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Enabling Delta Life

CEDA

Central Dredging Association

Ecosystem Services in Dredging and Marine Construction

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CEDA and their activities

- Is a vital network for the exchange of knowledge and experiences in dredging
- Is a centre for communication and training about environmental aspects of dredging
- Is a platform for promotion of dredging as a tool for sustainable development
  - Scientific Taskgroups for topics as MSFD, UW-sound
  - Organising congresses, conferences, seminars, workshops
  - Partner in ESPO, OSPAR, Danube Commission, PIANC
  - Providing independent technical and scientific advice
  - Promoting dredging as a tool for sustainable development
  - Leading-edge peer-reviewed papers, guides, books and briefing sheets, positioning papers
  - Organiser of WODCON, Web-based Network
  - Website http://www.dredging.org/

The general concept of Ecosystem Services

Objective

- For the future development of dredging activities and the environment in general, the concept of *Ecosystem Services (ES)* is of increasing importance as a tool for achieving sustainable development.

- The objective of ES is to classify, describe and assess a value to natural resources and ecosystem services in order to make it possible to link the environment to human well-being

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Historical roots of ecology and economy

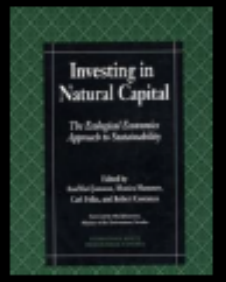
"benefits that humans derive from ecosystems" *(Millennium Assessment 2005)*

1) 1970s Economic framing of ecologic concerns

- 1970s: Economic role of ecosystem functions
- 1980s: First references to ecosystem services

2) 1990s: Mainstreaming in science

- 1992: ES and natural in the peer reviewed literature
- 1997: First estimation of nature's TEV at the global scale



3) 2000s: Ecosystem services in policy agenda

- 2000: Millennium Ecosystem Assessment; 2008 TEEB
- Ongoing revision of economic accounting systems (SEEA)
- Market mechanisms for ecosystem services (MES and PES)

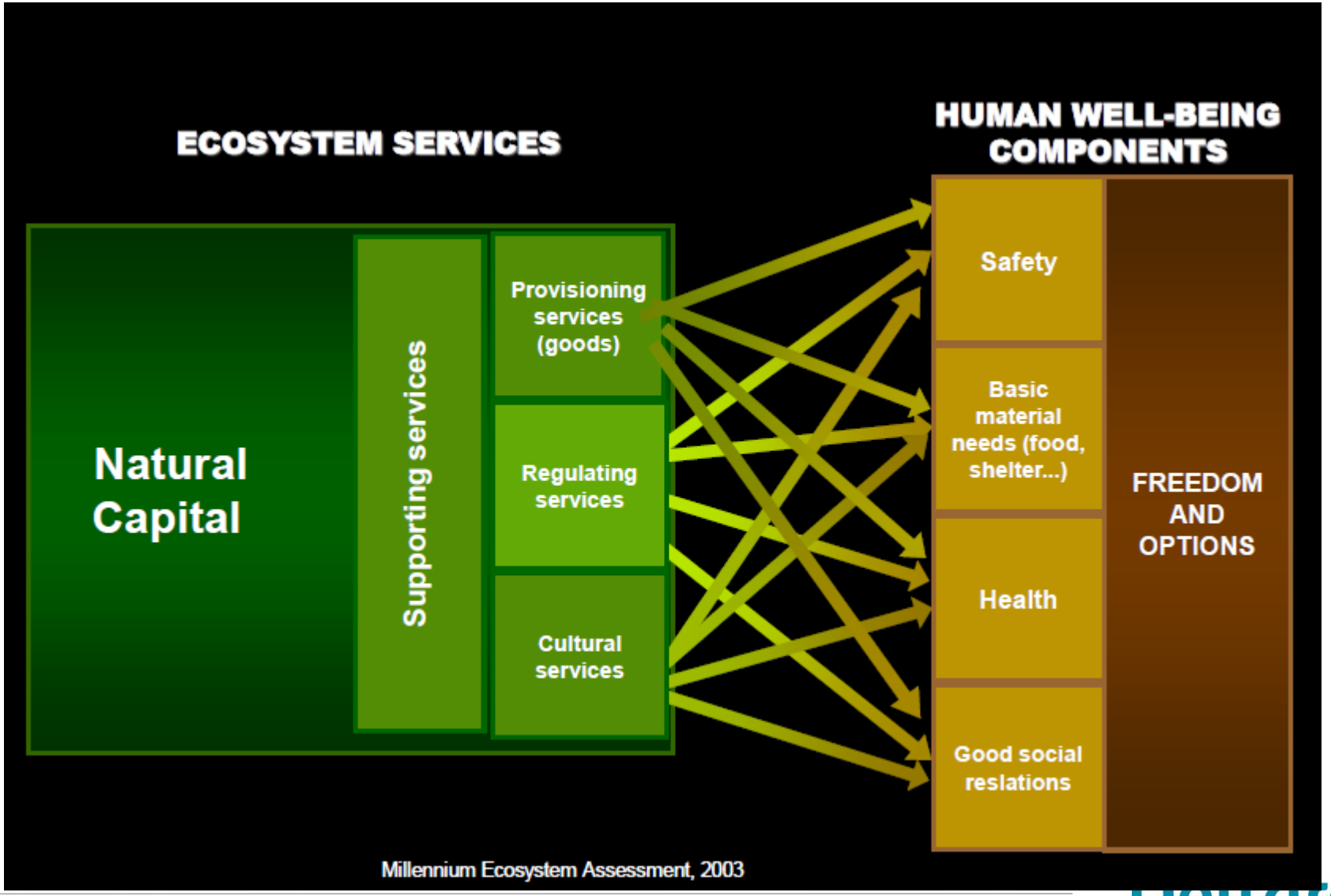
Gómez-Baggethun et al. 2010, *Ecological Economics* 69: 1209-1218.

What means Ecosystem services?

- Ecosystem services are the benefits that people get from nature
  - The value of nature conservation and sustainable use of the ecosystem and its services
  - Community spirit links the ecosystem services values and conservation measures
  - Increases the likelihood that measures will be accepted and implemented in an effective manner

The valuation of ecological services is not simple, but global knowledge in this field is fast developing. Payments for the use of ecosystem services by developers of all sorts may provide a pathway for this.

Connecting ecology and economy



A benefit to human wellbeing generated by an ES

- An ecosystem function is the set of structures and processes which eventually deliver the service, for example, the navigability of channels and harbours.

- The ES concept is a tool that can help to make a sustainable balance between pressures and services in ecosystems.

- The project can be opportunity driven (win-win situation) instead of defensive (minimisation of pressures).

ES of coastal and river ecosystems and how they are influenced by dredging activities

Ecosystem services	How is the service influenced by dredging
Flood protection	**Providing engineered structure to protect land**
Navigation	**Dredging enhances the services since it deepens waterways**
Construction materials	**Delivered by dredging. Mining of construction materials (dredging)change hydromorphology and decreases the amount of materials present in the ecosystem**
Seefood	Dredging may permanently enhance fish harvest when it restores fish nurseries or cerates hard substrate of shell fish
Recreational possibilities	Design of land reclamation
Water quality	Dredging of contaminated sediments decrease concentrations

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Application of ES in dredging and marine construction projects

- The challenge for the sector is to make use of the ES concept and show that dredging and marine construction projects can reconcile both economic and environmental requirements

- Mitigation of negative environmental impacts during the realisation phase

- Involved at an early stage in decision-making about the project

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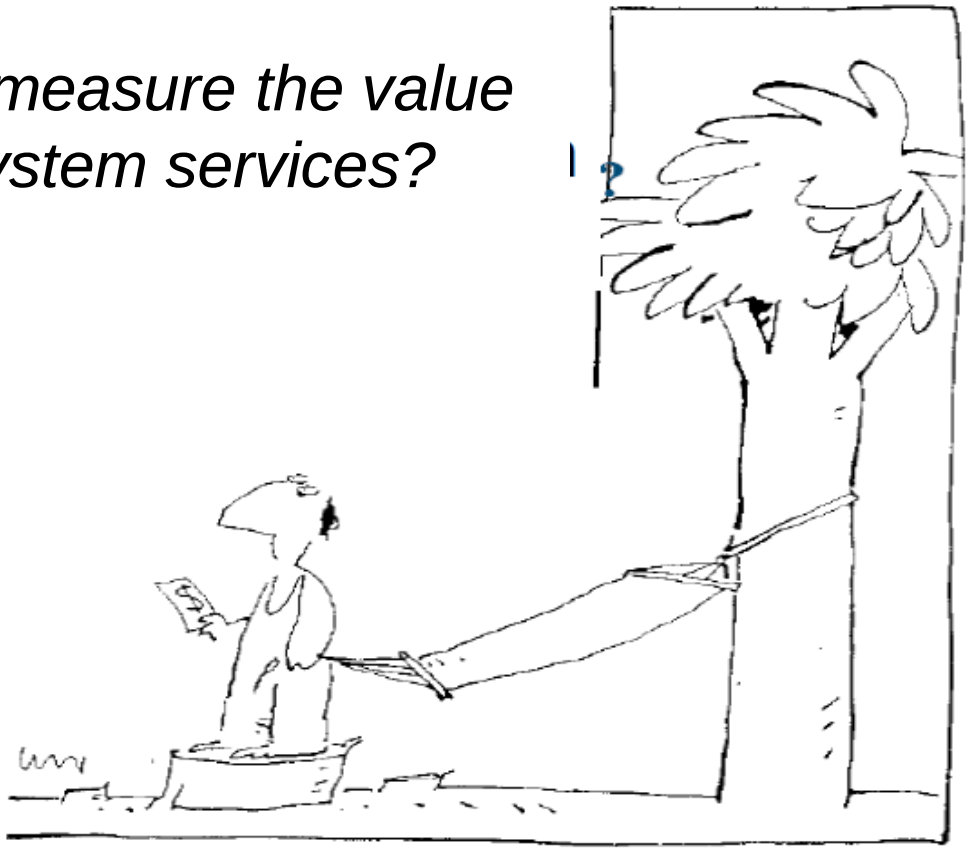
Multi-disciplinary project team takes 3 steps:

1. Assessment of the relevant ES
2. Valuation of services and pressures
3. Design of the project

How to measure the value of ecosystem services?



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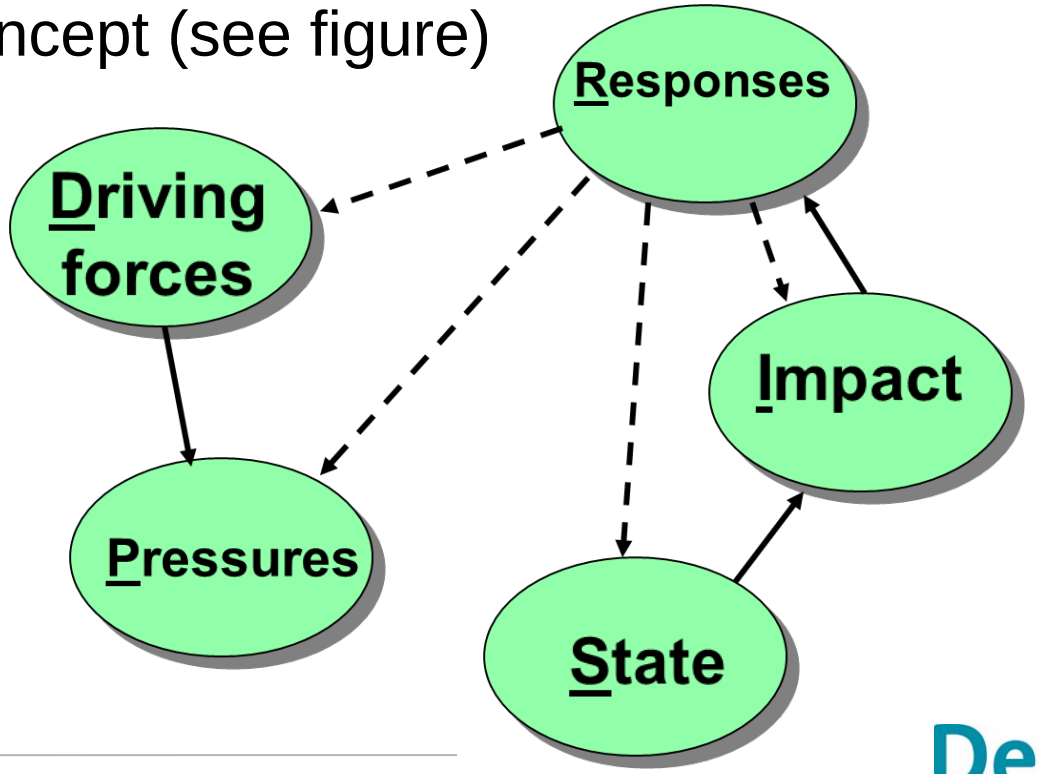
Assessment of the relevant ES

- The relevant direct and indirect pressures and impacts are identified

- Analysis is made of the functioning of the ecosystem in order to understand how the different ES are delivered. Use of DPSIR concept (see figure)



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- Classification and typology of ES is still on-going

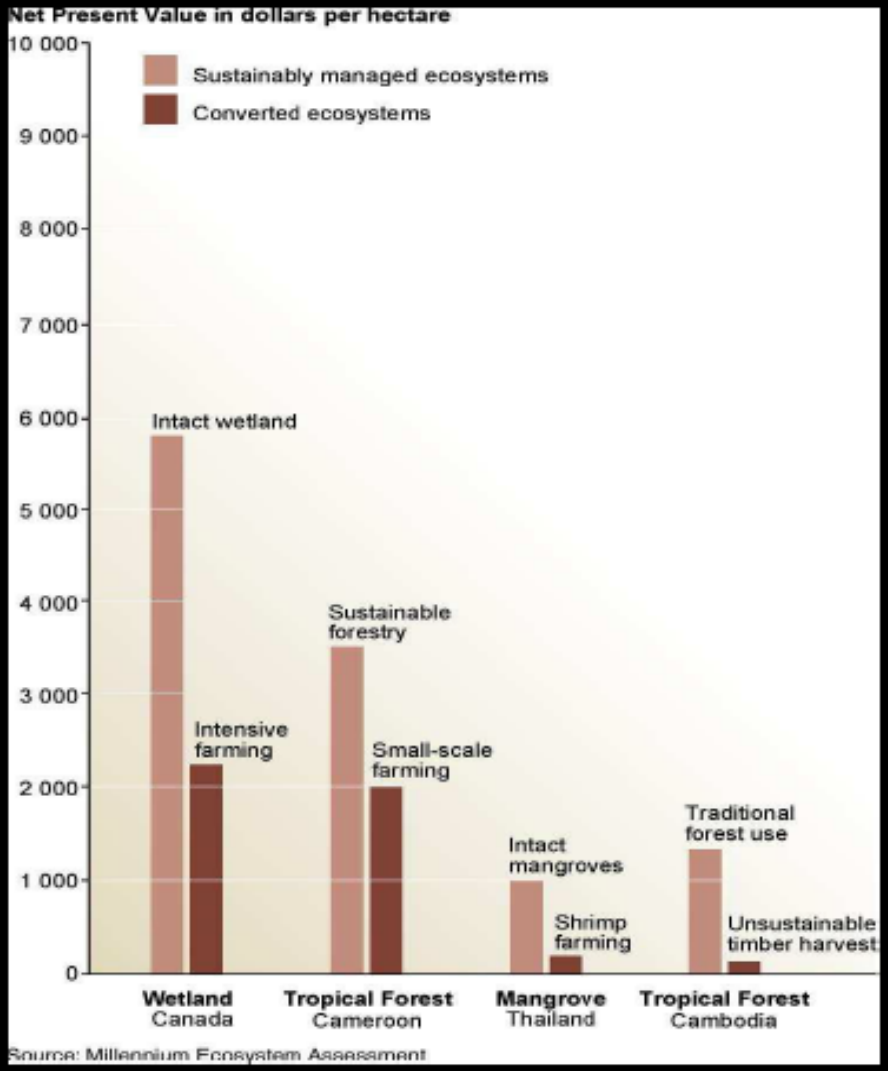
- Proper (relevant) scale (spatial and temporal) should be used for identifying the impacts relevant for an assessment.

- Be kept in mind that impacts/pressures are often local or limited in time and that benefits or services will manifest themselves during a longer period

Valuation of ES services and pressures

The **total economic value** associated to multifunctional natural ecosystems often proves higher than when converted for industrial production

„Every dollar invested .... saves any-where between 7,5 and 200 US$ in damage & repair costs“
TheEconomist
(23 April 2005)



Fuente: Balmford et al. 2002

Valuation of ES services and pressures

- Incorporate the outcome of the assessment into decision-making, the services and pressures of a project for society must be quantified
- How to give a monetary (market) value to the huge variety of such services and how to incorporate that value into a green economy.
- Value services and pressures together with stakeholders
- Existing regulatory framework has to be incorporated in the valuation process
- Existing regulations therefore will not automatically facilitate the concept of ES

Design of the projects addressed with elements of ES

- When the ecosystem functioning is analysed the design process can start

- Examples: Building with Nature (Netherlands), Sigma Plan (Belgium), Working in Estuaries (in East England)
  - ✓ developed guidelines and tools for eco-dynamic
  - ✓ development and design in order to integrate
  - ✓ economic development, nature values and quality of life

- Value Engineering is another project management technique that seeks the best functional balance between cost, reliability and performance of a product

Case studies of ES in dredging and marine construction

- Building with Nature, Working with Nature, Building for Nature, Green Climate Adaptation Measures and Eco-Engineering
- Programmes promote and facilitate the use of an integrated pro-active approach which helps countries and consortia
- Found in projects where a need for enhancing services such as• good protection, navigation and sand and gravel mining is ascertained and project owners try to combine these needs with the enhancement of other services such as recreation, biodiversity and water-quality

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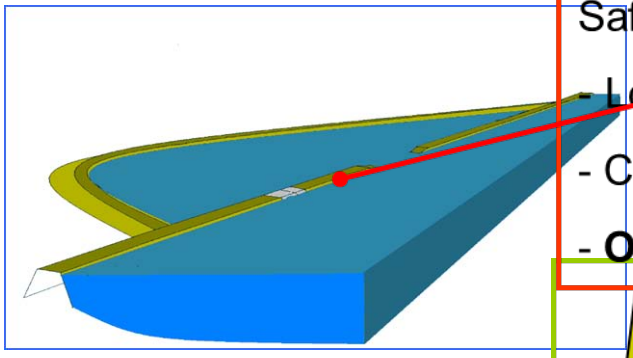
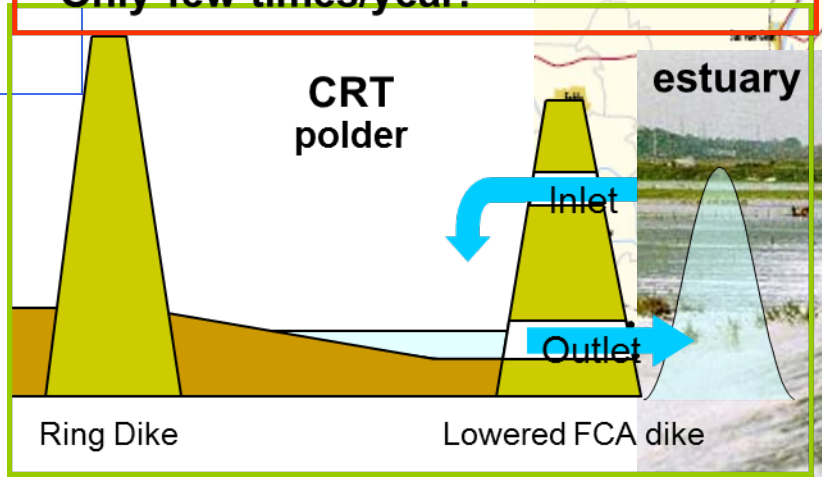
Sigma Plan to regulate urban flood control

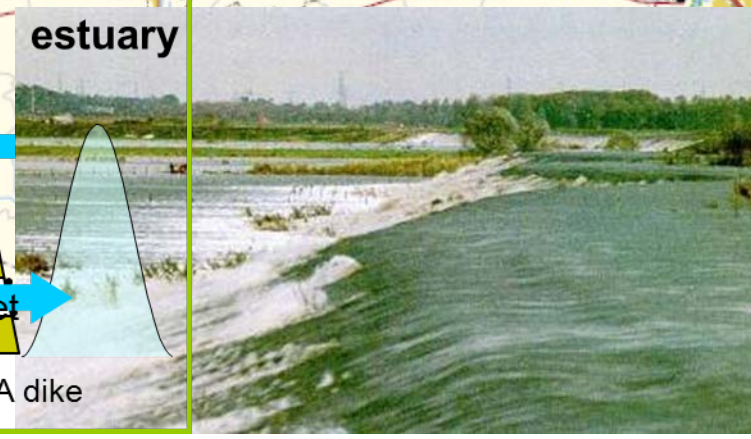
- Existing flood protection plan for the Scheldt
- ✓ safety, ecology and a new ecosystem
- High water levels are increasing due to morphological changes in the estuary and because of the possible effects of climate change Western Scheldt



Safety: **FCA**

- Lowered dike stretch
- Critical tides: whole storage capacity
- **Only few times/year!**





Working with Nature for creating ecosystem structures

Sand Engine on Dutch coast

- Ter Heijde peninsula: 128 hectares (256 soccer fields)
- Protection against rising sea levels and space for nature

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Experimental cases of ecosystem structures in harbour districts

Key messages of concept of ecosystem services in dredging and marine construction

- The concepts of ecosystem services has enormous integrative capacity, it offers a useful way to bridge ecology and economics
- The concept ES is of increasing importance,• it fits well with dredging and marine construction projects and is compatible with the ‘building and working with nature’ philosophies.
- The concept offers the opportunity to consider the ES and pressures of a project in a balanced and integrated way.•
- Stakeholders, must get involved at an early stage of decision-making about projects
- Monetary valuation can be tool to make visible hidden costs of biodiversity loss
- An analysis of drivers, pressures, state, impact and response relations (DPSIR) will be used as the starting point for assessment
- The ES concept to the dredging and marine construction sector will demonstrate the positive influence that the sector can have for river and coastal environments
- Information: http://www.dredging.org/

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