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Biodiversity as a key issue in the European Strategy for Marine and Maritime Research

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What general purpose for marine science, technology and research?

- Sustainable development of sea based activities
- Sophisticated understanding of the impact of human activities on marine systems
 - Objective: decoupling development of sea-based activities from environmental degradation



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How?

- Strengthening interdisciplinary approach to marine science will be an indispensable component, also for mitigation and prediction of the effects of climate change
- Making best use of Europe's resources, developing a strategy to link political and research priorities, address cross-sectoral challenges, maximize synergies between Member State and Community efforts, avoid duplication and improve dialogue
- Research has to better contribute to innovation and knowledge and skills have to be better transformed into industrial products and services
- The development of the Marine Observation and Data Network will be an important tool for this strategy



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What will the EC do?

- Present a comprehensive European strategy for Marine and Maritime Research in 2008
- Launch cross-cutting calls in FP7 to promote an integrated approach and improve understanding of maritime affairs
- Support research to predict, mitigate and adapt to the effects of climate change on maritime activities, the marine environment, coastal zones and islands.
- Support the creation of a European marine science partnership for a concerted dialogue between the scientific community, the industry and policy makers.



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Sea Based Activities and their Effects on Biodiversity

- Maritime transport, vessels, leisure ...
 - Transport of organisms with ballast water, pollution
 - Effects of sound production, sonar
 - Producing garbage: plastics, bottles, ...
- Maritime constructions (harbours, drilling platforms, ORED's)
 - dredging, sand and gravel exploitation, power generation
 - Habitat creation and destruction
- Military activities
- Oil and Gas Exploration, platforms, pipelines
 - Pollution, habitat creation
- Deep sea Mining
 - Removal of minerals, habitat
 - Sediment resuspension



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Sea Based Activities (2)

- Fisheries
 - Overfishing: changing food webs, fishing down the food web, induction of regime shifts
 - Habitat destruction (beam trawling)
- Aquaculture:
 - genetic erosion, introduction of exotics, pollution, habitat destruction
- CO₂ sequestration, trade in carbon permits: use of abandoned oil and gas fields, injection of CO₂ in deep waters
 - acidification
- Fertilization of the oceans by Fe (and perhaps other trace metals in the future)
 - Increasing productivity

Land-based activities with effects on the marine environment

- Greenhouse gas production
 - Climate Change
 - Temperature change, circulation change, increased frequency of storms:
 - species distribution, composition of communities
 - Sea Level Rise: can coastal biodiversity keep up?
 - Acidification
 - Calcification
- Tourism and coastal development
 - Habitat destruction (reefs, mangroves, ...)
- Land-Sea Interactions
 - Eutrophication, dead zones
 - Chemical pollution



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EU policies that require understanding of marine biodiversity

- Target of halting biodiversity loss by 2010
 - Marine biodiversity loss
- EU is signatory of the CBD
- Bird and habitat directive
 - Natura 2000 sites, ASP's
 - Applies to territorial waters but also EEZ's
- Water Framework directive
- Common Fisheries Policy
- Maritime Policy



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How can we contribute?

- Strengthening the interdisciplinary approach
- Strengthening interdisciplinary approach to marine science will be an indispensable component, also for mitigation and prediction of the effects of climate change
 - Understanding the relationship between species and environment = linking ecology, physics and biogeochemistry
 - Understanding the mechanisms in human society that produce impacts on the environment: behaviour, demography, sociology, politics, economy
 - Developing models of biodiversity linked to ecosystem models (including hydrodynamics, species interactions in food webs) and socio-economic models (fisheries, maritime transport)



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Mitigation and Prediction of Climate Change

- Understanding of selective pressures in the seas (including those exerted by humans) and adaptation
- Understanding food web changes due to new species (exotics), cascading effects through removal of top predators, eutrophication effects and regime shifts geared to climate change and acidification.
- Consequences for the protection, conservation and restoration of marine habitats



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Marine Observatories and Data Management

- Long-term monitoring / sustained observation of the European seas is a key element of any marine research strategy
 - Development of Biodiversity Observatories
 - What, how, ...
- The Life Watch Initiative, continues building on BIOMARE (Biodiversity Observatories)
- Example: MarBEF RMP's are opening and rescuing data, synthesizing and modelling them and is responsible for EurOBIS, the European component of the Ocean Biogeographic Information System
- How to conserve this legacy?



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Knowledge gaps

- See e-conference, break out groups



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Making best use of Europe's resources

- *Making best use of Europe's resources, developing a strategy to link political and research priorities, address cross-sectoral challenges, maximize synergies between Member State and Community efforts, avoid duplication and improve dialogue*
- Networking of people, infrastructures, instruments, platforms.
- Promote exchange of researchers
- Stimulate European research projects
- Develop outreach, education



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Strategy to link political and research priorities

- Review of what has worked and what not
 - EPBRS for biodiversity
 - Programme committees
 - National committees
 - More ?
- How to reconcile economic growth/sustainability and environmental sustainability?
- Comment on internet consultation on the economy of biodiversity loss



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Innovation and Industrial Products

- *Research has to better contribute to innovation and knowledge and skills have to be better transformed into industrial products and services*
- Biodiversity delivers economically important goods and services
- Industrial Products:
 - Fisheries, Offshore industry
 - Natural products, Antibiotics, Anti-Fouling, Glues, Pharmacology
 - Observation technology: sensors, satellites, platforms, observatories, ...
 - Research technology: sampling, ROV's, instruments, molecular, ...
 - Blue Biotechnology: genes, enzymes,
 - Biofuels
- Other products: audiovisual products (television, movies), games, ... Encyclopedia of Life (linked species information), Barcode of Life (rapid species identification),
- The sustainable exploitation of this potential is not achieved yet
- Innovation: where are the SME's? Present policies do not work. Why not tackle the large multinationals? Example IUCN, WWF, ...



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The Future Marine Research Structure

- NoE's I (and IP's) are a success story in bringing together marine scientists and effectively creating the European Research Area
- They assemble the best brains in Europe, have created research groups on many essential topics, and should therefore be part of any future strategy requiring the development of marine science and the scientific input into decision making.
- They are somewhat neglected in policy making at the European level because they fail to nest into policy making activities and because adequate fora do not exist.



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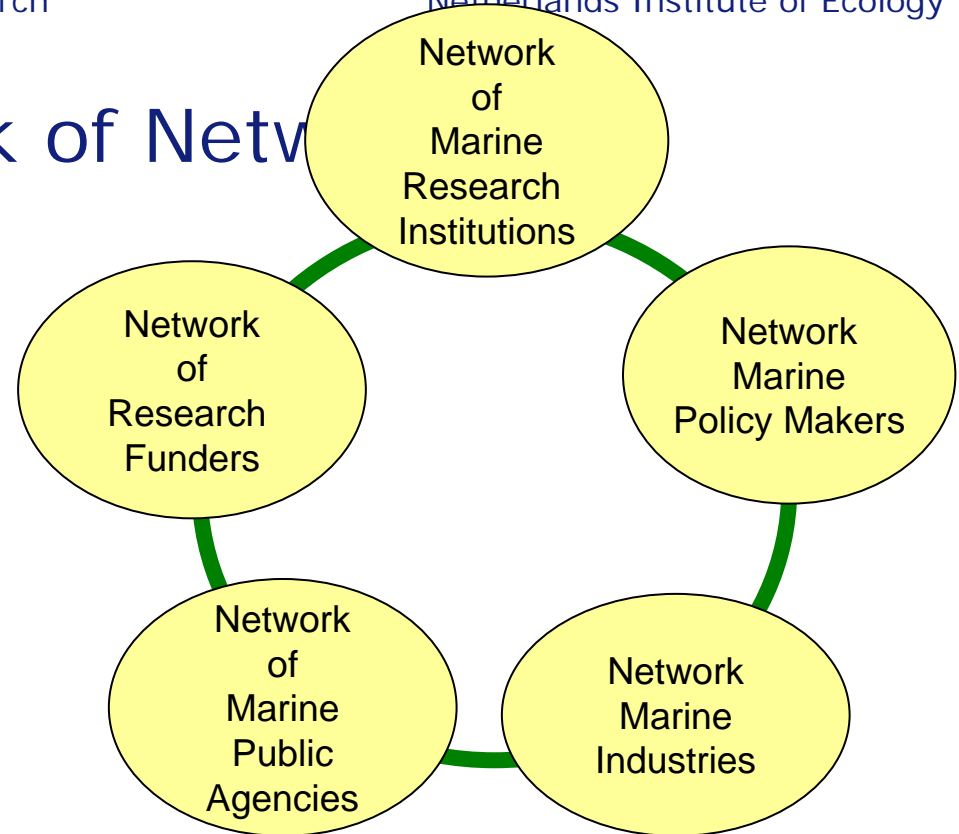
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How?

- Continue and support NoE's and IP's
- Flagship projects to consolidate partnerships?
- Create a network of networks
 - Involving industry and policy making (ICES, Marine Board)
- Create new European Societies and Foundations
- Use existing societies and foundations: MARS, CETAF
- Create European (virtual) institutes
 - EUROCEAN
 - EMBEF
- Establish and support a common data centre, modelling centre(s), interdisciplinary workshops and conferences (Gordon type), small European research projects, support marine research in the ERC, ...

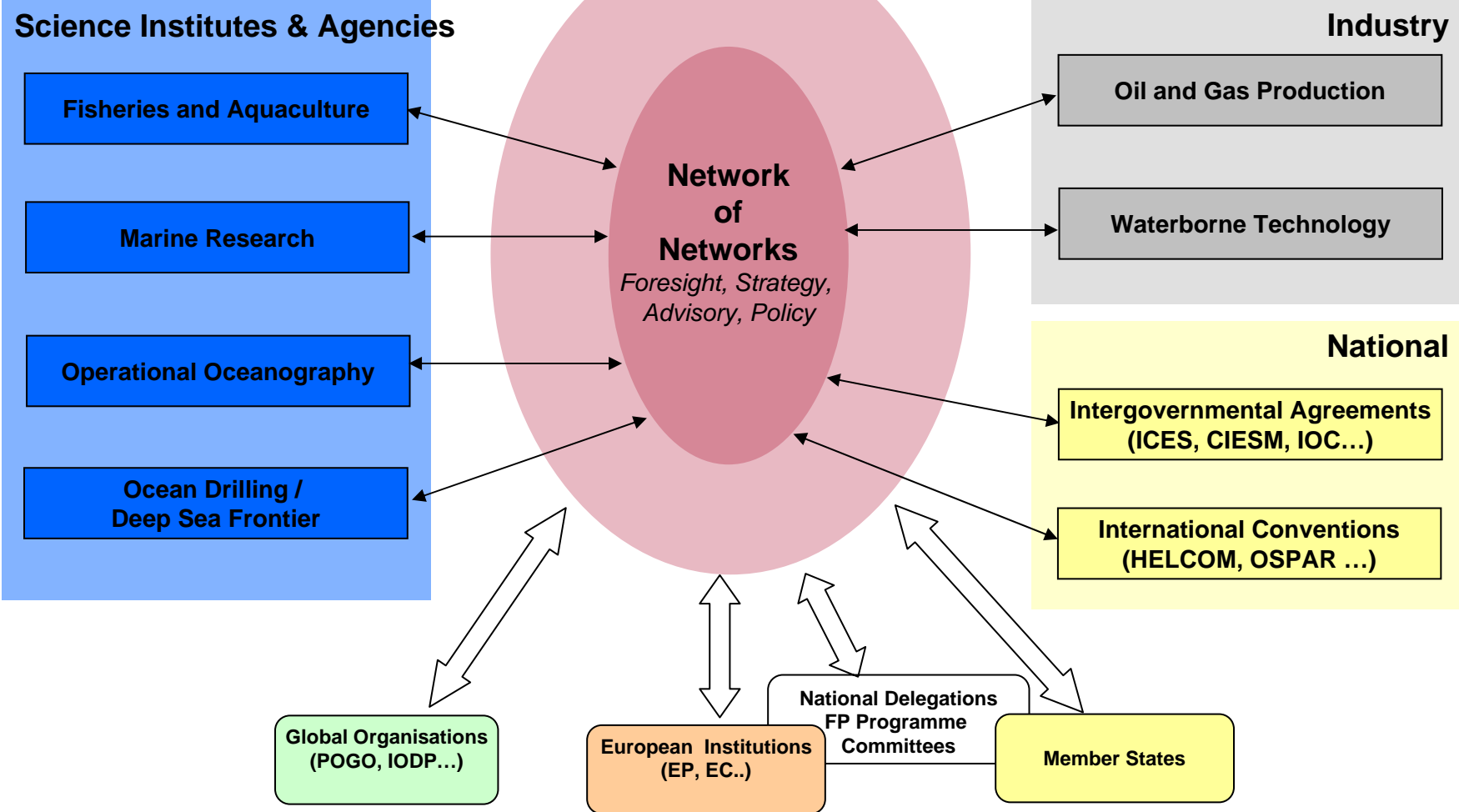
Network of Networks

**Not a single voice –
but many voices
brought together
in a holistic way
that can be heard**



European Thematic and Regional Structures

- National Networks of institutes and institutions
- Thematic Networks (I3s, NoEs, ...)
- Infrastructure-related Networks
- Networks of Funding Agencies (ERA-NETs, ERA-NET+...)
- Emerging Structures





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Flagship Project? The scientific, socio-economic and legal basis for Marine Conservation in the European Union

- Need for MPA's
 - How to define them? What purpose do they serve?
 - Requires scientific foundation which is different from the terrestrial environment and is at present underdeveloped.
 - Requires legislation at the European and international level to prevent fragmentation
 - Special problem: protection of the high seas
- Requires input from many disciplines
- Deliverables: habitat map of the European sea-floor, Atlas of the Seas, observatories, European fauna's and flora's on the Internet, decision support systems, Cochrane collaboration mechanism, etc.etc.



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And join the World Conference on Marine Biodiversity
in Valencia (11-15 November 2008)





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