 10 Thematic Networks, dealing with various aspects of Integrated Coastal Zone Management. BeNCoRe is the National Coastal Network counterpart of ENCORA in Belgium. It is a network service that facilitates sharing coastal expertise among coastal professionals in Belgium and with other coastal professionals throughout Europe.

What does BeNCoRe offer to coastal professionals?

- ❑ a service to support the search for cooperation partners on current coastal issues
- ❑ networks for information exchange and lobbying
- ❑ a portal that provides access to information contained in important coastal websites
- ❑ a programme for young coastal professionals to broaden their experience and build their own European network
- ❑ the coastal and marine wikipedia

These services are delivered by a network of coordination offices, established in the 18 ENCORA partner countries.

Coastal Wiki – the coastal and marine wikipedia

The Coastal Wiki – is an evolving, open knowledge base in wikipedia format that is being created and used by the communities of coastal science, policy, and practice. It will soon be online and can be consulted by any coastal professional who needs to get updated on knowledge and experience of issues related to one's own. Not detailed information, but analytical, well-referenced summaries in straightforward language will provide guidance for the reader. BeNCoRe members who want to contribute to the Coastal Wiki can get registered as editors and help the system to grow and remain up to date.

ENCORA and the European Maritime Strategy

The European Commission has written a Green Paper expressing the need for an all-embracing maritime policy aimed at developing a thriving maritime economy, in an environmentally sustainable manner. According to the Commission, such a policy should be supported by excellence in marine scientific research, technology and innovation. ENCORA has drafted a reaction to the Green Paper, indicating several ways in which coastal networking can contribute to the objectives of the European Maritime Strategy. The BeNCoRe partners are invited to add views to this reaction.

Spread the word!

ENCORA's and BeNCoRe's services reach their full potential if everybody who might profit from them is aware that they exist and how to make best use of them. So please join BeNCoRe and encourage others to do the same!

Introduction to Session 1: Coastal engineering and observation techniques

This session will be chaired by Dr. Marilaure Grégoire (Laboratory of Oceanology, ULg). Attention will be drawn on the following issue from the Green Paper:

"The EU could consider setting up a **European Marine Observation and Data Network** maintained and financed on a sustainable basis providing a sustainable focus for improving systematic observation, interoperability and **increasing access to data**. Such a Network would allow for an EU integrated analysis of different types of data and meta-data assembled from various sources. It would aim to provide a source of primary data for implementing in particular forecasting and monitoring services to public authorities, maritime services and related industries and researchers, integrating existing, but fragmented initiatives.

Creating such a network would require the EU to take legislative, institutional and financial steps. Legislation may be needed, for example, to facilitate **better access to data from sources such as that of the Common Fisheries Policy and the Framework Programmes for Research**. Institutional changes could include the strengthening of existing bodies at a national, regional and European level and the creation of a permanent secretariat with scientific and information technology expertise. Financial support should aim to be sustainable and long-term.

The improvement and dissemination of marine data would also **open up opportunities for high-technology commercial companies in the maritime sector and improve the efficiency of activities such as maritime surveillance, management of marine resources and marine research in European laboratories**. It would also contribute significantly towards reducing the current uncertainty about the oceanic system and climate change, bringing accurate seasonal weather forecasting a step closer."

ENCORA REACTION:

Efforts are underway for the inventory and collection of existing datasets and information retrieval systems, such as EIONET, SeaDataNet and ECOOP. EEA, HELCOM, OSPAR and MAP aim to streamline marine monitoring policies and EUROGOOS endeavours to harmonize monitoring practices. The **European Marine Strategy should support these efforts and broaden their scope to the entire maritime field**. European networks of coastal and marine scientists, practitioners and policymakers should be invited to advise on the rationalization of marine monitoring and on the harmonization of data acquisition and data access facilities.

Sustainable Coastal Engineering Techniques

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Theme 8 on the ENCORA coastal portal covers sustainable coastal engineering techniques and brings together *innovative coastal engineering techniques to solve practical coastal protection issues*. These techniques are many and are often divided in *hard* techniques (seawalls, revetments, breakwaters, groins, ...) and *soft* techniques (beach nourishment, beach drainage,...). Both soft and hard techniques need to fulfill their duty as coastal protection against episodic events, i.e. storms with the accompanying storm waves and storm surges. These impacts should be clearly distinguished from long term trends, i.e. trends of structural erosion (or accretion). In view of sustainable coastal zone management not only the protection from the sea purely in terms of hydraulic aspects (stability of the protection) is sought after, but also the use of the coastal zone in a broader sense needs to be considered.

Coastal protection in Belgium is the responsibility of the Coastal Division of the Flemish Ministry of Mobility and Public Works and it is therefore not surprising that they play a central role in the Belgian know how on coastal protection. To fulfill their task they are supported by private consultants, contractors and research institutes. Integrated coastal zone management is part of their philosophy: high protection level against flooding, a resilient coast, flexibility i.f.o. sea level rise, and biodiversity. The most visible technique used and best known to the public definitely is beach nourishment, but e.g. the less visible foreshore feeder berm in de Haan supplemented with beach and dune fill was definitely innovative and reduced maintenance. To ensure the effectiveness of the coastal protection, monitoring forms an essential part: foreshore surveying with hovercraft, lidar scans for beach and dune DTM, visible-infrared and hyperspectral imagery for dune vitality and biodiversity, the last technique even to study the fate of nourished sand particles,... Sediment related activities, like dredging, dumping, mining of aggregates, investigation on nautical bottom, ... are in the long term all linked to sustainable coastal engineering.

A good understanding of coastal morphological processes is needed to estimate the effect a coastal protection measure will have. More and more use is being made of numerical tools such as dune erosion models to estimate safety against episodic events and of line models to look at long term coastal evolution. Such models need forcing in terms of water levels and in terms of wave conditions nearshore. And this would not be possible without long term wave measurements offshore (and nearshore) and adequate wave transformation models. But the considerable tidal range makes use of these coastal sediment transport models at least challenging. The 'theoretical' division line between the zone of coastal sediment transport and the zone of shelf sediment transport is very fuzzy, probably too fuzzy. Coastal and shelf

sediment transport models will need to be linked. And of course sediments don't know about boundaries between countries. Research on the morphology of the Belgian coastal zone (and continental shelf) therefore necessarily needs to involve European partners. Access to high quality data on sediments, bathymetry, hydrodynamic parameters in a broader than national context is needed and openness is from a research point of view only to be encouraged.

Assessment of field observation techniques

Alberto Vieira Borges

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An overview of the Belgian activities related to the BENCORE theme 9 will be reviewed. This Theme focuses on the assessment of field observation techniques: New and emerging tools and practises for coastal and marine observation, with focus on remote sensing and remotely controlled measuring devices. Theme specific issues are:

- The needs for new observation techniques and further development of existing methods with special reference to the requirements of EU directives;
- Interfacing between field observations and models;
- Validation and calibration of remote sensing techniques.

Introduction to Session 2: ICZM Implementation and Stakeholder Participation

Session two will be chaired by Rudy Herman (Ministry of Flanders, Department Economy, Science and Innovation). It will address EU Green Paper issues about ICZM implementation and stakeholder involvement.

The main discussion point of this session could be whether **the EU should actually have an integrated maritime policy**. So far our policies on maritime transport, industry, coastal regions, offshore energy, fisheries, marine environment and other relevant topics have been developed separately. No one examined in a systematic manner how these policies could be combined to reinforce each other. The green paper states however that it is now time to bring all these elements together and forge a new vision for the management of our relations with the oceans. This will require new ways of designing and implementing policies at the EU, national and local levels, as well as at international level through the external dimension of our internal policies.

Green paper topic '**How an integrated approach to maritime affairs can be implemented in the EU and what principles should underlie it**' will be addressed during the theme presentation *ICZM Participation and Implementation*.

The issue on **how quality of life in coastal regions of Europe can be maintained, while continuing to develop sustainable income and jobs** is particularly related to the theme *Social and economic aspects, ICZM functionality and Valuation* is. Development inevitably brings with it pressures on space and environment. It requires improvements in accessibility to and internal mobility within coastal zones, in particular small islands through transport infrastructure improvements. It also calls for the supply of general interest services (health, education, water and energy supply, telecommunications, postal services, waste water and waste treatment) in order to improve the quality of life in coastal zones, in particular during peak tourist seasons.

The theme *Capacity building, training and education in ICZM* could explore the green paper issue on the role that can be played by regional centres of maritime excellence and extend this to **the need of ICZM centres of excellence?**

ENCORA REACTION:

The European Maritime Policy should strengthen and complement existing initiatives to share existing practical ICZM expertise in different European regions by facilitating the creation of coastal managers networks for regions with similar characteristics and issues.

ICZM Participation and Implementation

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The increasing interest in and efforts towards an integrated approach in Coastal Zone management in Belgium, has been described in the National report on the implementation of the European Recommendation on Integrated Coastal Zone Management (2002/413/EC). The report was prepared by and approved by the North Sea and Oceans Steering Committee. The report was presented to the European Commission in February 2006, and gives a state-of-the art of ICZM implementation in Belgium.

For the Belgian situation two major issues are the setting-up of the Co-ordination centre on ICZM, and the focus on land-sea interactions. The Co-ordination centre on ICZM is a collaboration between three authority levels: the provincial, the regional (Flemish region) and the federal level. The Flanders Marine Institute is the partner providing the scientific backup. The main strategic objectives of the Co-ordination centre are:

- Implementing the European Recommendation on ICZM
- Stimulate integration of planning and policy in the coastal zone
- Awareness raising on ICZM

Other institutes which contribute to ICZM are described in chapter 2 of the above mentioned report. ICZM is not a task for one single organisation, but for all those bodies involved in coastal management.

Concerning the land-sea interactions, an analysis was dedicated to the mapping of all land-sea interactions, including a description of the current status, the existing legislation and policies and the consultation bodies. For five land-sea interactions major problems in the management were identified. These will be the focus for future action.

ICZM is a continues and slow process. However, since the mid 90ies, there clearly is a positive trend in moving towards a more integrated approach. The increase in the number of emerging co-operations at management level, and the increase in projects with an integrated approach are a good indicator to illustrate this.

Concerning participation in ICZM, two processes can be distinguished:

- (1) the official circuit –such as foreseen in the Environmental Impact Assessment, Strategic Impact Assessment, spatial planning procedures, in which public consultation is obligatory;

- (2) the informal circuit, where advisory committees or steering groups are set up in a voluntary way.

Recent research done by the Maritime Institute (University Ghent) in the frame of the COREPOINT project and by the Co-ordination centre on ICZM, indicates that especially coastal stakeholders would like to be involved more closely in coastal zone management. Their interest lies especially in being involved in case of specific themes or sites (64%), some 23% would like to be involved always and for coastal management topics in general. At the moment the possibilities and preferences for setting up a coastal forum for stakeholders is looked at. The stakeholders expressed the need for a clear mandate and objectives for the forum, and their wish to let it function as an advising and evaluating body.

The biggest challenge for ICZM lays in dealing with the still very sectoral oriented legislation and authority structures. Integrated working still needs a mental change, with all relevant bodies and actors.

Naturally, also science can help implementing ICZM and participate in this never ending process. BeNCoRe can help providing the link between scientists and managers. BeNCoRe can play a role in bringing scientists from different disciplines together, in identifying scientific stakeholders, in increasing awareness with scientific stakeholders and in improving the participation of scientists in management.

Social and economic aspects of ICZM; functionality and Valuation

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Managing systems in a sustainable way has become one of the key considerations in environmental policy over the last decade. Implementing sustainable management of the Belgian part of the North Sea (BPNS) is one of those challenges. It becomes clear however that a sustainable management of the BPNS faces a number of uncertainties, environmental complexity and an intense interaction between users and their ecological impacts. Still, policy advisors, decision makers and users demand advice on how to manage the system in order to safeguard it from deterioration in the future. The management of the system and more specifically the valuation of impacts on the North Sea calls for a multidisciplinary approach as social, economical and ecological interests are at stake.

Sustainable development has been integrated in Belgian legislation namely as a principle of law in the Law of 20 January 1999 for the protection of the marine environment in the sea areas under Belgian jurisdiction (Marine Protection Law). Sustainable management is thus management based on the principles of sustainable development: economy, social environment and ecology. These pillars are all equally important during the balancing of options in a sustainable decision process. To attain sustainable management of the North Sea, the impact of the uses may not be limited to the consideration of socio-economic factors, but the impact on the marine environment must also be examined. As a result of the Marine Protection Law an environmental impact assessment (EIA) is mandatory for each activity subject to a permit in the BPNS (territorial sea and exclusive economic zone). Ecolas has coordinated several EIA's for the offshore wind energy and aggregate sector.

Besides, Belgium has a very long and productive history in marine research. Up to 2006, the Federal Government of Belgium funded marine research through several scientific programmes. A diversity of impact studies of different activities on the North Sea have been realised within this framework, such as:

- RAMA: Risk analysis of marine activities on the Belgian Part of the North Sea.
- MARE-DASM: Evaluation of marine degradation in the North Sea.
- BALANS: Balancing the Impacts of Human Activities on the Belgian Part of the North Sea.
- CLIMAR: Evaluation of climate change impacts and adaptation responses for marine activities.

- GAUFRE: Towards a spatial structure plan for the sustainable management of the North Sea.

The projects overlap where all encompass social, economic, environmental, policy and legal components. While RAMA/ MARE-DASM and BALANS are both focussing on the impact of one or two users of the BPNS, CLIMAR starts from an environmental perspective and will investigate the impact of climate change on the marine ecosystem and the possible consequences for the fisheries and coastal defence sector. These projects build on other fundamental research projects (biological, sedimentological, etc.). GAUFRE on the other hand compiles information from these impact studies and other research to propose scenarios and a spatial planning vision for activities in the BPNS.

In these studies, different tools and approaches have been developed and put into practice to identify user-conflicts and to evaluate the impact on the North Sea ecosystem. Research was carried out using a.o. risk analysis, sensitivity analysis, conceptual & numerical models, spatial planning and decision support systems. Such scientific research activities actively supports policy aimed at sustainable management of the North Sea. A selection of studies, developed tools and approaches related to the evaluation of socio-economic impacts will be presented.

Furthermore challenges for the future will be highlighted. This includes new developments at sea, new impacts, sustainable management on a broader European scale (e.g. SPICOSA), etc.

Capacity building, training and education in ICZM

Natalie Beenaerts

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It is generally accepted that coastal areas need to be protected while economic and social activities should be sustained, even increased where necessary. But, many stakeholders are involved in this complex matter. Therefore, the coast needs a specific management approach at all levels. This integrated management requires also specific needs for capacity building. In this epoch, the concept Capacity Building (CB) is evolving into a new philosophy. Formal education and training are only considered part of it. In an effort to structure this complex matter and assess the current CB, its needs and gaps and ways to maximize CB effectiveness within ICZM in Europe, the Encora theme 10 members decided to follow a web-based technology to communicate and structure their efforts.

Within this effort, a non-exhaustive list of CB, education and training in ICZM within Belgium is presented to give an idea of the current CB in ICZM in Belgium, and reflect on the possible gaps and needs.

The Green Paper of the new Maritime Policy for EU emphasizes on a holistic, integrated and 'all embracing' approach. Capacity building requirements in Belgium associated to these new ocean strategies and European vision on oceans and seas will briefly be discussed. After all, the need for capacity building is subject to idiosyncrasy, environmental context and regulations, level of awareness and the technical and management capacity of its region. The centers of maritime excellence, more specifically centers of ICZM excellence in Belgium can play an important role within Belgium and Europe. In Belgium, centers of maritime excellence more or less already exist for the different users and disciplines. Centers of ICZM excellence, however, should be units of these maritime centers, and should concentrate on institutional-social implementation.

Introduction to Session 3: The Natural System and Human Impact

Prof Dr. Magda Vincx (Marine Biology Section, UGent) will chair the session on the Natural System and Human Impact. The European Issue in the Green Paper 'How can maritime policy contribute to maintaining our ocean resources and environment' will be brought under attention.

The Commission has proposed a Thematic Strategy for the Marine Environment (Marine Strategy, <http://ec.europa.eu/environment/water/marine.htm>), that will be the environmental pillar of a future maritime policy. The key aim is to achieve good status of the EU's marine environment by **2021**. It introduces the principle of **eco-system based** spatial planning. Without this, we will soon be unable to manage the increasing, and often conflicting, uses of the oceans. It may lead to the designation of further marine protected areas, which will help to safeguard biodiversity and to ensure the rapid transition to sustainable levels of fishing. The proposed Directive will establish **European Marine Regions as management units for implementation**. For their marine waters within each Marine Region, Member States will be required to develop Marine Strategies on the basis of the completion of a number of steps. In developing Marine Strategies, Member States will be invited to co-operate actively among themselves and also with relevant third countries.

Key elements in building the Strategy are:

- ❑ a **dual EU/regional approach** setting at the EU level common co-operation and approaches among Member States and third countries bordering EU oceans and seas, but leaving the planning and execution of measures to the regional level to take into account the diversity of conditions, problems and needs of marine regions requiring tailor-made solutions
- ❑ a **knowledge-based approach**, in order to achieve informed policy-making
- ❑ an **ecosystem-based approach**, whereby human activities affecting the marine environment will be managed in an integrated manner promoting conservation and sustainable use in an equitable way of oceans and seas
- ❑ a **co-operative approach**, providing broad engagement with all relevant stakeholders and enhancing co-operation with existing regional seas conventions
- ❑ **monitoring and assessment issue**
- ❑ the particular challenge of **hazardous substances**.

Pollution, prevention, detection and mitigation

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After a brief review of international convention ruling pollution problems in the North Sea, we first focus on operational activities in preventing, detecting and mitigating pollution. The research activities aiming to improve these operational tools and procedures are then presented with illustrations such as mitigation of eutrophication and modeling of sediment transport and associated pollutions. The presentation will conclude with a series of emerging topics such as the problem of defining new global indicators for water qualities.

Marine Ecology and Biodiversity

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Belgian research activities in the field of Coastal Marine Ecology and Biodiversity cover a broad variety of benthic and pelagic organisms and taxa such as algae, bacteria, protozoan, copepods, mussels, oysters, shrimps, polychaetes, echinoderms and fishes but also seabirds and sea mammals. In the frame of several independent national and EU projects and networks of excellence, this research focuses on the understanding of the link between biodiversity and ecosystem structure and function, but also on the impact of human activities (eutrophication, over-fishing, oil, plastic and heavy metal pollution, wind turbines, coastal engineering) on biodiversity and functioning of coastal ecosystem. This is a multidisciplinary research, which combines taxonomy and phylogeny, population genetics, biology, physiology, ecology and involves field and laboratory experimental work making use of a large panel of techniques (e.g. molecular, light and electron microscopy, flow cytometry, micro- and mesocosm studies) and tools (remote sensing, modelling, data base).

As a whole, the Belgian scientific community involved in the field of Marine Ecology and Biodiversity presents a high expertise and offers the potential to actively contribute to the sustainable management of marine coastal ecosystems by identifying thresholds of disturbance and developing scientifically-based EcoQo's. As a matter of fact, as a contribution to the objectives of the ENCORA theme 7, scientists from the Marine Biology section (Gent University) are currently working on the biological valuation of patrimonial resources.

Some progress has however to be made to federate the research themes and develop synergies between teams and projects for developing an holistic approach of the coastal ecosystem. At the national level, the BeNCoRe network has a key role to play by increasing communication between research teams to share expertise and techniques.

Effect of Development and Use on Eco-morphology and Coastal Habitats

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The seas around north-west Europe support an exceptionally wide range of seabed habitats and rich biodiversity. These provide important food resources (fish, shellfish), contribute to essential ecosystem functioning (e.g. nutrient recycling) and yield valuable natural resources (oil, gas, aggregates). In addition the seabed is subject to increasing pressures from e.g. dredging/dumping operations and from new developments, such as renewable energy (e.g. windfarms) and from coastal developments (e.g. coastal defences).

These multiple uses bring ever-growing pressures on our seas and coasts, leading to increased risk of conflict between users and a greater potential for degradation of the marine environment. On a European level, there is a clear need for improved integrated spatial planning and this is reflected by the new requirement for Strategic Environmental Assessments (SEAs) and issues raised within the EU Marine Strategy, by the OSPAR Commission and by Governments. Additionally, there are new and increasing international commitments (from the EC Habitats Directive and OSPAR) to protect certain marine habitats, including through the designation of a network of marine protected areas, whilst the EC Water Framework Directive and OSPAR require periodic assessment of ecosystem health, including its seabed biological communities.

This creates a substantial demand for information about intertidal and seabed habitats, but is set against a background of patchy, inconsistent and poorly collated information on their distribution, extent and quality. The recent increase in demand (e.g. fisheries, commercial, nature conservation), coupled with advances in remote-sensing technologies over the past ten years, has led to a burgeoning of seabed mapping studies at various scales. Ideally, these studies should meet international standards enabling data comparison and aggregation in the view of national and international perspectives on the seabed resource in spatial planning and decision-making.

Recent studies on the Belgian Continental Shelf have led to a significant increase in the knowledge on the spatial extent of benthic habitats. On the fine to intermediate scale, coastal habitats have been mapped, with high confidence, through the combined use of remote sensing techniques and adequate sampling and visualisation tools. From these, relationships have been modelled from bio-physical datasets and together with wide spread physical datasets, full coverage habitat distribution maps have been obtained. On a broad scale, areas have been classified into biologically relevant discrete eco-units, based on the combined use of data layers on topography,

substrate and energy regime, most relevant for habitat mapping. Meanwhile, datasets on anthropogenic use have been compiled and should be coupled to the habitat distributions.

Habitat changes can be expected if any of the above mentioned physical parameters changes significantly (e.g. sediment or turbidity changes). It is unlikely that this would occur naturally (e.g. bedform movement) and mostly, anthropogenic use will have the most influence. However, the evaluation of an impact is hard to define and a sound judgement is often hampered by the lack of baseline data and of knowledge on the natural evolution of the seabed. Moreover, most habitats tend to have a wide ecological niche and thresholds of change are difficult to set. A qualitative approach, by expert judgement, is mostly procured in absence of adequate datasets allowing quantitative analyses. This becomes now feasible since extensive datasets are available, both in space and in time. However, the analyses remain difficult, due primarily to the varying quality and discontinuity of the data.

It is clear, that a significant advancement in this research realm would require a sound cooperation of a multidisciplinary partnership with a balanced mix of skills including scientific and technical habitat mapping skills, spatial planning, impact assessments, national data collation and management expertise and experience in the use of the results in management and regulatory frameworks, both nationally and internationally.

Introduction to Session 4: Land-sea interface and Marine Spatial Planning

David Cox (Belgian Science Policy) will chair the 4th session. This session is related to the issue in the Green Paper 'What are the principles and mechanisms that should underpin maritime spatial planning systems and how can systems for planning on land and sea be made compatible?'

As maritime activities continue to thrive, there will be increasing competition between them for the use of European coastal waters. Without some form of indicative planning, investment decisions will be hampered by uncertainty with respect to whether the activity in question will be licensed for a particular site. The Commission believes that a **system of spatial planning for maritime activities on the waters under the jurisdiction of or controlled by the Member States should be created**. It should build on the ecosystem-based approach laid down in the Thematic Strategy for the Marine Environment, but should also deal with licensing, promoting or placing restrictions on maritime activities.

Therefore consideration should be given to setting up European programmes to develop the comprehensive mapping of European coastal waters for purposes of spatial planning, security and safety. The mapping of existing and planned activities in the water and on the seabed is essential. Mapping of the location of marine flora and fauna is needed for ecosystem analysis. On the basis of data collected from these various sources, the **EU could also develop a veritable Atlas of EU coastal waters which could serve as an instrument for spatial planning**. It would be a contribution to the similar UN project and a valuable educational tool to raise the consciousness on Europeans on their maritime heritage.

ENCORA REACTION:

Spatial planning often requires a level of detail beyond the scale of a European Atlas. ENCORA therefore recommends to analyze and identify which data should be made available at the European scale and which data are more suited for being collated and stored at national or regional level. To be useful for ICZM, an Atlas of the EU coastal waters should include information of the terrestrial part of the coastal zone. The value of the Atlas would be greatly augmented if it would not only provide figures, but also explanation and understanding.

Coastal geo-morphological Change and land-sea interface

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The geomorphological character of the Belgian coast is fairly dynamic. The landside of the coast however, has recently been turned into a much more static shape, mainly due to increasing human settlements, port activities and coastal defence works. The contradiction between dynamic nature and static human activities causes some major challenges for the future, especially when considering changing climate and intensification of severe weather conditions. This has been duly recognised by the Maritime Green Paper. The ambition to find the right balance between the different maritime activities, where the dynamic aspect is much more present, using an ecosystem based approach can only be seconded. However, human life and human activities should be considered as an integral part of the ecosystem. Maritime activities and safety issues have to be fully integrated in a comprehensive maritime strategy.

A very important tool, if not the most important one, to improve the management of the North Sea and the North Sea coast, is spatial planning. When considering marine spatial planning, many important initiatives have been taken for the Belgian coast over the last years. Mainly through scientific research projects, but also through some important legislative work, our country has been recognised in Europe as successful and innovative in this subject.

One of the main results of these initiatives is that all maritime stakeholders, both private and governmental, have been identified. Better understanding of mutual competences and interests leads to more efficient management of the coast. Discussion between stakeholders will improve support for policy decisions, such as the delimitation of MPA's.

The dispersion of competences between the different decision levels (federal, regional, provincial and local) is an especially relevant topic for the Belgian part of the North Sea and the Land-Sea interface. Many maritime activities, such as designation of shipping lanes, coastal protection, offshore wind energy and sand and gravel extraction are subject to different decision levels, but are also directly influenced by geomorphological parameters.

Scientific research must therefore be continued and intensified in order to improve knowledge of sediment transport models, process models etc. Better understanding of long term geomorphological change can contribute to a better management of the North Sea and can be part of a policy decision instrument. However, dissemination of scientific knowledge to the political and economic stakeholders remains a challenge for researchers. Simplification

and reduction of information is needed in order to integrate scientific knowledge into decision making instruments.

Marine and Coastal Spatial Planning

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The marine spatial planning problem and the current situation in Belgium

The Belgian part of the North Sea (BPNS) is approximately 3600 km² and highly exploited. New demands for exploitation at sea are additional to an actual theoretical exploitation rate of 2.6 times the available space, under the condition that space allocations are based on current legislation and this space would actually be used. Future requirements for space will continue to increase and put pressure on current uses and natural systems. The need for space changes in two directions. The fixed activities (such as wind energy, cables and pipelines, coastal defence, port structures, aquaculture and land extension) are gaining importance in comparison with the mobile uses. The mobile uses (such as fisheries, shipping, air transport, military use, water recreation, sand and gravel extraction and dredging activities) do not increase their spatial occupation, but rather intensify their action in the zones they already occupy and can hamper the development of new fixed activities.

So far, we have in Belgium: 1. a marine bill (Law of 1999 on the protection of the marine environment) fully supporting an ecosystem approach and introducing legal and administrative tools to regulate space allocations, mainly by environmental impact assessments, concessions, permits and approvals for new activities or for the extensions of existing activities. Only international shipping cannot be made permit dependent and fisheries is regulated on EC level; 2. a spatial plan, called the Masterplan BPNS (2003), that has been implemented incrementally. This Masterplan is not a holistic plan, but focussed on the delimitation of sand and gravel extraction zones and a zone for future offshore wind energy projects (Phase 1) and the delimitation of marine protected areas as part of the EU Natura 2000 Network (Phase 2); 3. a scientific research report as a result of the GAUFRE project (BELSPO, 2003-2005): "Towards a spatial structure plan for the sustainable management of the North Sea", applying land planning expertise at sea. This report visualizes the activities in the BPNS on GIS maps and structure maps, assesses ecological impacts of these activities, identifies potential user-user conflicts and proposes marine spatial planning visions based on six spatial scenarios. In contrast to the Masterplan, the project did not produce a single spatial plan. Besides the report, the GAUFRE partners organized a very successful stakeholder workshop on spatial planning in the BPNS. Unfortunately, time and money constraints, withheld us from organizing a broader public consultation on the proposed scenarios and visions for marine spatial planning in the BPNS. In fact, this should be a governmental task in a marine spatial planning process that is comparable to the public participation foreseen in the development, adjustment and revision of river basin

management plans (Water Framework Directive 2000/60/EC and Flemish Decree on integral water policy, 2003).

Gaps

Scientific uncertainty

There is not only lack of crucial data, but most existing data are not readily processed for spatial planning purposes or not accessible. Even after processing, there remain serious gaps in time and/or space, making interpretation of these data in an ecosystem-based spatial planning context more difficult or even impossible. Data on physical occupation at sea for immobile structures is not a problem. For mobile activities like shipping and fisheries new techniques such as automatic identifications systems (AIS), radars and satellites need to be used. However, assessing effects of all activities at sea is not very well performed. Assessing cumulative effects and predicting future threats is still a challenge due to the dynamics of the sea and its processes. Combining ecological data with socio-economic objectives in order to achieve a sustainable management of the sea is even more complicated.

Political complexity

Due to our division of competences between the federal and the Flemish level, different administrations and ministers have competences in the coastal zone and at sea. Although a lot of initiatives have been initiated by the regional and provincial level to improve interdepartmental co-operation regarding integrated coastal zone management, a holistic co-operation between the regional and federal policy level can not be considered as a great success so far.

Role for Bencore

Bencore can play a major role in the spatial planning process, such as: 1. improve scientific knowledge on ecosystems of the BPNS and the environmental effects of existing and proposed activities by stimulating scientific co-operation between all disciplines involved in marine research in Belgium; 2. stimulate scientific co-operation amongst marine scientist of our neighbouring countries to develop spatial scenarios and visions transcending national legal boundaries; 3. develop good spatial planning practices in an European perspective; 4. raise political awareness for an ecosystem-based spatial planning to allocate activities at sea. Bencore is best placed, since it is the only network in Belgium that has full interdisciplinary potentials. Its members represent all scientific disciplines with maritime expertise: engineering, earth sciences, natural sciences, social sciences (economics, law and politics).

Links to the Green paper and recommendations

The need for an ecosystem-based spatial planning of sea areas under jurisdiction or control of coastal states (territorial sea and exclusive economic zone) is recognized by the European Commission in its Green Paper

"Towards a future Maritime Policy for the Union: A European vision for the oceans and seas" (2006) and in the UK government Marine Bill White Paper "A Sea Change" (2007) presented to Parliament this year. In this White Paper chapter 4 (p. 18-40) is fully dedicated to planning in the marine area with the aim to *"create a strategic marine planning system that will clarify our marine objectives and priorities for the future, and direct decision-makers and users towards more efficient, sustainable use and protection of our marine resources"*. The EU Green Paper considers an ecosystem-based marine spatial planning as a tool to ensure investment decisions at sea and refers to licensing, promoting or placing restrictions on maritime activities. It is recognized that under the current legal circumstances *"individual decisions on activities should be taken at a national or local level"* but that *"a degree of commonality between the systems will be needed to ensure that decisions affecting the same ecosystem or cross-border activities, such as pipeline and shipping routes, are dealt with in a coherent manner."* (p. 34). Cross-border co-operation should not be limited to pipelines and shipping only, but should encompass all activities for which co-operation is needed, such as cross-bordering marine protected areas, the best environmental and economical suitable sites for sand and gravel exploitation, a renewed fisheries policy to better manage fishery zones and fish stocks, risk assessment of activities a sea that can affect neighbouring countries, Besides we can fully agree with the appeal in the Green Paper for more and better data on multiple activities (p. 31). However, the main challenge will be to link data on activities, with ecosystems data, social and economic data and integrate these data in a spatial planning process. Without any doubt, this process needs involvement of all relevant stakeholders and the public at large. The latter involvement is poorly expressed under the chapter on spatial planning, as well as under the ICZM chapter (p. 29-30). The Green Paper proposes to ensure *"consistency between land and marine systems in order to avoid duplication of regulations, or the transfer of unsolved land-planning problems to the sea"* by associating *"as closely as possible the same stakeholders in the planning processes of each"* (see also p. 37 on Maritime Governance). This is of course true, but what about the public at large for whom the seas provide ecosystem services too? Should not everyone have a right to participate in a marine spatial planning process (see Aarhus Convention and land practice)? Spatial planning can raise awareness concerning the marine environment, its complexity and ecosystem services that are often not well known by the general public. The participation of the public is not addressed in principle 6 on stakeholder participation in EU Recommendation 2004/413 on Integrated Coastal Zone Management. In the Green Paper the question is posed *"how can ICZM be successfully implemented"*? I believe part of the answer is by making use of marine spatial planning to allocate activities at sea. Spatial planning should be used as a tool to achieve integrated coastal zone management that on its turn should be extended beyond the coastal zone, encompassing the exclusive economic zone.

The questions raised in the Green Paper are *"What are the principles and mechanisms that should underpin maritime spatial planning systems?"* and *"How can systems for planning on land and sea be made compatible?"* Part of the answers can be made by referring to some principles of ICZM, being: 1. a holistic perspective taking into account the interdependence and disparity of

natural systems and human activities; 2. a long-term perspective that takes into account the precautionary principle and the needs of present and future generations; 3. adaptive management and the need for a sound scientific basis; 4. working with natural processes and respecting the carrying capacity of ecosystems, which will make human activities more environmentally friendly, socially responsible and economically sound in the long run; 5. involving all the parties concerned; 6. improved co-ordination of relevant administrative bodies at national, regional and local level.

Finally, I invite participants to read the Conclusions and Next Steps from the International Workshop on Marine Spatial Planning, UNESCO (Paris, November 2006) at <http://ioc3.unesco.org/marinesp>.

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