Integrated Costal Zone Management- retrospective analysis of existing ICZM best practice case studies

Marija Kataržytė

www.baltcoast.net

A SYSTEM APPROACH FRAMEWORK FOR COASTAL RESEARCH & MANAGEMENT

BONUS-BaltCoast received funding from BONUS (Art 185), funded jointly by the EU and Baltic Sea national funding institutions

Content

- Coastal zone
- Coastal zone issues (in Europe)
- Integrated coastal zone management (in Europe)

Coastal zone

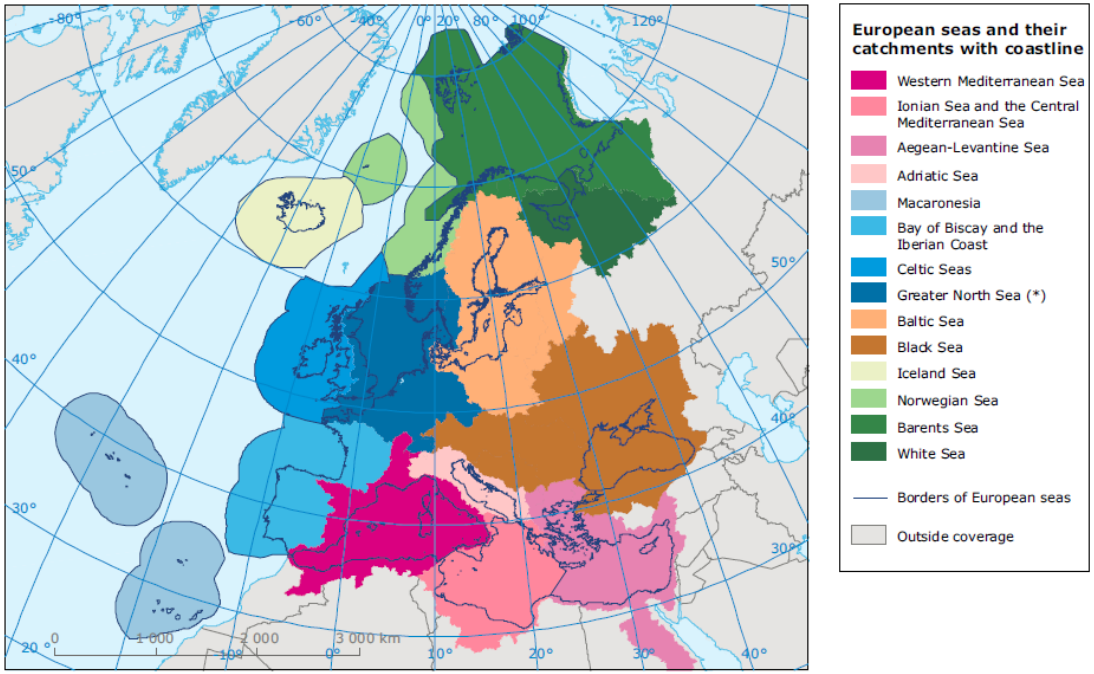
- The coastal zone is understood to reflect the coexistence of two margins on both sides of the seashore area: terrestrial and marine part

- Estimates of the European terrestrial coastal zone vary between 4 % and 13 % of the land mass

- Coastal zones (the terrestrial part) cover approximately 619 000 km^2 in the 29 European coastal countries (23 coastal EU Member States plus Albania) (EEA, 2013)

Coastal zone

- **Seas surrounding Europe and their catchment areas** (EEA, 2013)



Note: (*) including the Kattegat and the English Channel.

The seaward boundary in the North-East Atlantic is set at 200 nautical miles. It does not reflect any claims concerning the Extended Continental Shelf nor is it intended to pre-empt any ongoing discussions within the United Nations Convention on the Law of the Sea (UNCLOS) on issues related to maritime boundaries.

- European coastlines are characterized by a great diversity of geomorphologic features, climatic conditions, biologic and socio-economic pressures, creating wide types of biotopes that simultaneously provide a variety of ecosystems services.
- Coastal regions are fragile ecosystems that are particularly vulnerable to natural and human pressures, which contribute to its deterioration.

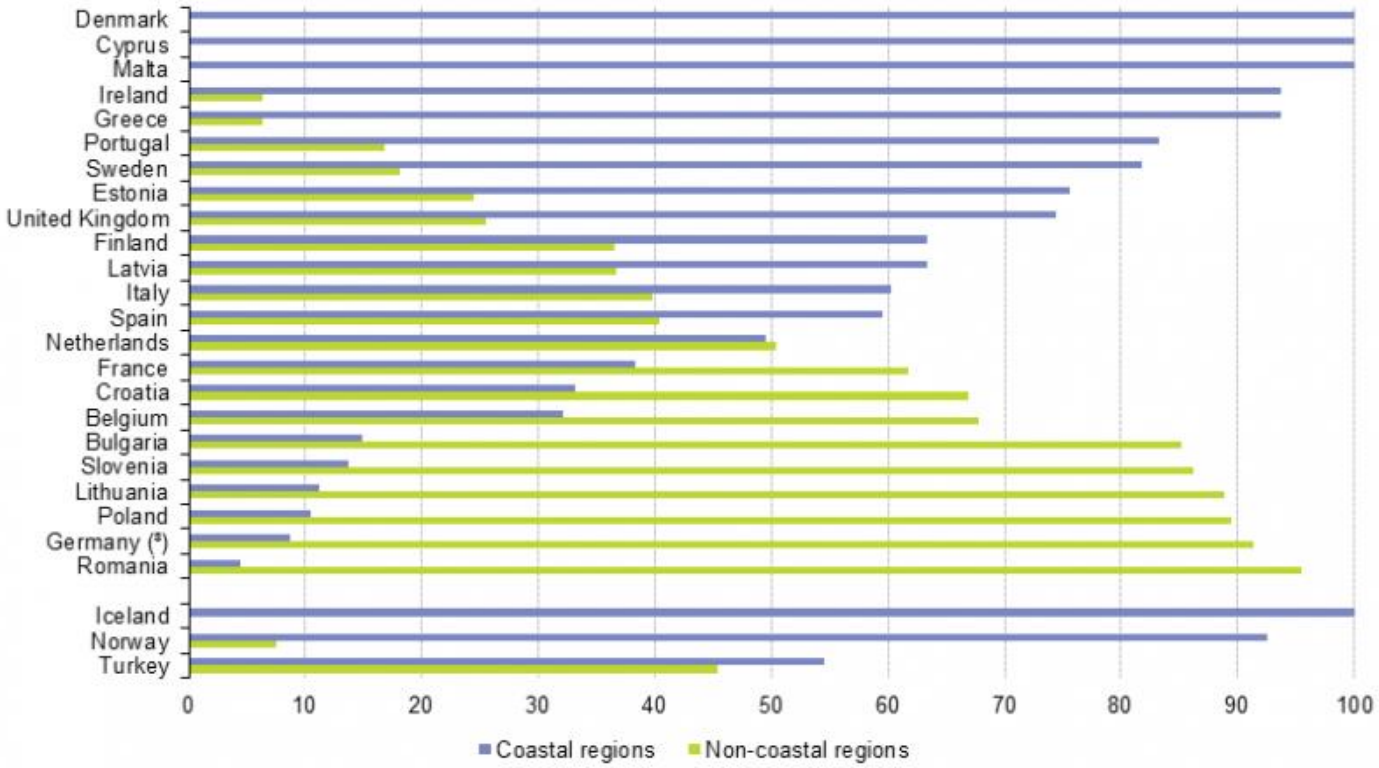
Coastal zone

Key messages (EEA, 2010):

- As an interface between land and sea, European coastlines provide vital **resources for wildlife**, but also for the **economy and human health and well-being.**
- Multiple **pressures**, including habitat loss and degradation, pollution, climate change and overexploitation of fish stocks, affect coastal ecosystems.
- **Coastal habitat types and species** of Community interest **are at risk** in Europe; two thirds of coastal habitat types and more than half of coastal species have an unfavorable conservation status.
- **Integrated** and **ecosystem-based** approaches provide the foundation for sustainable coastal management and development, supporting socio-economic development, biodiversity and ecosystem services.
- **Coordinated** action at the **global**, **regional** and **local** levels will be key to sustainable management of coastal ecosystems.

Coastal zone issues

- **Shares of the population living in coastal regions, 2014** (Eurostat, 2015)

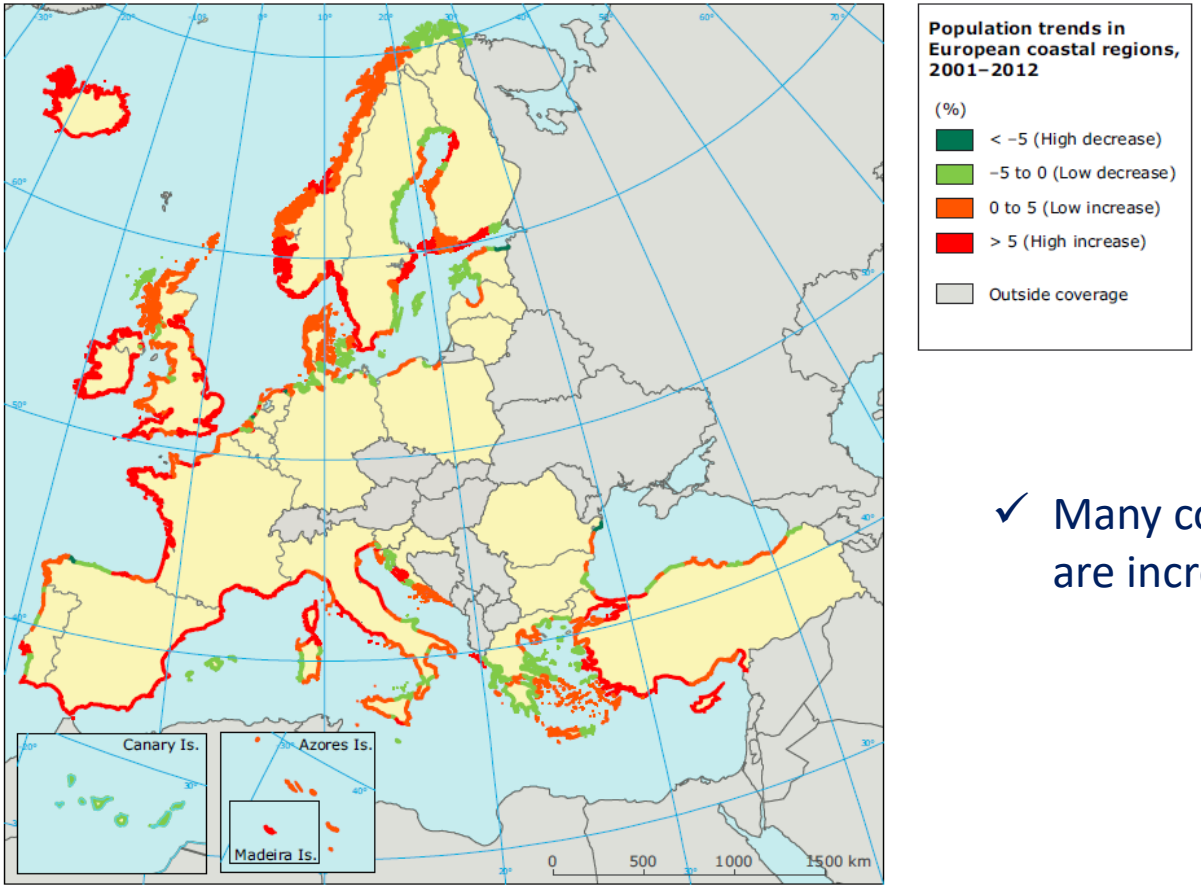


(¹) The Czech Republic, Luxembourg, Hungary, Austria and Slovakia are landlocked countries and are not presented.
(²) Denmark, Cyprus and Malta are coastal areas in their entirety.
(³) Break in time series.

- ✓ 206.2 million people live in EU coastal regions, representing 41% of total population (Eurostat, 2013)

Coastal zone issues

- **Population trends in European coastal regions 2001–2012** (EEA, 2013)

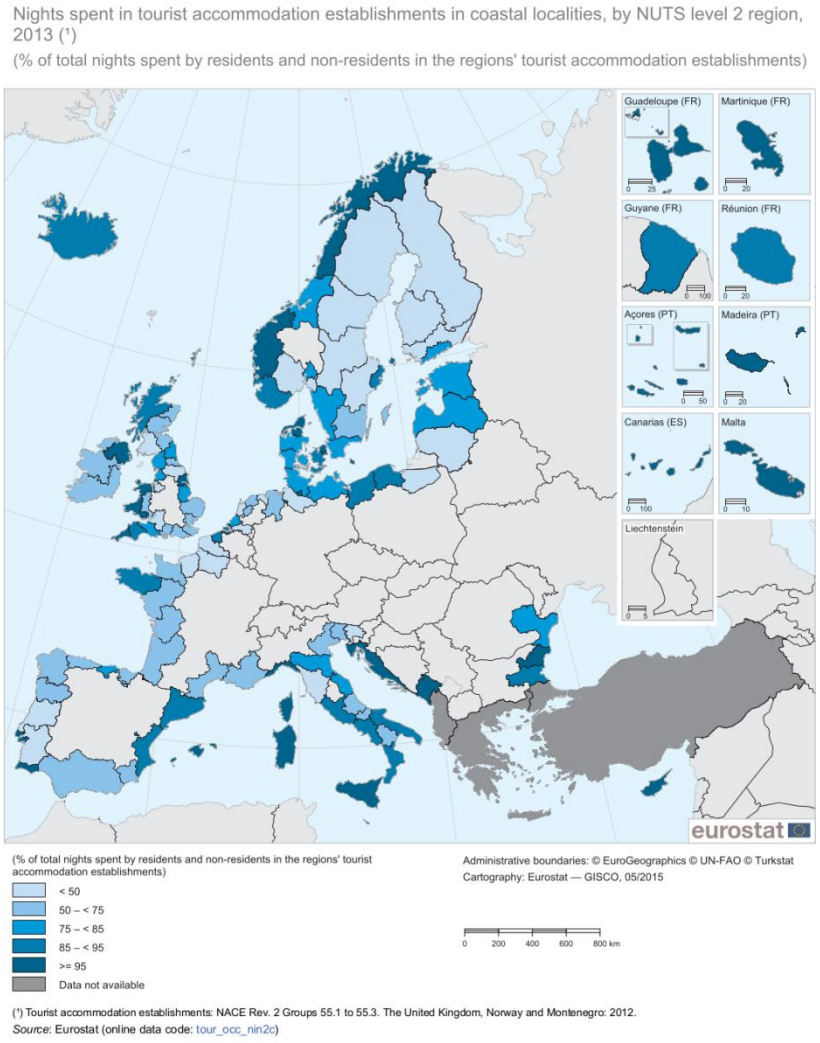


Source: ETC/SIA, population data by coastal region (NUTS 3) from Eurostat.

- ✓ Many coastal populations are increasing

Coastal zone issues

- **Overnight stay in coastal localities** (Eurostat, 2013)



- ✓ Tourism in Europe is concentrated in the coastal regions

Coastal zone issues

Economic drivers of coastal development (EEA, 2013)

- Coastal regions account for an estimated 40 % of the EU's GDP; the maritime economy represents between 3 % and 5 % of the EU's GDP, or a yearly gross value of EUR 485 billion.
- Economic assets within 500 m of the coastline account for an estimated EUR 500 to 1 000 billion (Policy Research Corporation, 2011).
- It is estimated that a total of 5.4 million people are employed as a result of maritime economic activities alone.
- EU industry accounts of the global value in shipping and transport (44 %), minerals and aggregates (49 %), marine tourism activities (48 %) and maritime renewable energy (> 90 %).

Coastal zone issues

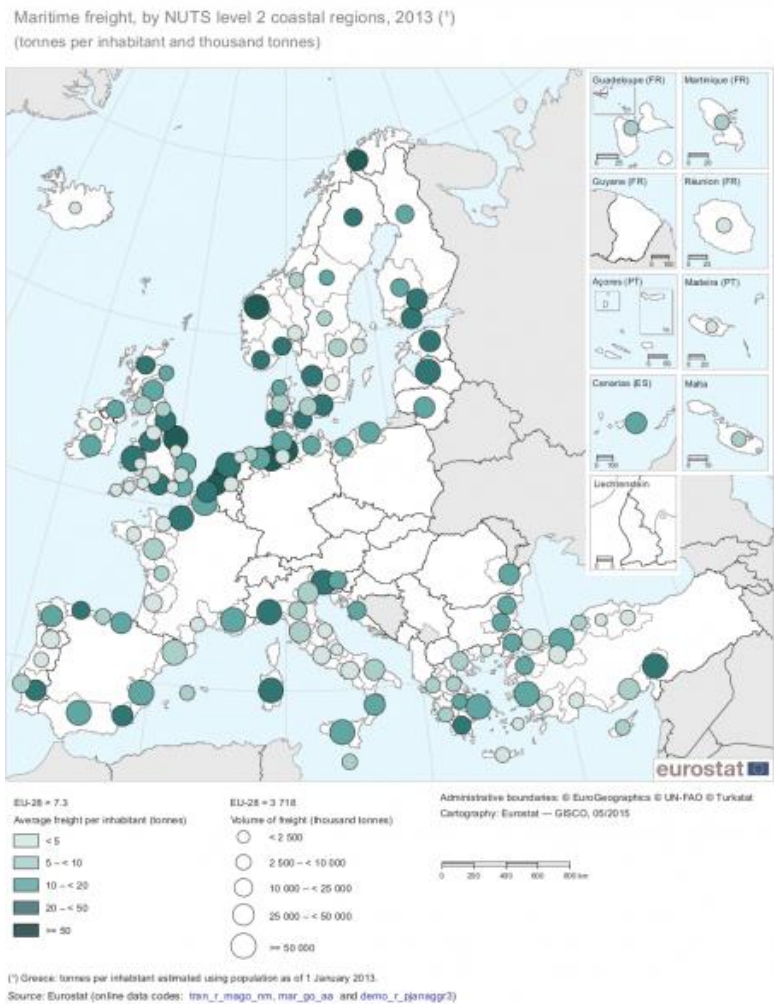
➢ Maritime economic activities (EEA, 2013)

Maritime economic activity	Size today (billion EUR)	Recent trends	Estimated future potential	Comment (b)
Mature stage				
Short-sea shipping	57	5.8 %	2	100 % growth by 2050 (Tetraplan et al., 2009)
Offshore oil and gas	107–133	– 4.8 %	1	Globally only 20 % of exploitable oil and gas have been exploited
Coastal tourism and yachting	144	3–5 %	4	No data
Coastal protection	1–5.4	4.0 %	6	No data
Fisheries Landings/production Fishing fleet capacity Employment	4.8 (c)	– 25 % since 1993 (d) Annual growth since mid-1990s – 2 % – 4 to – 5 %		Only 13 % of European fish stocks are fished at maximum sustainable yield (MSY). Many stocks are not assessed
Growth stage				
Offshore wind	2.4	21.7 %	6	By 2030, industry's contribution EU GDP increases fivefold, and employment by factor of three (EWEA, 2012)
Cruise tourism	14.1	12.3 %	5	Recently, above 10 % annually in the Baltic Sea Region (Cruise Baltic, 2013)
Marine aquatic products	0.5	4.6 %	4	Aquaculture in many countries is stagnating
Maritime monitoring and surveillance	5.6–10	Growth expected	5	No data
Development stage				
Blue biotechnology	0.8	4.6 %	5	4–12 % (ESF, 2010)
Ocean renewable energy (non-wind)	0.25	Growth expected	5	No data
Marine minerals mining	0.25	Growth expected	4	No data

✓ Many maritime sectors are expected to grow substantially

Coastal zone issues

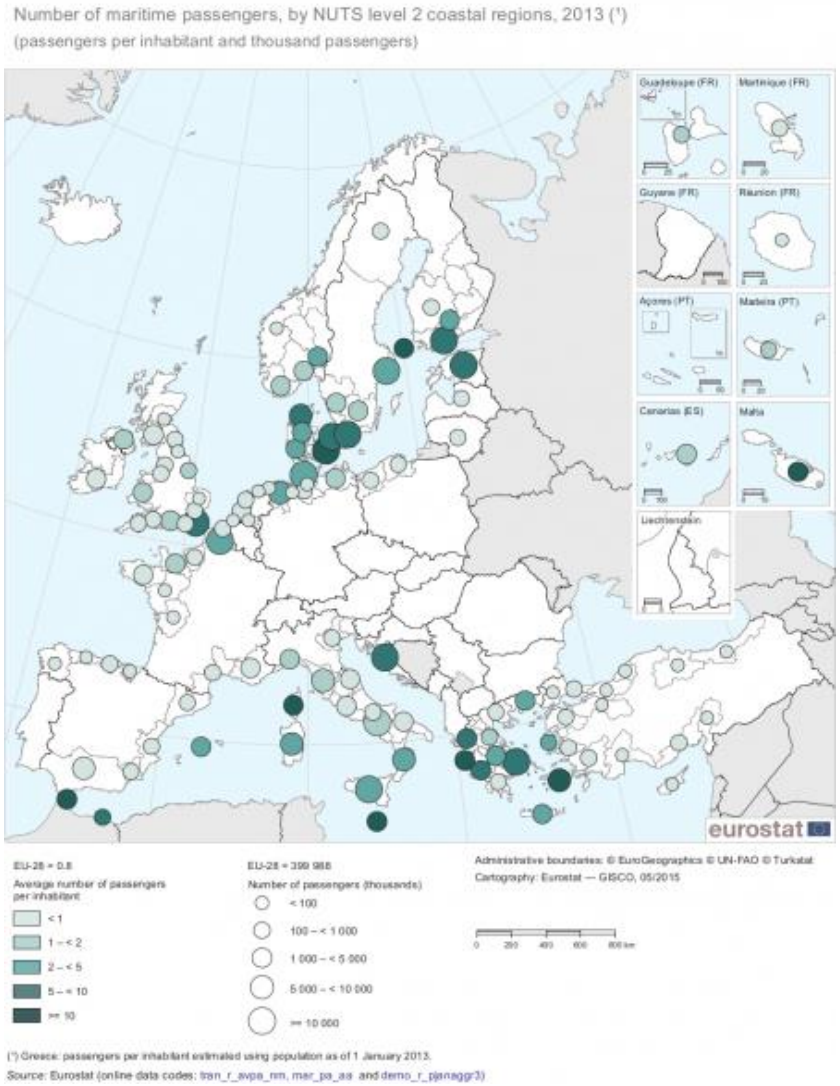
- **Maritime freight, 2013** (Eurostat, 2015b)



- ✓ Almost 90 % of the EU's international freight trade (in tonnage) is transported by sea.
- ✓ 3.7 billion tonnes = an average of 7.3 tonnes/inhabitant.

Coastal zone issues

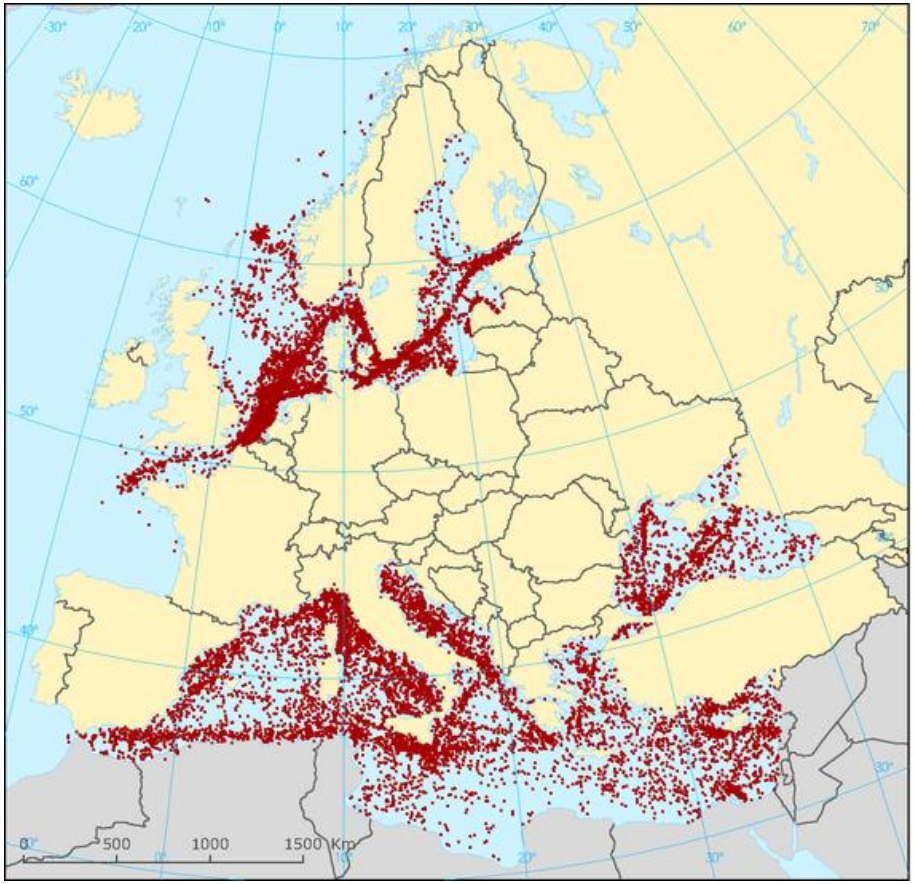
- **Maritime passengers, 2013** (Eurostat, 2015b)



- ✓ Number of maritime passengers that embarked or disembarked in ports are 400 million/year

Coastal zone issues

- **Oil discharges in European seas** (EEA, 2007)



Operational oil discharges detected in European seas, 2000–2004

- Oil discharges

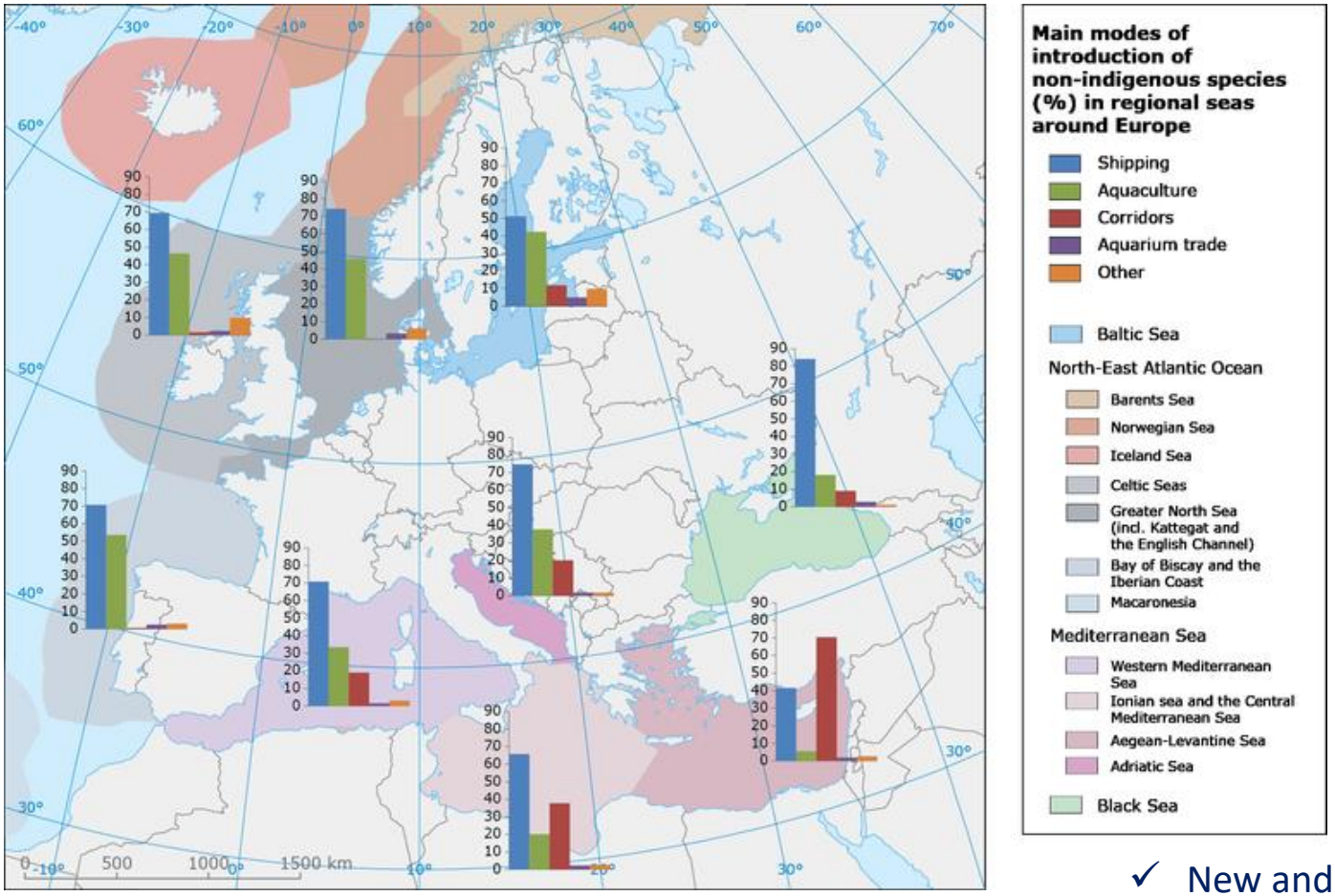
Note: This map covers the North, Baltic, Mediterranean and Black Seas only.
In the North and Baltic Seas, illegal operational oil discharges were detected by aerial surveillance. In the Mediterranean and Black Seas, these have been detected by radar satellite images (i.e. 'probable' spills), but not been cross-validated by aerial surveillance. Further, the varying extent of surveillance in different seas may lead to over or under representing the degree of pollution.

- ✓ Operational oil discharges, mainly along major shipping lanes, continue to pose a serious problem across pan-European seas

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

Coastal zone issues

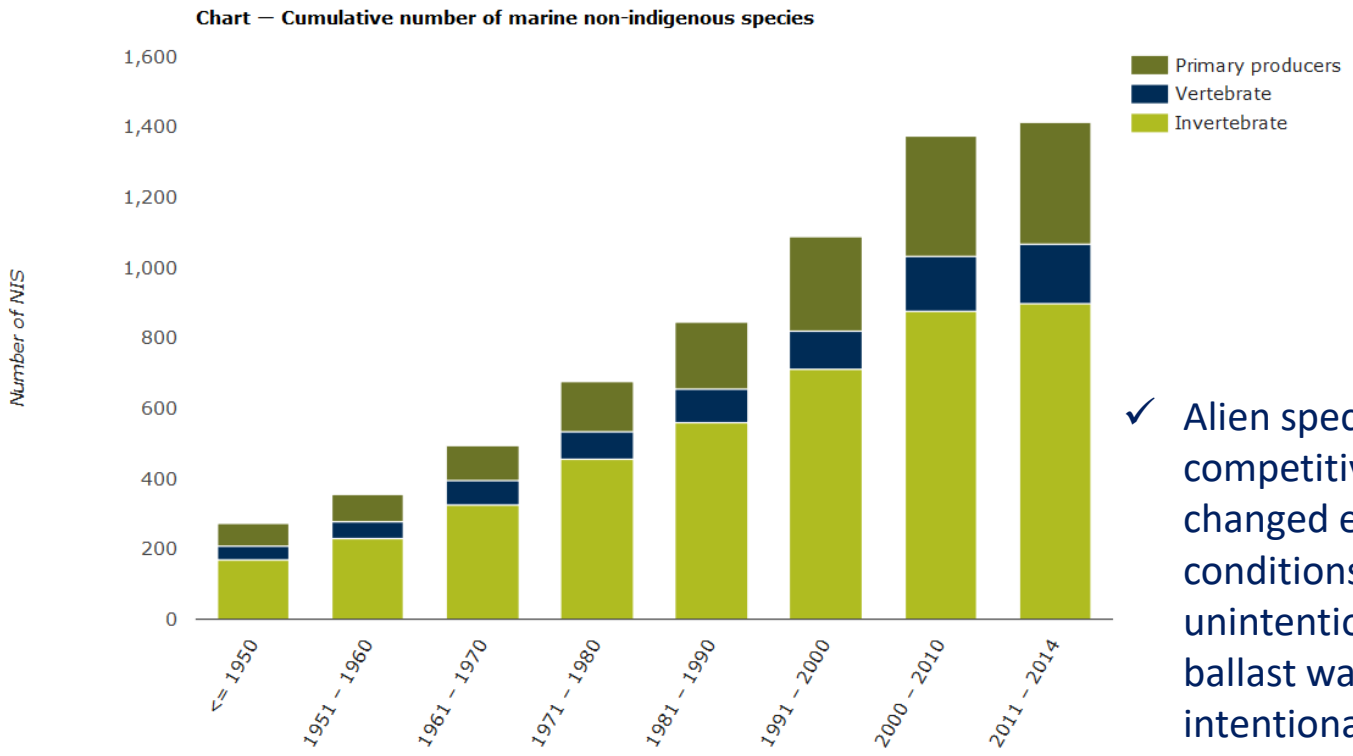
- **Main pathways of introduction of marine non-indigenous species in 2014** (EEA, 2015i)



- ✓ New and enhanced pathways for the spread of alien invasive species

Coastal zone issues

➢ Number of marine non-indigenous species (EEA, 2015i)



✓ Alien species become competitive with natives in changed environmental conditions when unintentionally (e.g. in ship ballast water) or intentionally transported into coastal waters

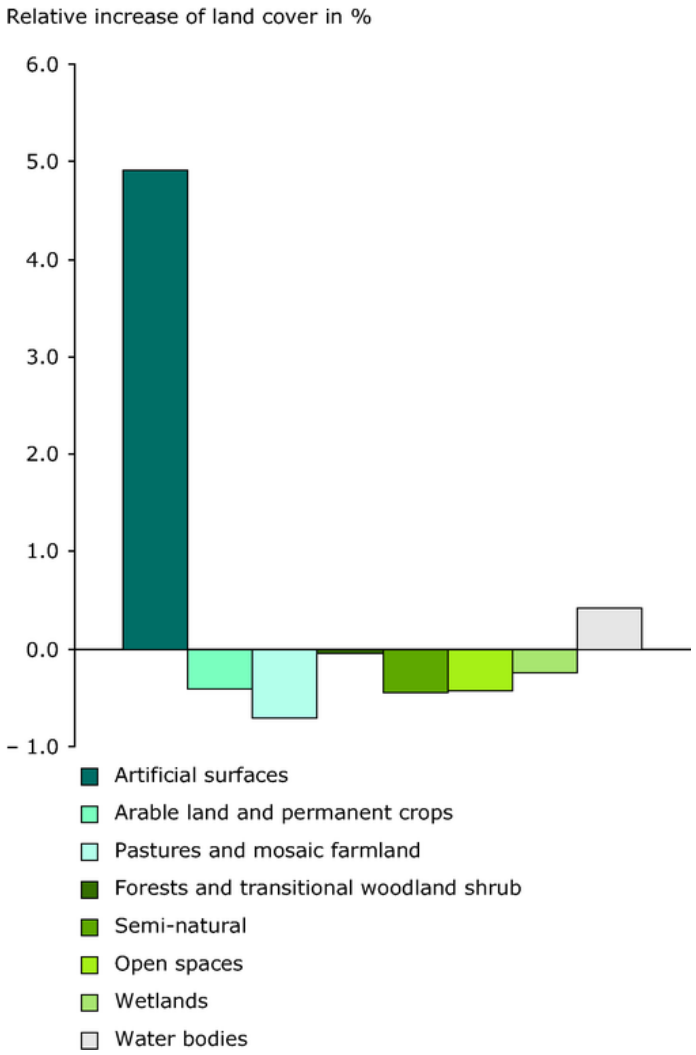
Note: This figure shows the cumulative number of marine Non-Indigenous Species (NIS). Analysis is made at Pan-European level and shown per decade. The most recent period only covers 2011 to 2014.

- **Maritime transport and shipbuilding contribute to a broad range of environmental pressures and impacts** (EEA, 2015d):

  - physical damage of the seabed due to abrasion;
  - disturbances from noise and litter;
  - contamination from the introduction of synthetic and non-synthetic compounds (e.g. anti-fouling paints on ship hulls);
  - death or injury to marine species caused by collision with vessels;
  - air quality degradation in coastal areas, caused by the increasing number of ships.

Coastal zone issues

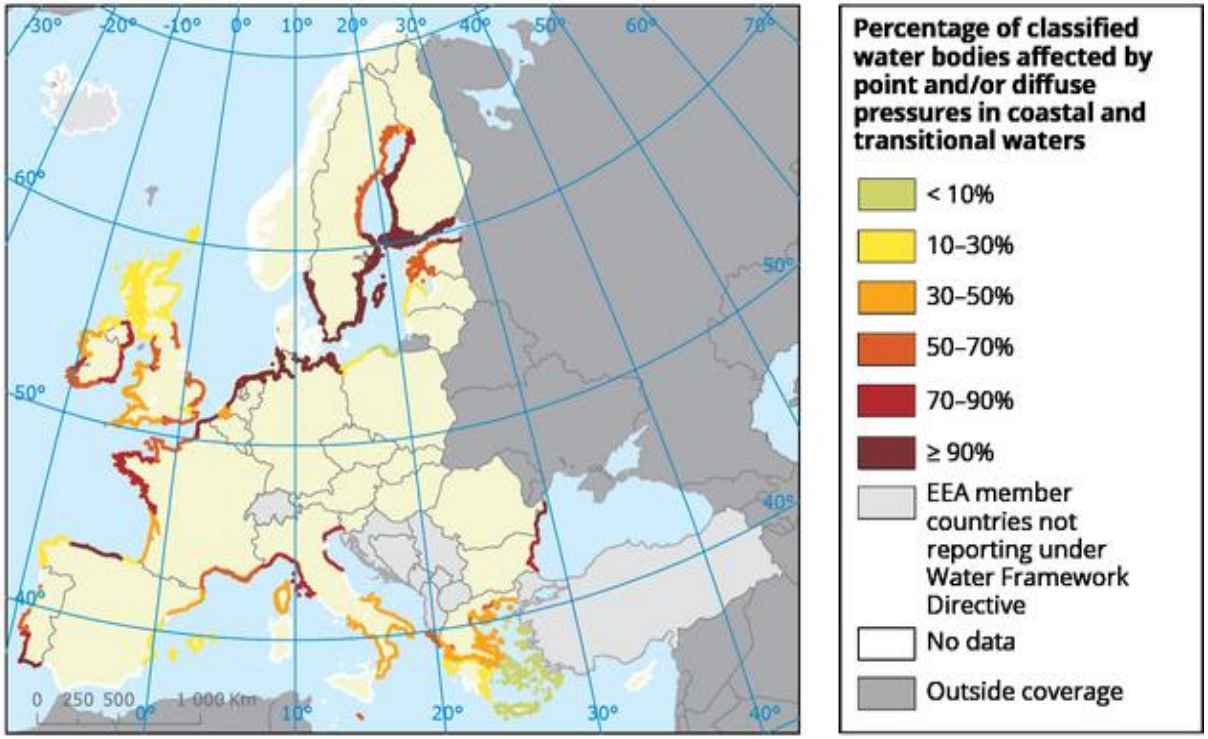
- **Relative change in land cover 2000–2006** (EEA, 2010)



- ✓ An increase in artificial surfaces is observed

Coastal zone issues

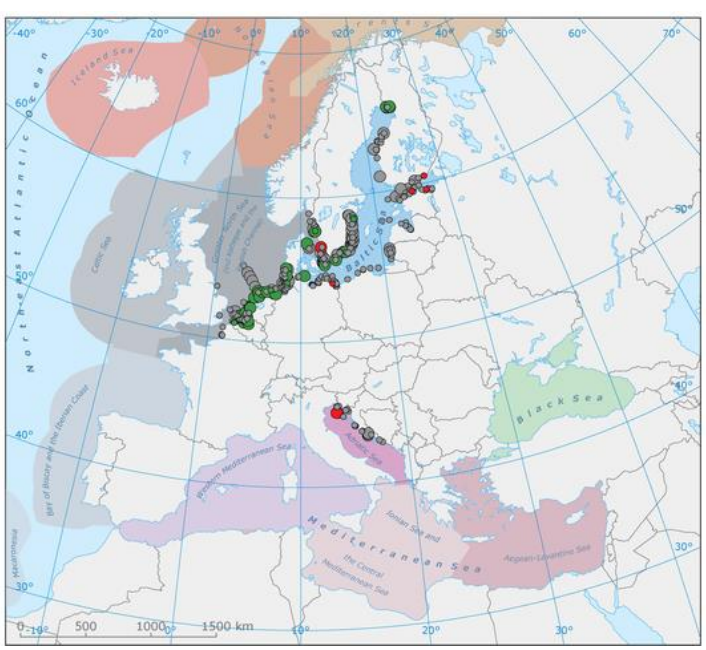
- **Point or diffuse pollution** (EEA, 2015)

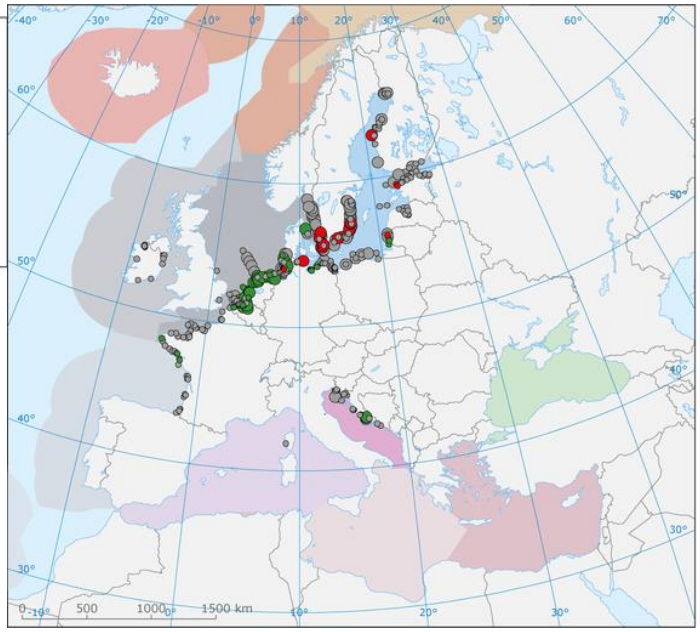


- ✓ 40% of rivers and coastal water bodies - affected by diffuse pollution from agriculture
- ✓ 20% - 25% - point source pollution (industrial facilities, sewage systems and wastewater treatment plants)

Coastal zone issues

- **Trends per station in dissolved inorganic nitrogen and orthophosphate concentrations** (EEA, 2015b)

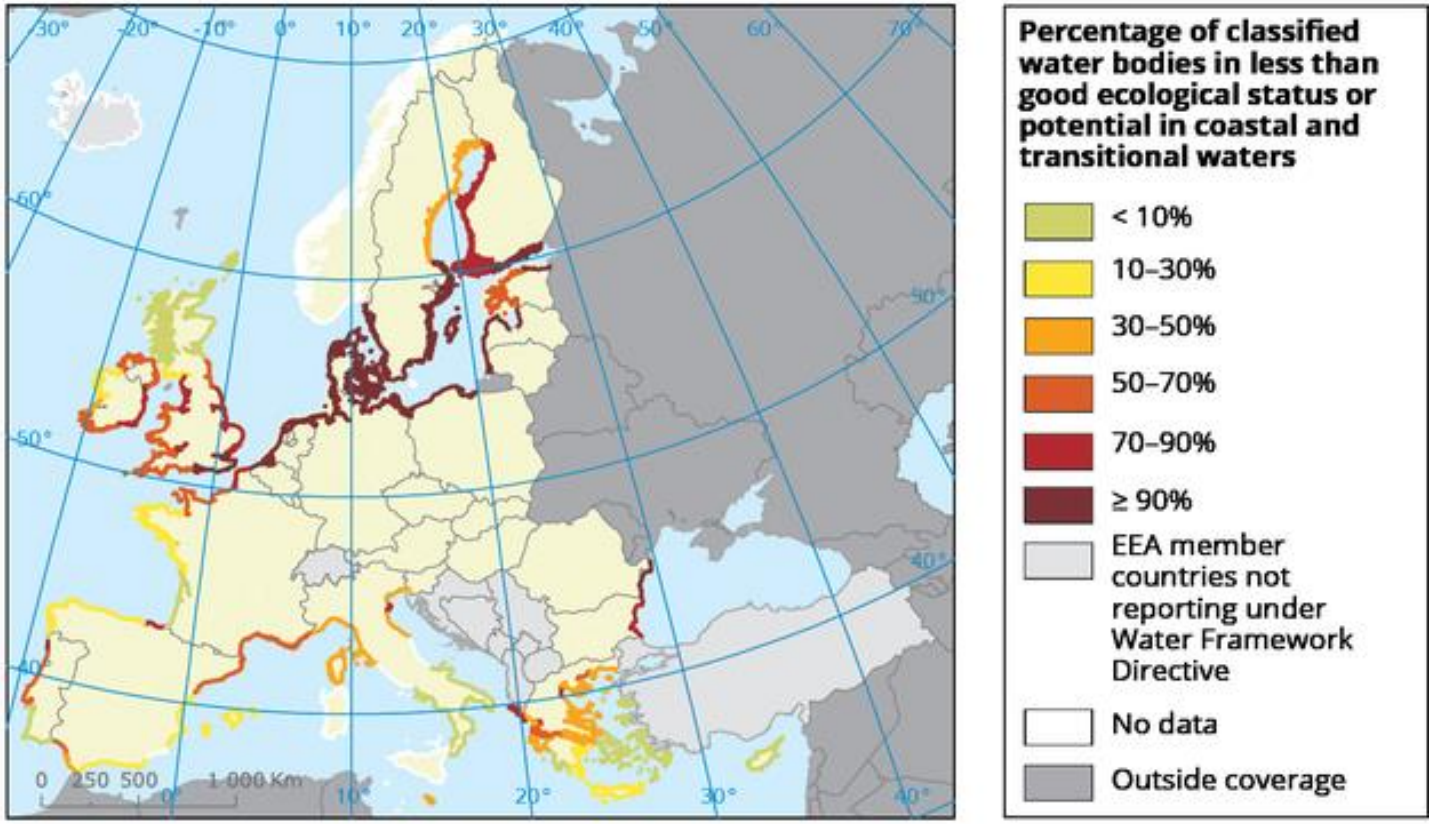




- ✓ decrease in concentrations of N and P observed for 14% and 13%

Coastal zone issues

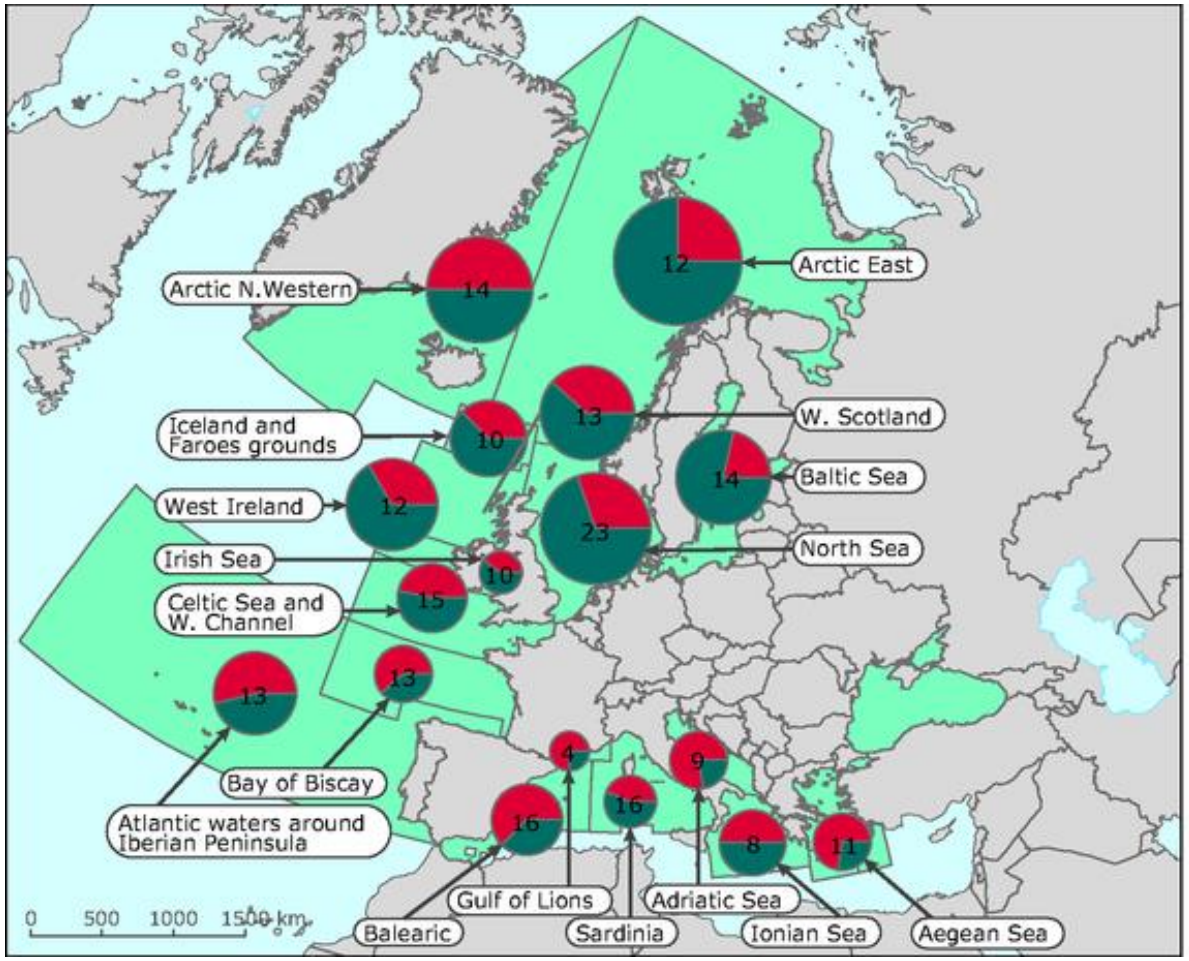
- **Good ecological status or potential of classified coastal and transitional waters (bottom) in Water Framework Directive river basin districts** (EEA, 2015)

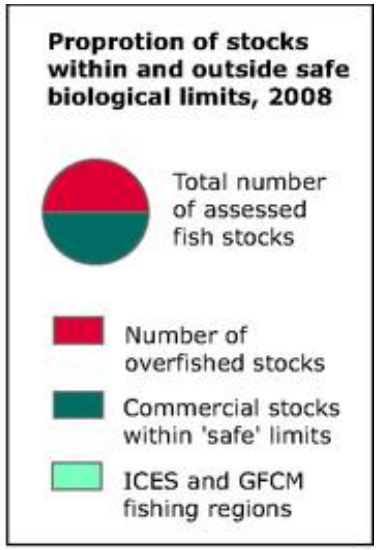


- ✓ 43% of surface water bodies were in good or high ecological status

Coastal zone issues

- **Proportion of fish stocks within and outside safe biological limits** (EEA, 2010b)

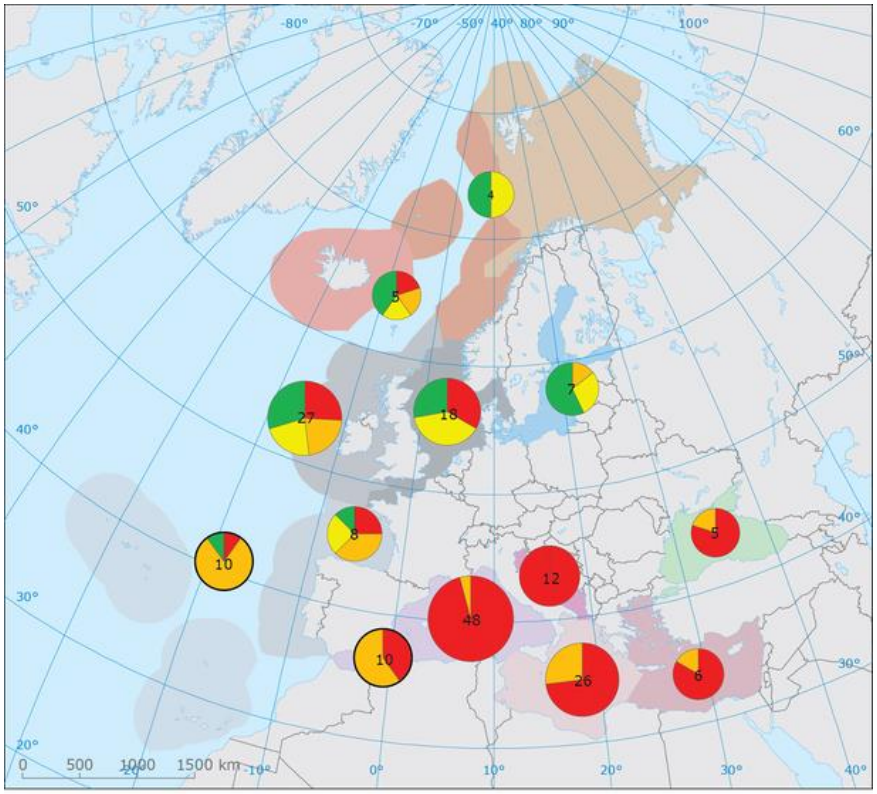


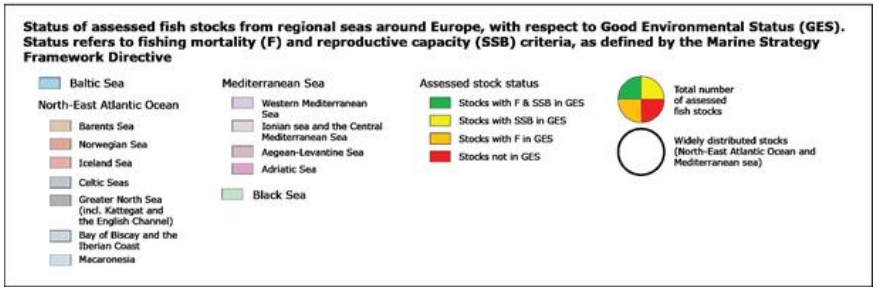


- ✓ Reduce of the total stock of commercial species
- ✓ Affect on the age and size distribution within fish populations
- ✓ Affect on the species composition of the marine ecosystem.

Coastal zone issues

- **Status of fish stocks in relation to Good Environmental Status (GES)** (EEA, 2015i)

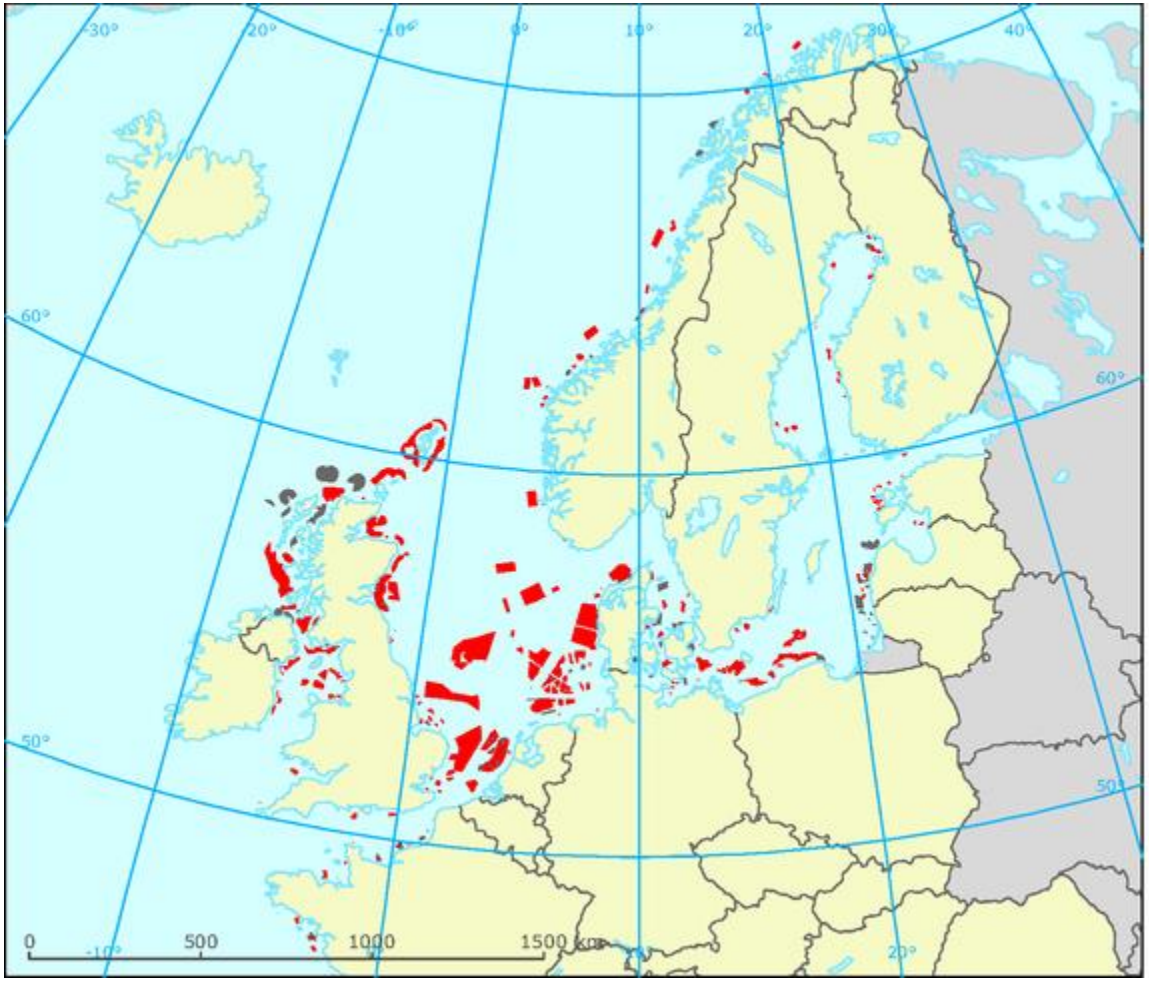


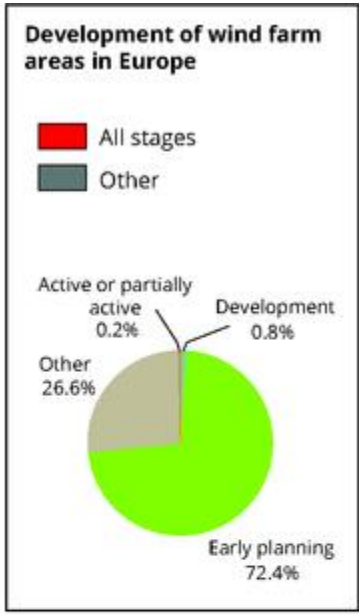


- ✓ 58% of the assessed commercial stocks are not in GES
- ✓ Only 12% are in GES for both the level of fishing mortality and reproductive capacity

Coastal zone issues

- **Development of wind farm areas in Europe** (EEA, 2015d)

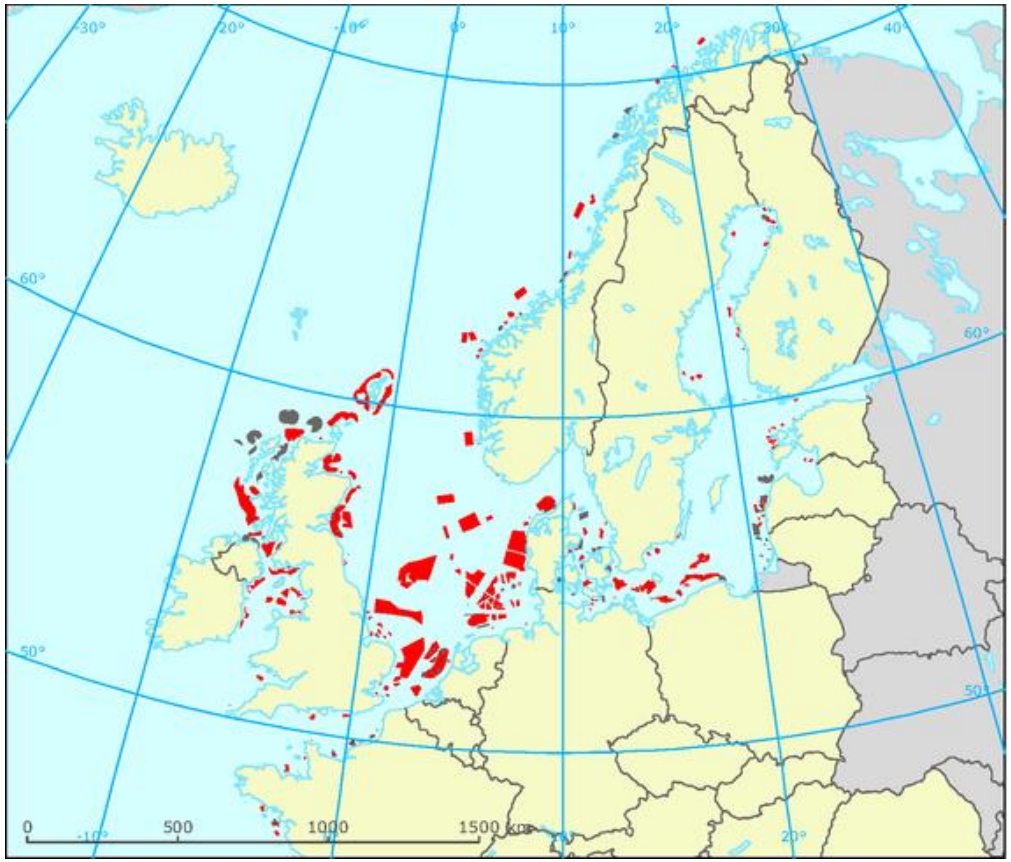




- ✓ Offshore wind farms produce 10% of total wind energy in Europe

Coastal zone issues

- **Development of wind farm areas in Europe** (EEA, 2015d)



Pressures:

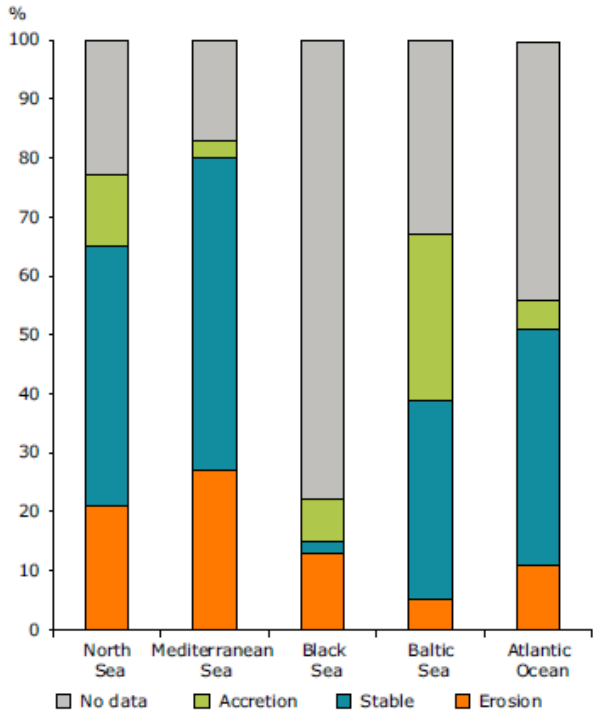
- ✓ underwater noise
- ✓ disturbance and loss of habitats
- ✓ collision with birds
- ✓ hydrological impacts

Coastal zone issues

- **Coastline dynamics in Europe** (EEA, 2012)

Coastal erosion patterns in Europe (2004)
Status of coastline
Accretion
Erosion
Stable
No data
Outside data coverage

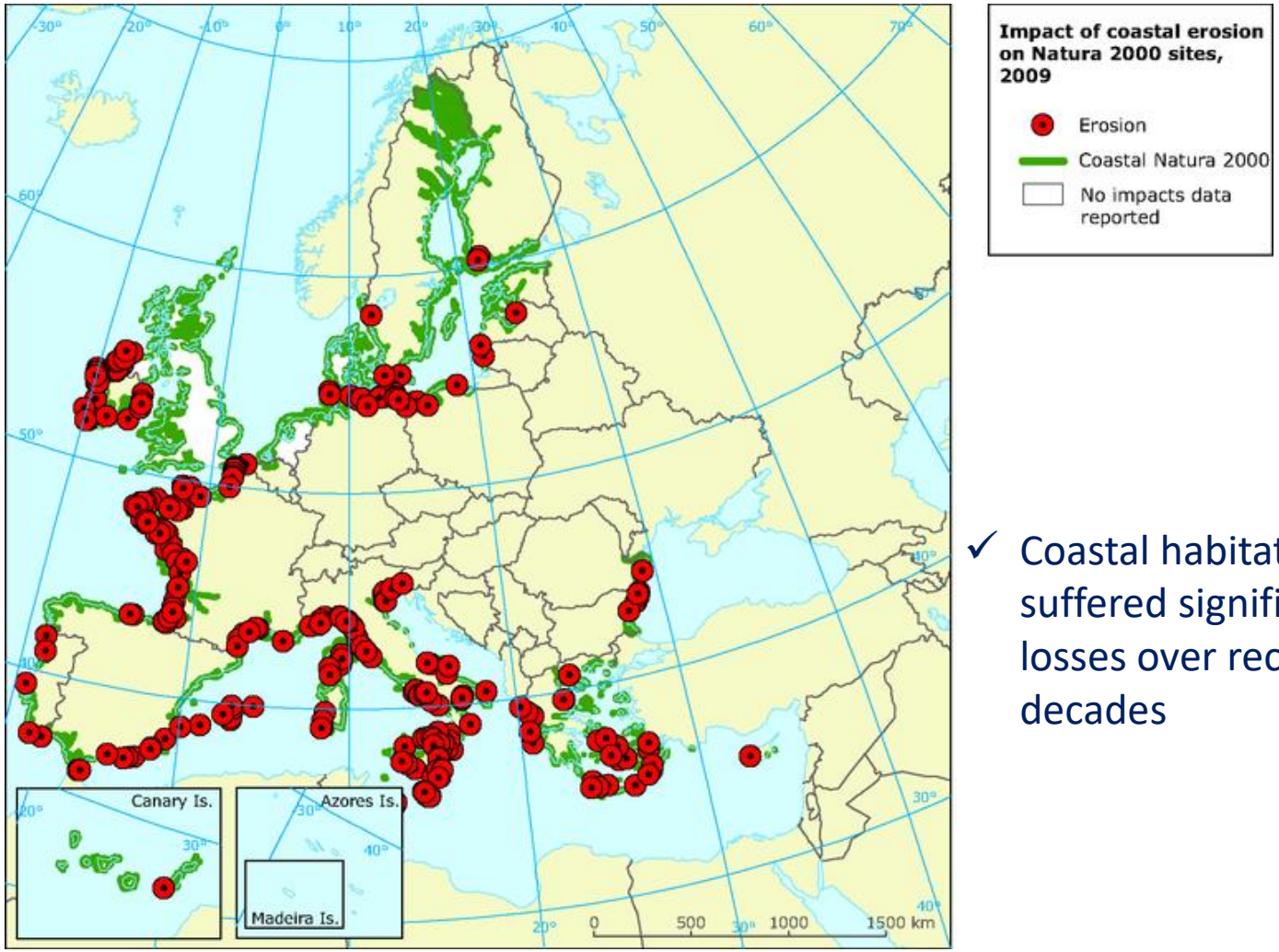
Source: Deduce project (44) (http://www.deduce.eu/IFS/IFS26.pdf).



- ✓ Coastal erosion in Europe causes significant economic loss, ecological damage and societal problems
- ✓ One quarter of the European coastline is currently eroding
- ✓ Future climate change, in particular rising sea levels, is expected to accelerate coastal erosion

Coastal zone issues

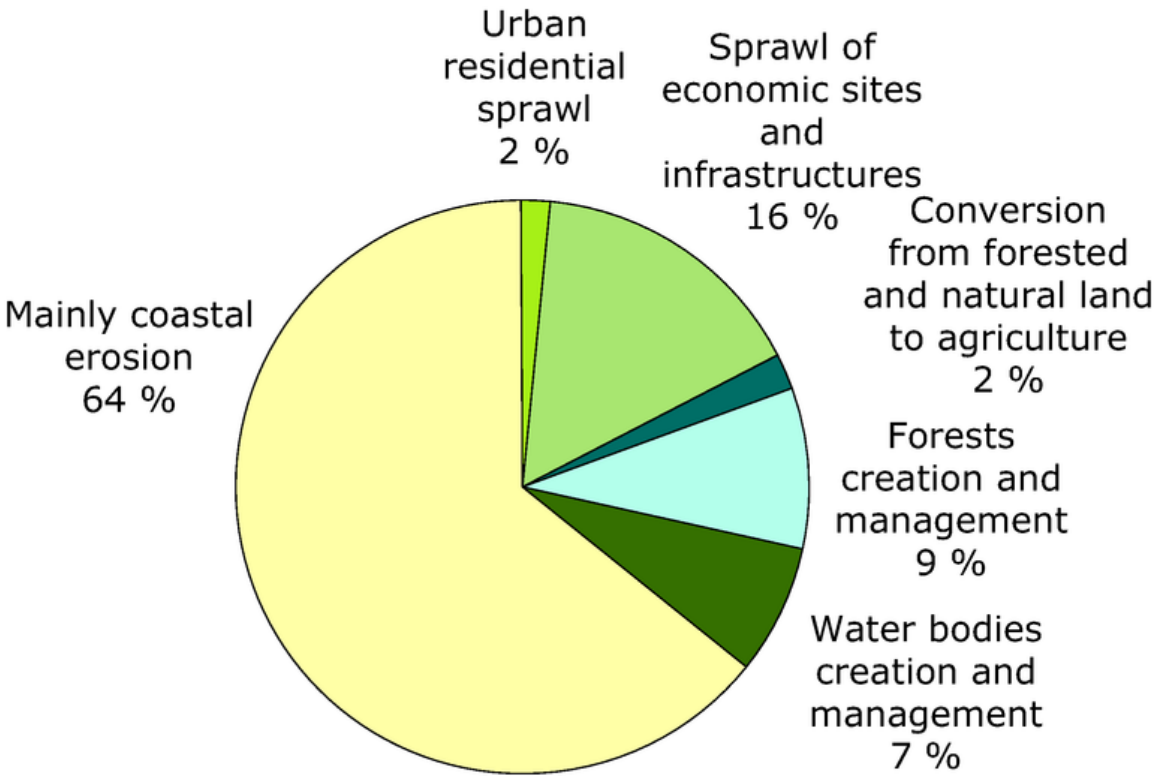
- **Impact of coastal erosion on Natura 2000 sites** (EEA, 2010)



- ✓ Coastal habitats have suffered significant losses over recent decades

Coastal zone issues

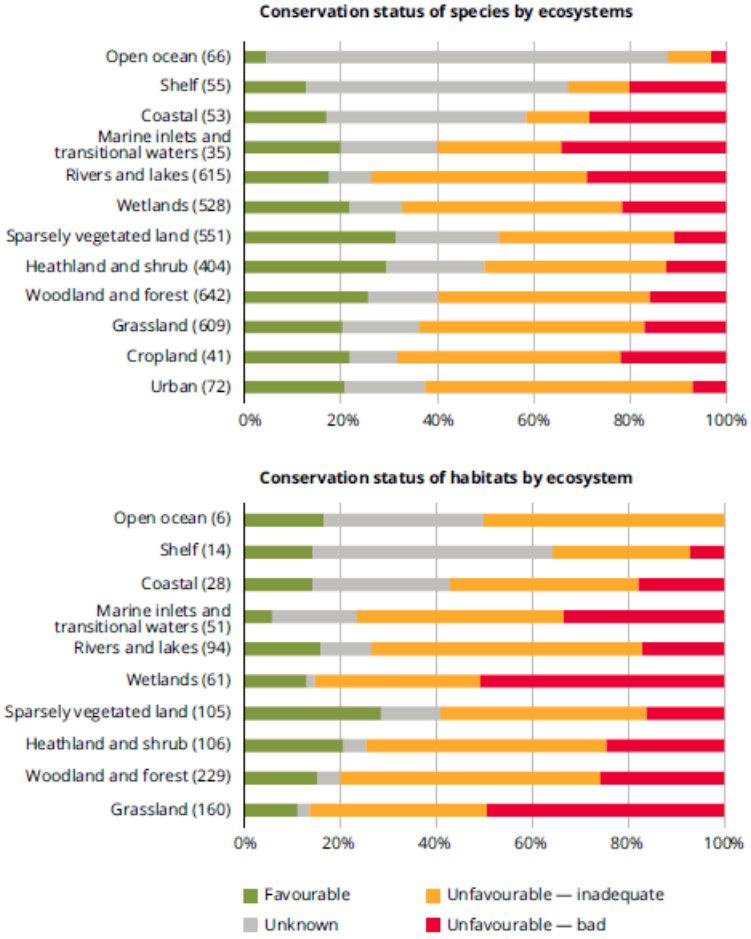
- **Causes of loss of coastal ecosystems** (EEA, 2010 a, b)



- ✓ 8 km^2 of coastal ecosystems (dunes, salt marshes and salines) were lost;
- ✓ 26 km^2 of coastal ecosystems (intertidal flats, lagoons and estuaries) were gained through the creation and management of water bodies.

Coastal zone issues

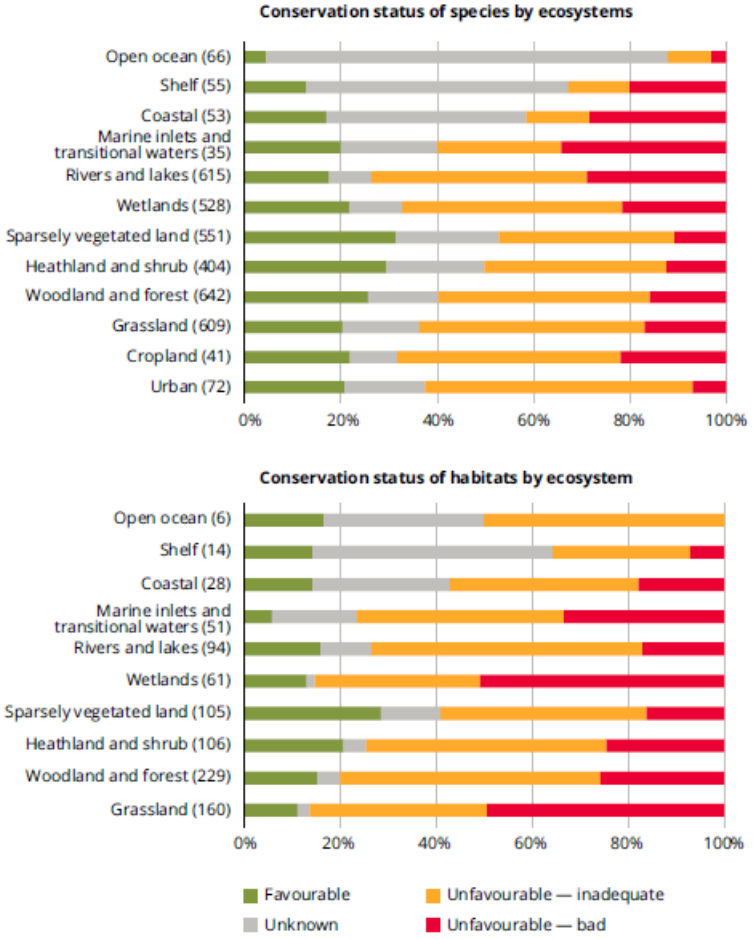
- **Conservation status of species (top) and habitats (bottom) by ecosystem type (number of assessments in brackets) from Habitats Directive Article 17 reporting 2007–2012** (EEA, 2015)



- ✓ ~ 130 species in the Habitats Directive are linked to coastal ecosystems
- ✓ 52 species in the Birds Directive are linked to coastal ecosystems
- ✓ Of the reptiles 16 % are threatened
- ✓ Of the mammals 20 % are threatened
- ✓ Of the birds 12 % are threatened (EEA, 2010b)

Coastal zone issues

- **Conservation status of species (top) and habitats (bottom) by ecosystem type (number of assessments in brackets) from Habitats Directive Article 17 reporting 2007–2012** (EEA, 2015)

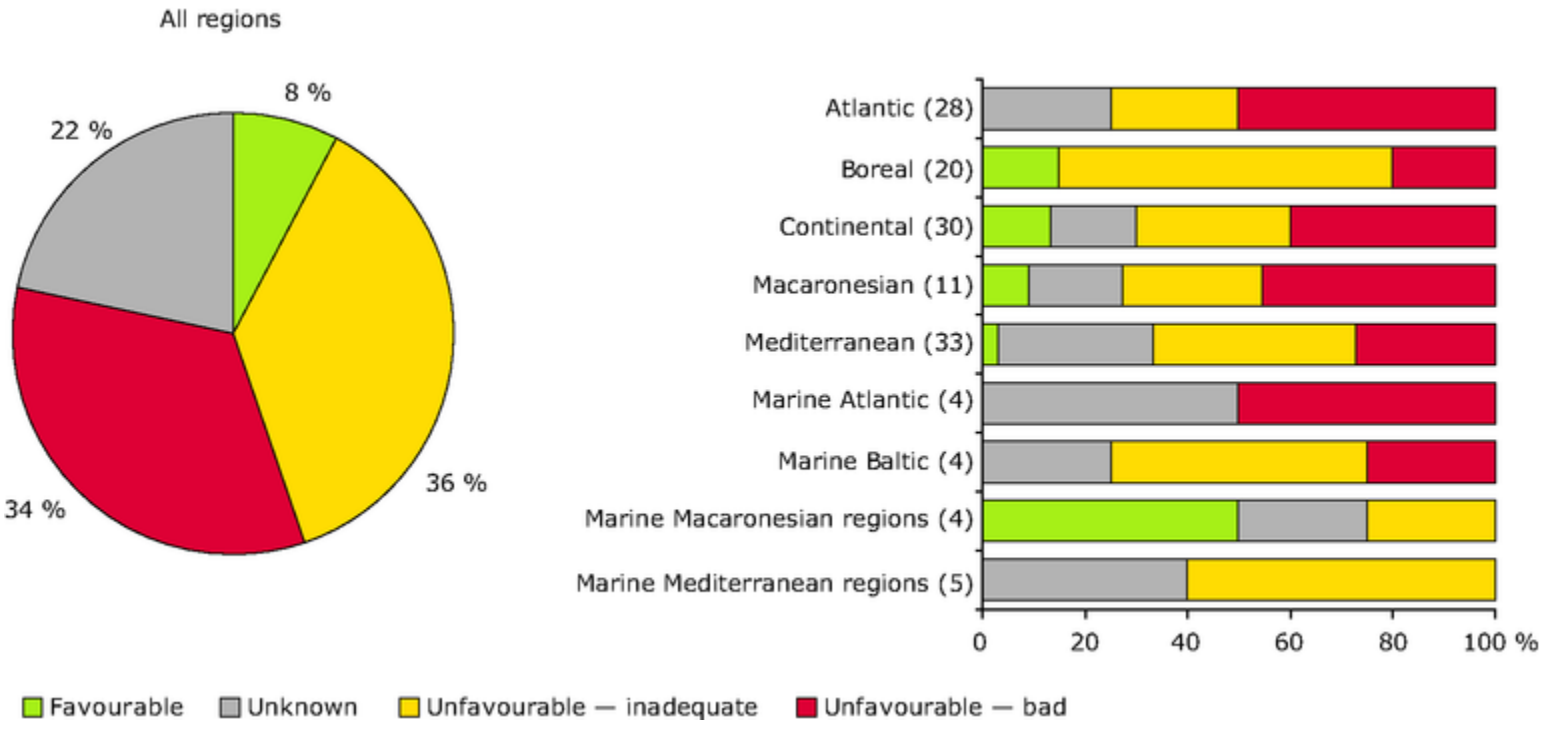


- ✓ Only 23% of animal and plant species and only 16% of habitat types were considered to be in a favourable conservation status

331 Beaches, dunes and sands
421 Salt marshes
422 Salines
423 Intertidal flats
521 Coastal lagoons
522 Estuaries

Coastal zone issues

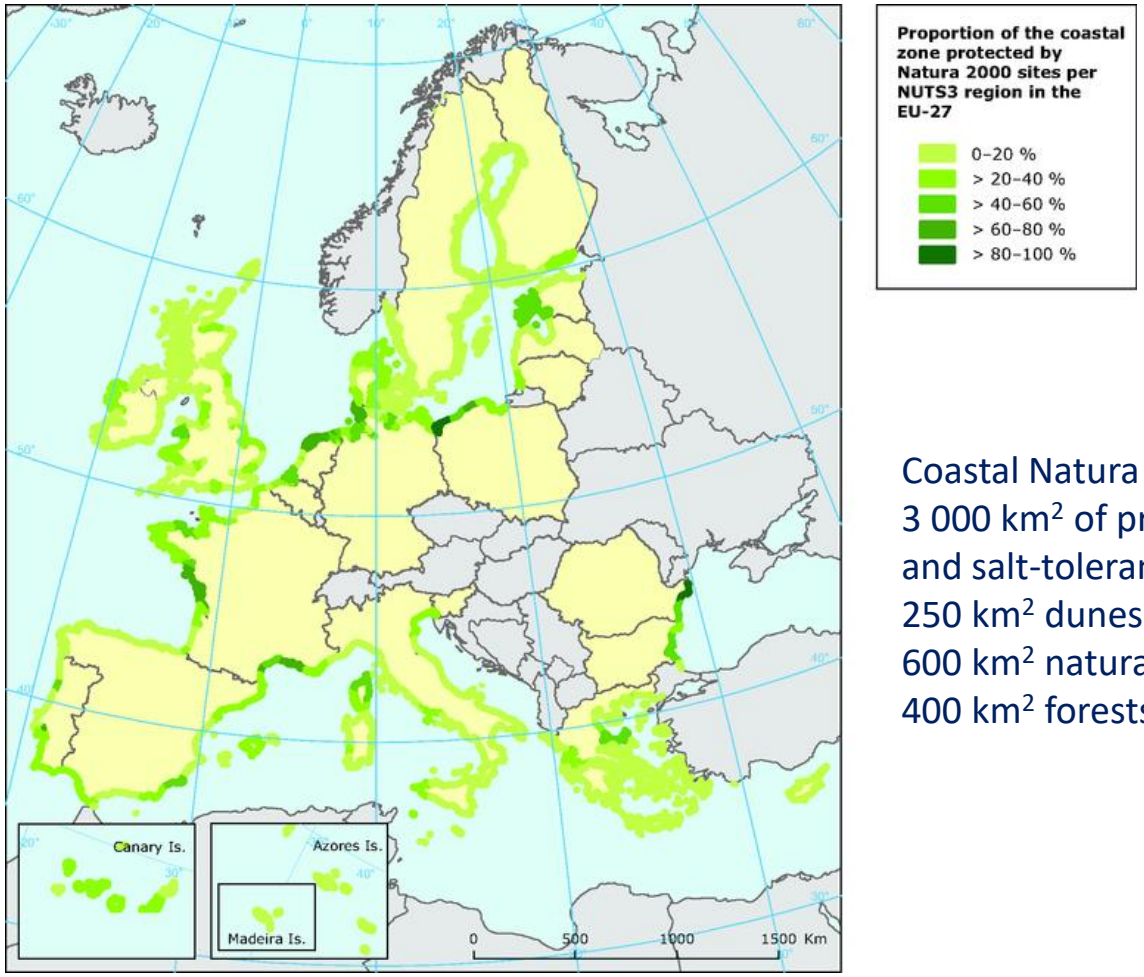
- **Conservation status of coastal habitat types** (EEA, 2010)



- ✓ More than two-thirds of coastal habitat types of Community have an 'unfavourable' status, with no 'favourable‘ assessments in the Atlantic biogeographic region or in the Marine Atlantic, Marine Baltic and Marine Mediterranean regions

Coastal zone issues

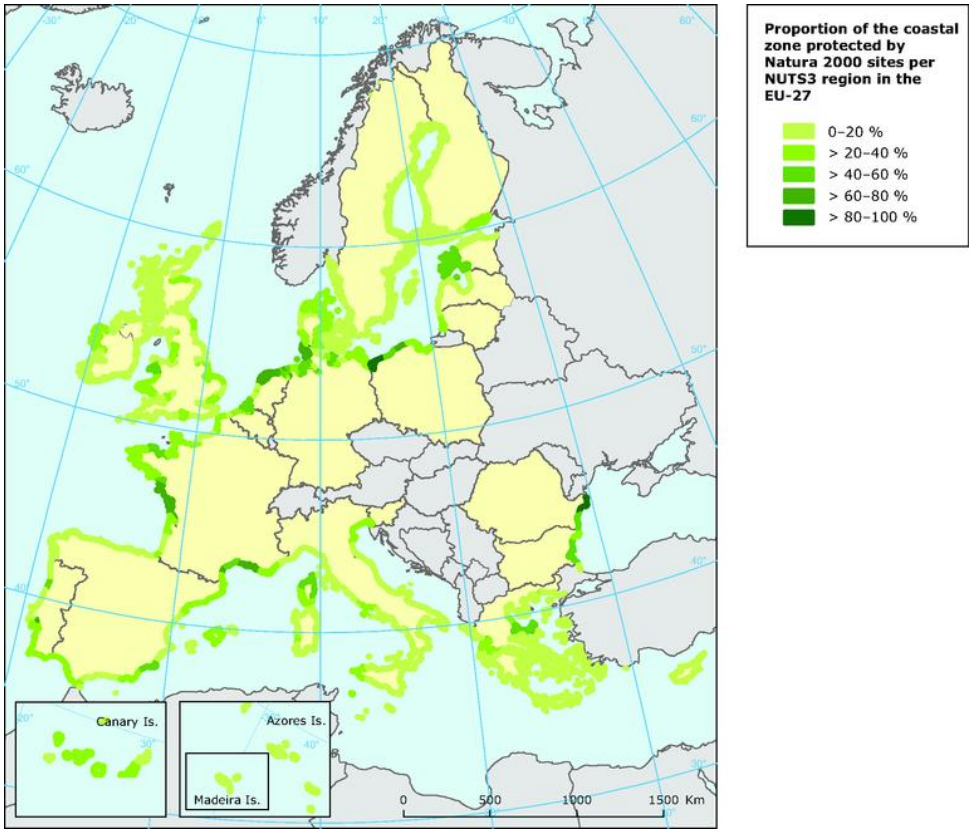
- **Coastal zone protected by Natura 2000 sites %** (EEA, 2010)



Coastal Natura 2000 sites
3 000 km^2 of primarily coastal and salt-tolerant habitat types:
250 km^2 dunes,
600 km^2 natural grasslands
400 km^2 forests

Coastal zone issues

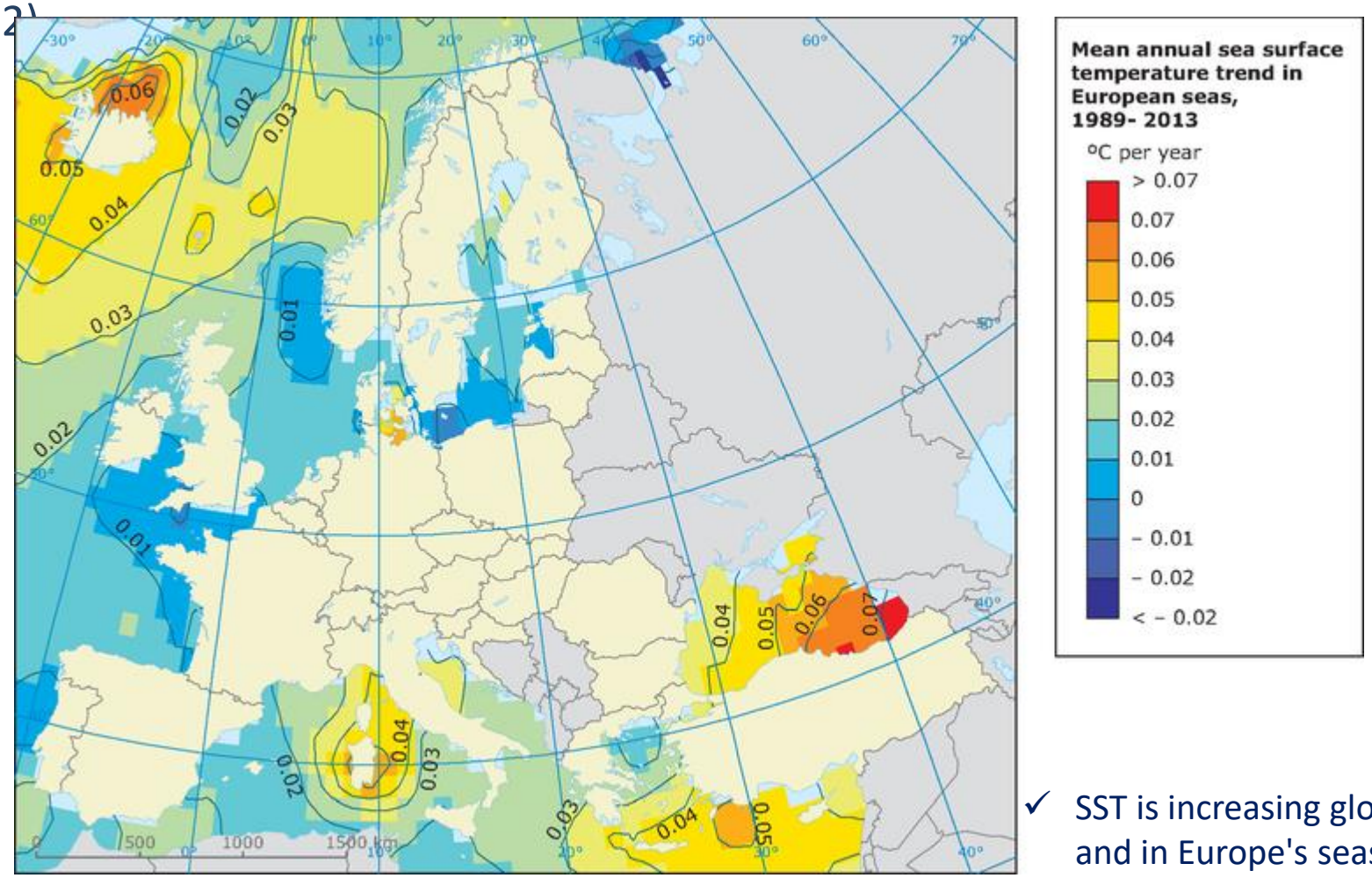
- **Coastal zone protected by Natura 2000 sites %** (EEA, 2010)



- EU Marine Strategy Framework Directive + EU Water Framework Directive -> supporting status of ecosystems improving

Coastal zone issues: adaptation to climate change

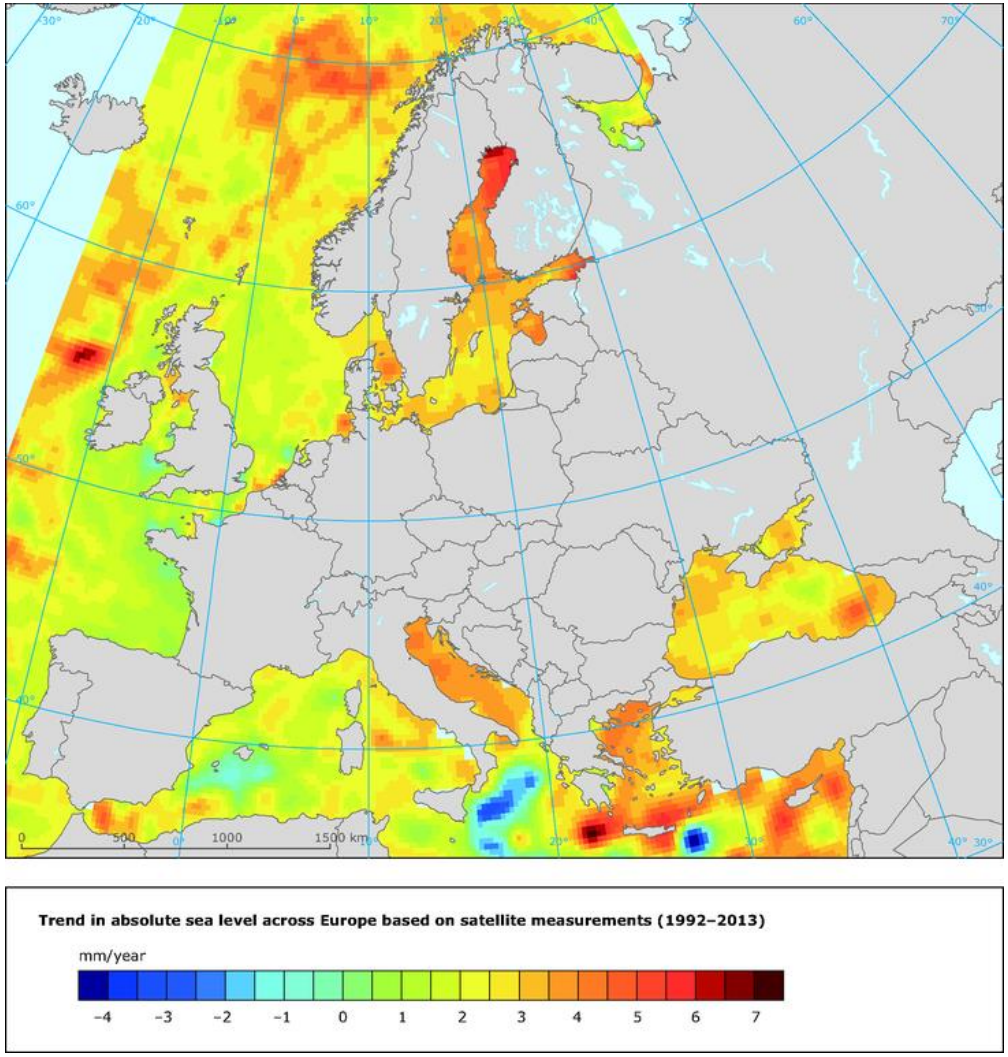
- **Mean annual sea surface temperature (SST) trend in European seas** (EEA, 2012)



- ✓ SST is increasing globally and in Europe's seas but the rate of warming varies across European seas

Coastal zone issues: adaptation to climate change

- **Trend in absolute sea level in European Seas based on satellite measurements (1992–2013)** (EEA, 2013)



- ✓ Sea level increases in North Sea - 2 mm/year, Baltic Sea - 2 - 5 mm/year, Mediterranean Sea > 6 mm/year

Coastal zone issues

Human activity

- Urbanisation and transport
- Agriculture
- Tourism, recreation
- Industry (energy production)

Coastal zone degradation problems

- Loss of habitats and species diversity
- Coastal erosion
- Water pollution
- Public health
- Eutrophication
- Overfishing
- Litter and oil on beach
- Alien species

Socio-economical problems

- Unemployment and social instability
- Competition between users for resources
- Destruction of cultural heritage and dilution of the social fabric
- Loss of property and development options
- Lost opportunities for durable employment
- Marginalization and emigration

Coastal zone issues

- **Europe's seas facing sustainability challenges** (EEA, 2015)

  - Healthy sea
  - Climate change
  - Clean and undisturbed seas
  - Human anad marine ecosystems
  - Productive seas
  - Marine knowledge

Integrated coastal zone management historical perspective

- The UN **Earth Summit of Rio de Janeiro in 1992** kick-started the development of focussed EU policy on integrated coastal zone management.
- Agenda 21
  - Call on coastal states to set up integrated coastal zone management strategies.
  - Stresses the need for sustainable and integrated land management.

Integrated coastal zone management

- The European Commission operated the European Demonstration Programme on Integrated Coastal Zone Management (ICZM), with the aim of providing "*technical information about sustainable coastal zone management, and stimulate a broad debate among the various actors involved in the planning, management or use of European coastal zones*".

- In 2000, based on the experiences and outputs of the Demonstration Programme :
  - A Communication from the Commission to the Council and the European Parliament on "Integrated Coastal Zone Management: A Strategy for Europe" (COM/2000/547 of 17 Sept. 2000);
  - A proposal for a European Parliament and Council **Recommendation** concerning the implementation of Integrated Coastal Zone Management in Europe (COM/2000/545 of 8 September 2000).

Integrated coastal zone management

Recommendation concerning the implementation of Integrated Coastal Zone Management was adopted by the European Parliament and Council **on 30 May 2002**:

- Integrated coastal management aims for the **coordinated application of the different policies** affecting the coastal zone and related activities such as nature protection, aquaculture, fisheries, agriculture, industry, off shore wind energy, shipping, tourism, development of infrastructure and mitigation and adaptation to climate change.
- It will contribute to sustainable development of coastal zones by the application of an approach that respects the limits of natural resources and ecosystems, the so-called '**ecosystem based approach**'.
- Integrated coastal management covers the **full cycle of information collection, planning, decision-making, management and monitoring of implementation**. It is important to involve all stakeholders across the different sectors to ensure broad support for the implementation of management strategies.

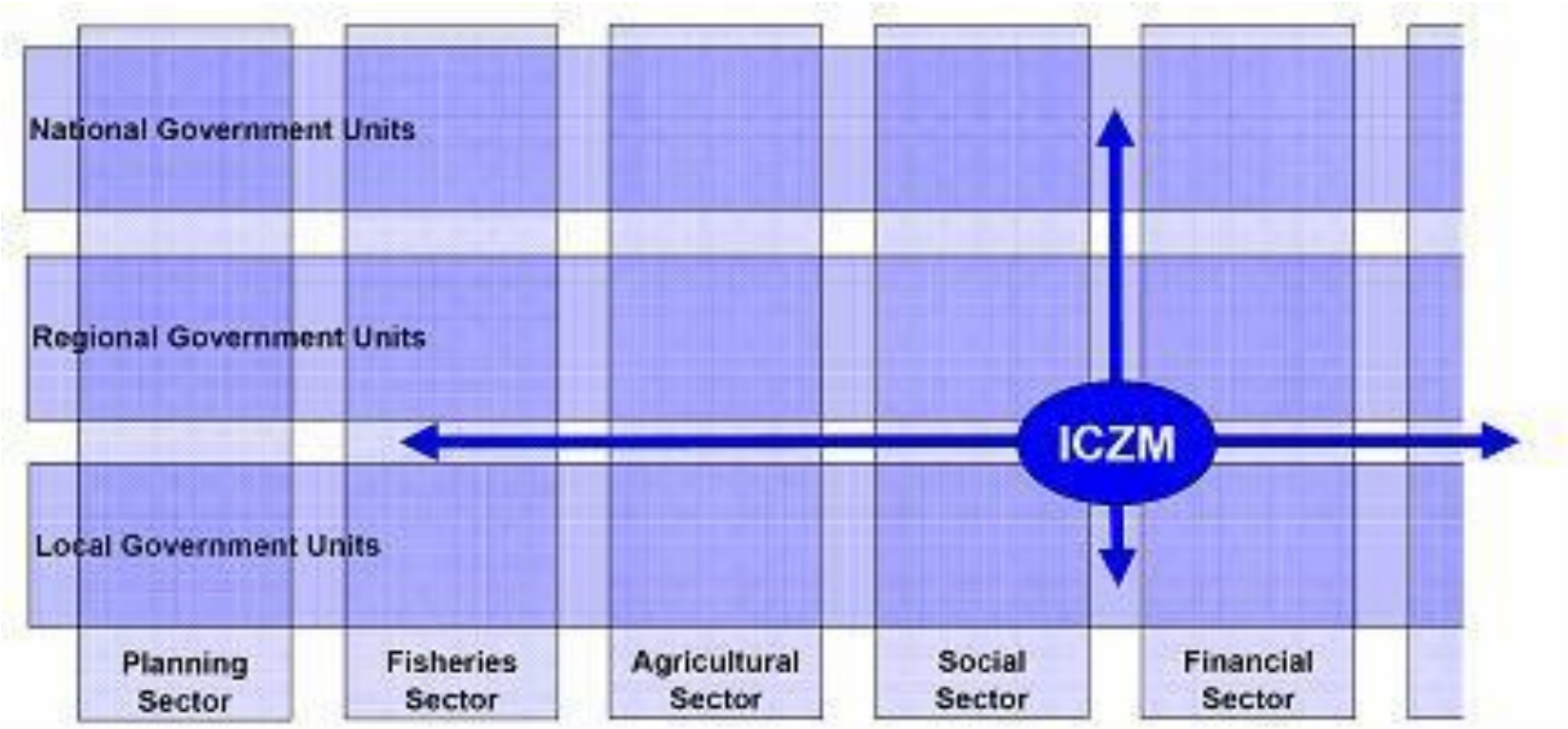
Integrated coastal zone management

Management of European coastal zones principles (2002/413/EC):

- **a broad thematic and geographic perspective**
- a **long-term perspective**
- **adaptive management** during a gradual process
- **reflect local specificity and the great diversity** of European coastal zones
- **work with natural processes**
- involving **all the parties concerned** (economic and social partners, the organisations representing coastal zone residents, non-governmental organisations and the business sector) in the management process, for example by means of agreements and based on shared responsibility;
- **support and involvement of relevant administrative bodies at national, regional and local level**
- **use of a combination of instruments** designed to facilitate coherence between sectoral policy objectives and coherence between planning and management.

Integrated coastal zone managment

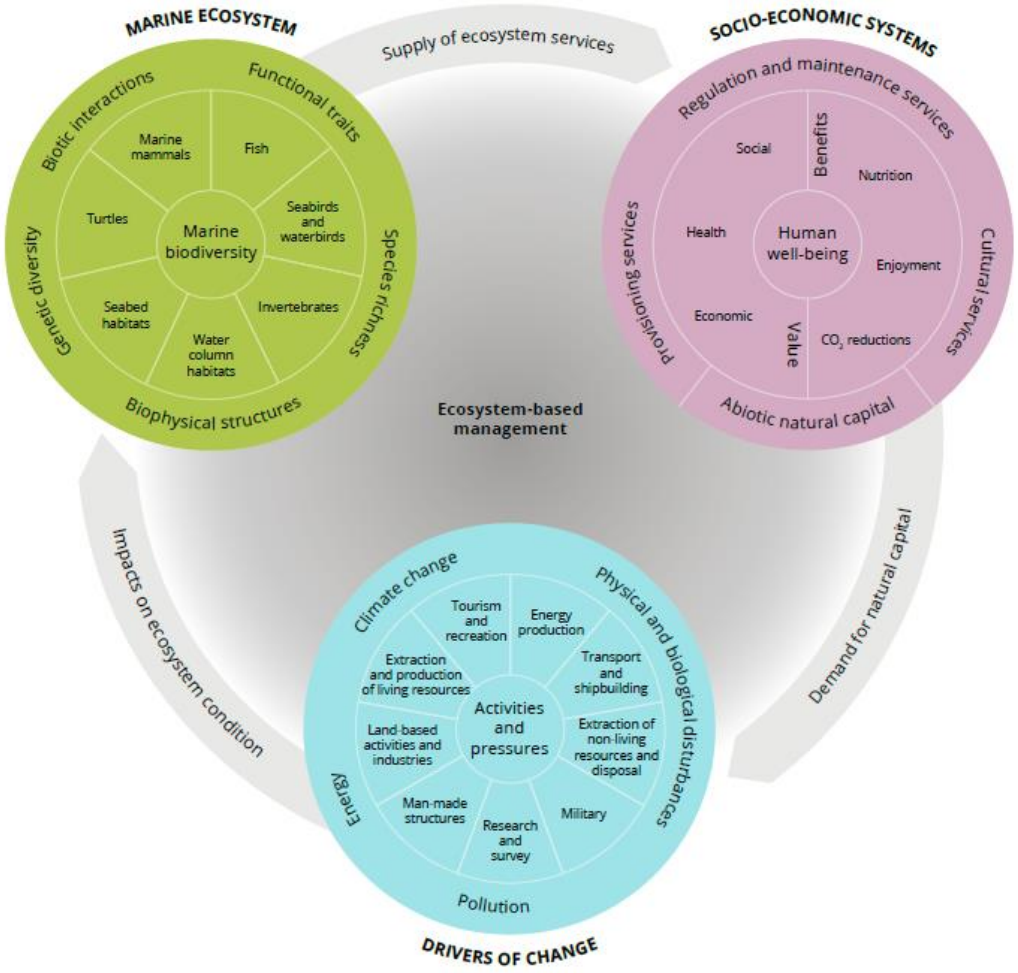
➢ Integration



- ✓ Integration as part of ICZM has two basic dimensions, the cross-sector and the people dimensions.
- ✓ The first dimension means intersectoral technical correlation, coordination and cooperation.
- ✓ The second dimension means effective communication between stakeholders, which includes communication between institutional actors but also information dissemination, sensitisation, awareness participation of non-state actors and the civil society.

Integrated coastal zone managment

- **Ecosystem-based management** (EEA, 2015d)



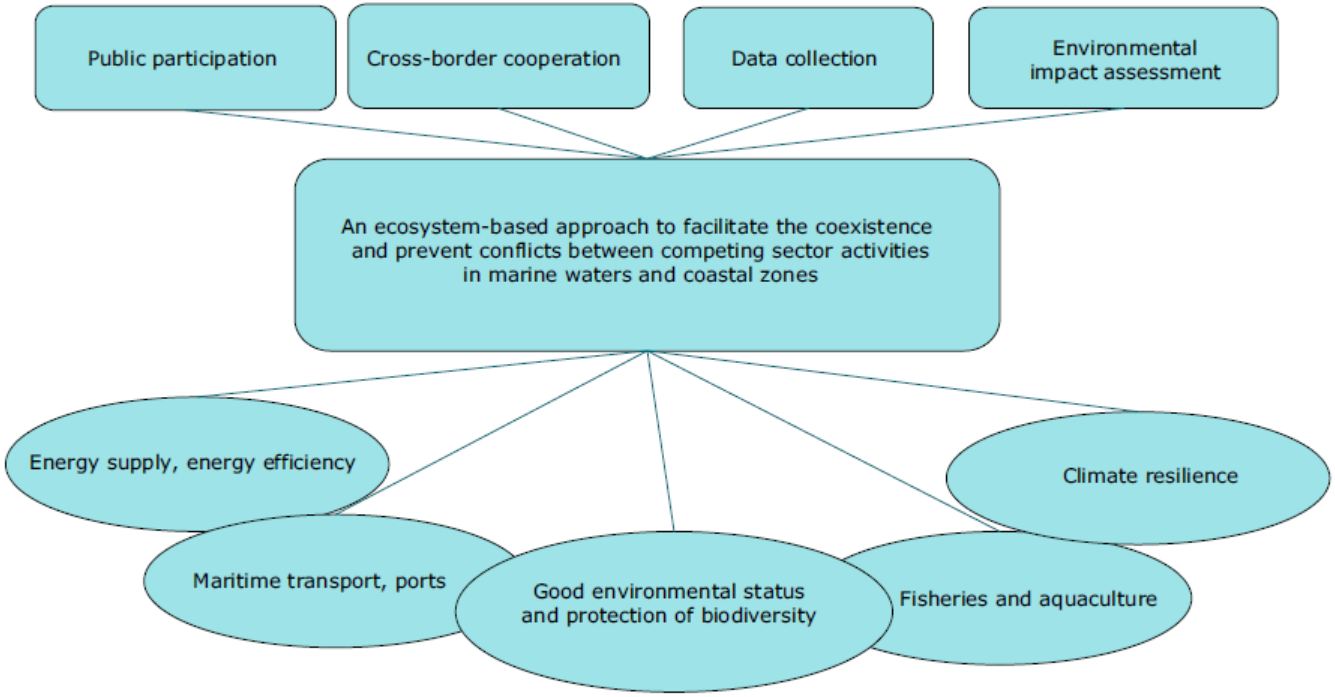
Ecosystem-based management is an integrated approach to management that considers the entire ecosystem including humans.
The goal is to maintain ecosystems in a healthy, clean, productive, and resilient condition, so that they can continue to provide humans with the services and benefits upon which we depend.
It is a 1) spatial approach that builds around
2) acknowledging connections,
3) cumulative impacts and
4) multiple objectives rather than traditional approaches that address single concerns e.g. species, sectors, activities or individual national interests
(EEA, 2015d)

Integrated coastal zone management

- 350 ICZM case studies analysed (2009-2012)
  - Implementation of ICZM was only 50% across the EU
  - Shortcomings:
    - lack of clear administrative responsibility for the implementation of ICZM
    - absence of commonly agreed objectives and timeframes in which these objectives should be achieved.

Integrated coastal zone management

- On **12 March 2013** the Commission adopted a **proposal for a Directive** establishing a framework for maritime spatial planning and integrated coastal management.
- The basic elements of the marine spatial plans and integrated coastal management strategies, according to the proposed framework directive



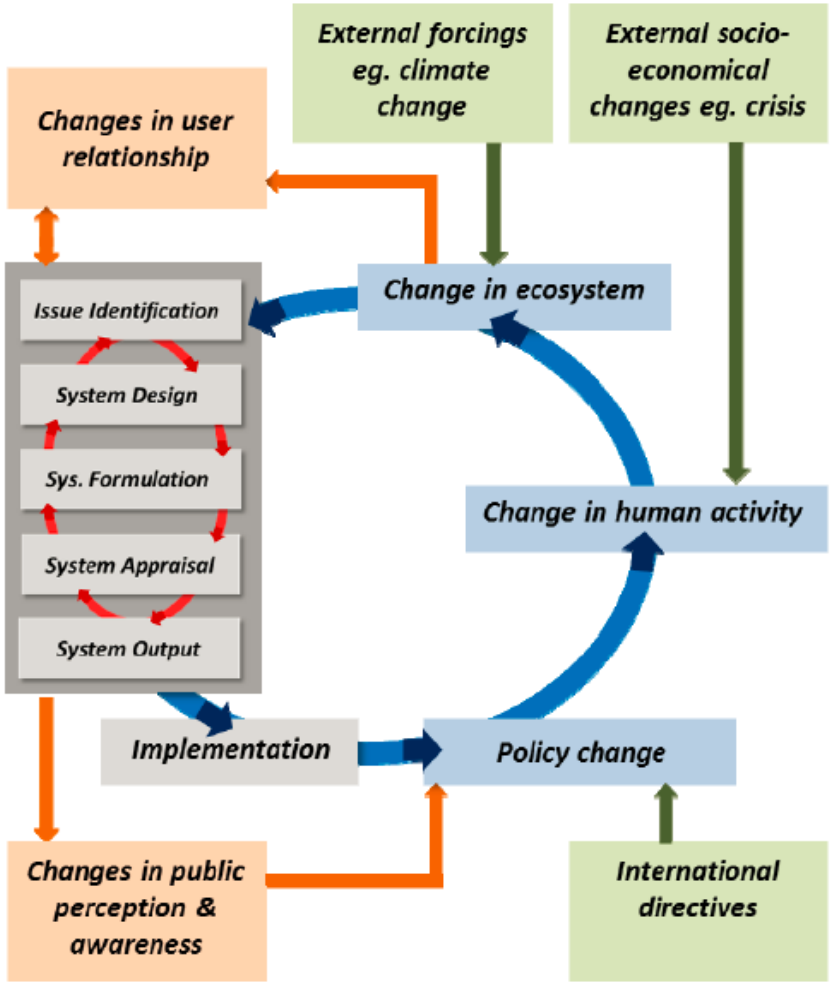
Source: ETC/CCA.

Integrated coastal zone management

Systems Approach Framework (SAF)

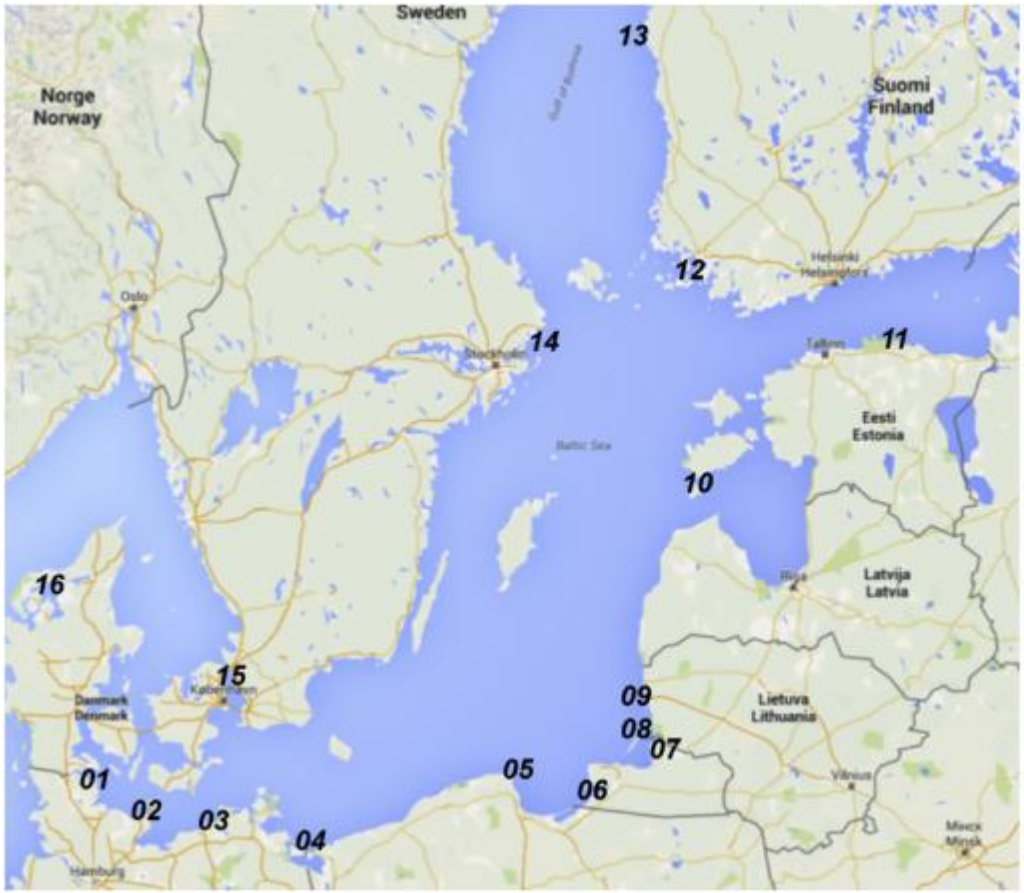
The Systems Approach Framework serves as broader context for the Ecological-Social-Economic-Assessment (ESE).

It takes into account changes, resulting from the assessment process itself or from external drivers, that lead to revision or modification of the ESE.



BONUS BaltCoast

Re-visiting ICM theory and practice: Lessons learned from the Baltic Sea Region



Case study sites

01 - Geltinger Birk (DE)
02 - Timmendorfer Strand (DE)
03 - Markgrafenheide (DE)
04 - Szczecin Lagoon (PL)
05 - Hel Peninsula (PL)
06 - Vistula Lagoon (RU)
07 - Neman catchment (RU)
08 - Rusne (LT)
09 - Palanga (LT)
10 - Nasva (EE)
11 - Kunda (EE)
12 - Southwest Finland (FI)
13 - Bothnian Sea (FI)
14 - North Baltic Water District (SE)
15 - Oresund (DK)
16 - Limfjord (DK)

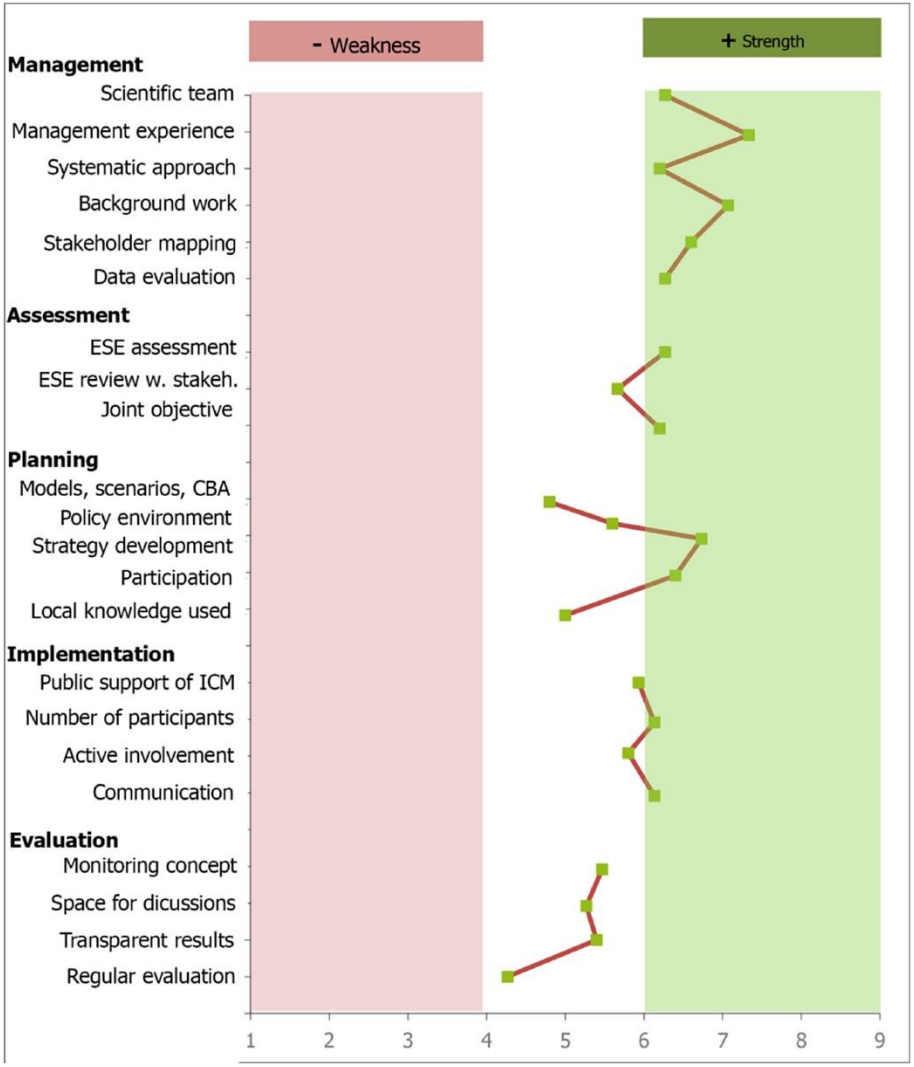
(Støttrup et al., 2017)

Policy Issues and issue driver in ICM

- The main ICM driver was either ecological (44%) or economic (44%).
- The main issues were:
  - the needs for **coastal protection or realignment** due to impacts from climate change or coastal development needs (50 %).
  - **eutrophication** issues or were related to water quality (25%).
  - general proactive ICM planning with no specific Policy Issues.
  - tourism and nature conservation.
  - spatial conflicts in human activities either as primary or secondary concerns.

- Leading of the ICM
  - by national managers and thus top-down (69%), 38% were related to implementation of EU legislation.
  - Of all the case studies 25% were initiated by stakeholders, which ensured their participation in the ICM process.
  - In almost all case studies (88%) a core group (Management Team) was established to deal with the Policy Issue (Støttrup et al., 2017).

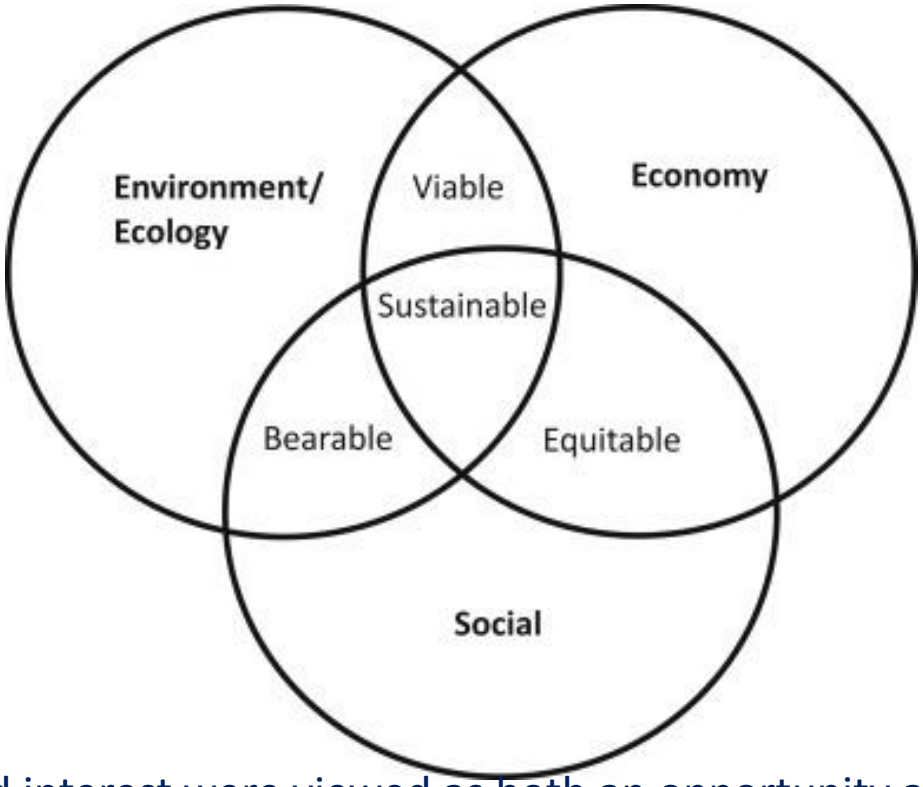
Strengths and weaknesses of 15 ICM case studies



- ✓ While the evaluators valued most of the strength-weaknesses test criteria as strengths, nearly all those criteria that refer to active stakeholder involvement were considered as being imperfect

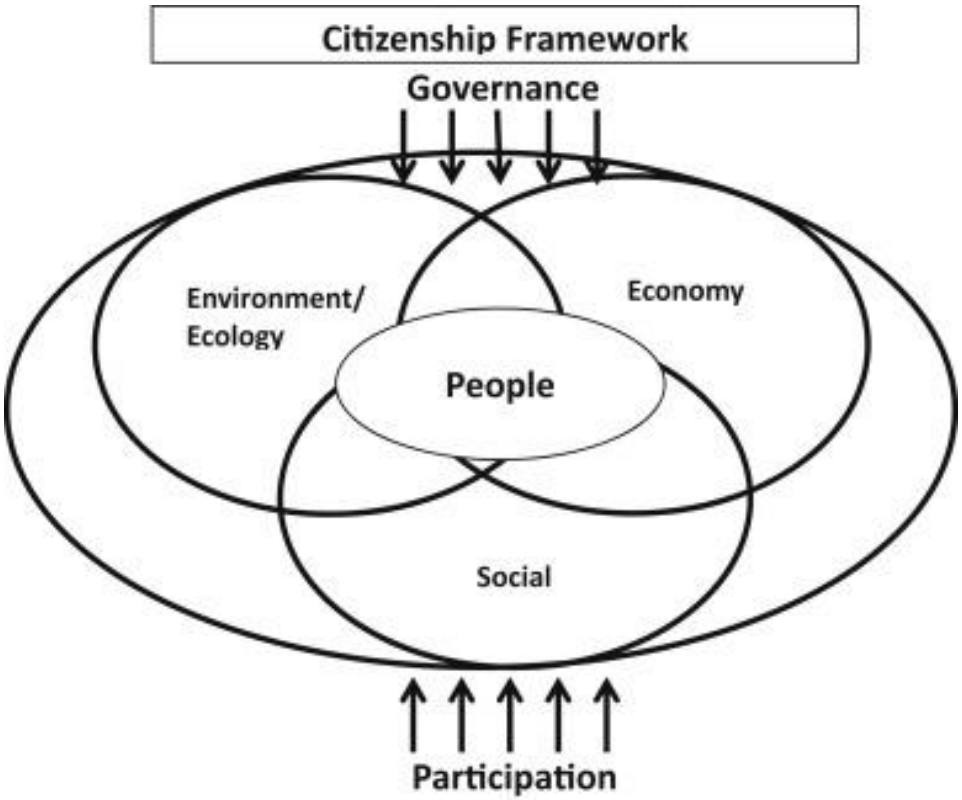
Average values for strengths and weaknesses of 15 ICM case studies (Støttrup et al., 2017).

The three pillars of sustainable development



- ✓ Public opinion and interest were viewed as both an opportunity and a threat to the ICM process in the Baltic cases.
- ✓ There has been a paradigm shift in the hegemony of opinion and decision making to take on more seriously the input of citizens in recognition of the fact that citizens have to live with the decisions and the outcomes.
- ✓ Conceptualised social ecology as a critical theory that integrates environmental, social and economic aspects for sustainable management (Støttrup et al., 2017).

The Citizenship Framework



- ✓ Sustainable management builds on three pillars: environmental, social and economic elements. These elements need to be integrated within a framework of public and stakeholder participation and a robust governance system. This study highlighted the need for national and international frameworks to ensure legal certainty in holistic approaches (Støttrup et al., 2017)

BONUS BaltCoast

A SYSTEM APPROACH FRAMEWORK FOR COASTAL RESEARCH & MANAGEMENT

BONUS-BaltCoast received funding from BONUS (Art 185), funded jointly by the EU and Baltic Sea national funding institutions

BONUS
SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION

Literature

- European Environment Agency (EEA 2013) **Balancing the future of Europe's coasts— knowledge base for integrated management** — 64 pp. — 21 x 29.7 cm ISBN 978-92-9213-414-3 doi:10.2800/99116
- European Environment Agency (EEA 2015a) **The European environment — state and outlook 2015: synthesis report** 2015 — 205 pp. — 14.8 x 21 cm ISBN 978-92-9213-515-7 doi:10.2800/944899
- European Environment Agency 2012 (EEA 2012) **Climate change, impacts and vulnerability in Europe 2012** 2012 — 300 pp. —ISBN 978-92-9213-346-7 doi:10.2800/66071
- European Environment Agency (EEA 2012b) **Europe's environment — The fourth assessment**
- European Environment Agency (EEA 2015b) **Nutrients in transitional, coastal and marine waters**
- European Environment Agency (EEA 2015c) **Status of marine fish stocks**
- European Environment Agency (EEA 2010) **10 messages for 2010 Coastal ecosystems.** ISBN 978-92-9213-145-6 doi:10.2800/55812
- European Environment Agency (EEA 2010b) **EU 2010 Biodiversity baseline** 2010 — 121 pp. — ISBN 978-92-9213-164-7
- doi:10.2800/6160
- European Environment Agency (EEA 2012b) **Protected areas in Europe — an overview** 130 pp. ISBN 978-92-9213-329-0 doi:10.2800/55955
- European Environment Agency (EEA 2015d) **State of Europe Seas.** *EEA* Report No 2/*2015*
- Jan van de Graaff (2008): ***Coastal Zone Management***. Available from http://www.coastalwiki.org/wiki/Coastal_Zone_Management [accessed on 16-08-2016]
- Eurostat 2015. **Europe in figures - Eurostat yearbook Coastal regions - population statistics**
- Eurostat 2013 **Coastal regions: people living along the coastline, integration of NUTS 2010 and latest population grid** *Statistics in focus 30/2013; Author: Isabelle COLLET, Andries ENGELBERT ISSN:2314-9647 Catalogue number:KS-SF-13-030-EN-N*
- Eurostat 2015 **Maritime economy statistics - coastal regions and sectoral perspective**
- Eurostat 2015b **Transport statistics at regional level**
- European Commission 2016 **Environment** http://ec.europa.eu/environment/index_en.htm
- Støttrup, J. G., Dinesen, G. E., Janßen, H., Gillgren, C., & Schernewski, G. (2017). Re-visiting ICM theory and practice: Lessons learned from the Baltic Sea Region. *Ocean & Coastal Management*, *139*, 64-76.