

Integrated Coastal Zone Management-Introduction

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**A SYSTEM APPROACH FRAMEWORK FOR
COASTAL RESEARCH & MANAGEMENT**



Content

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



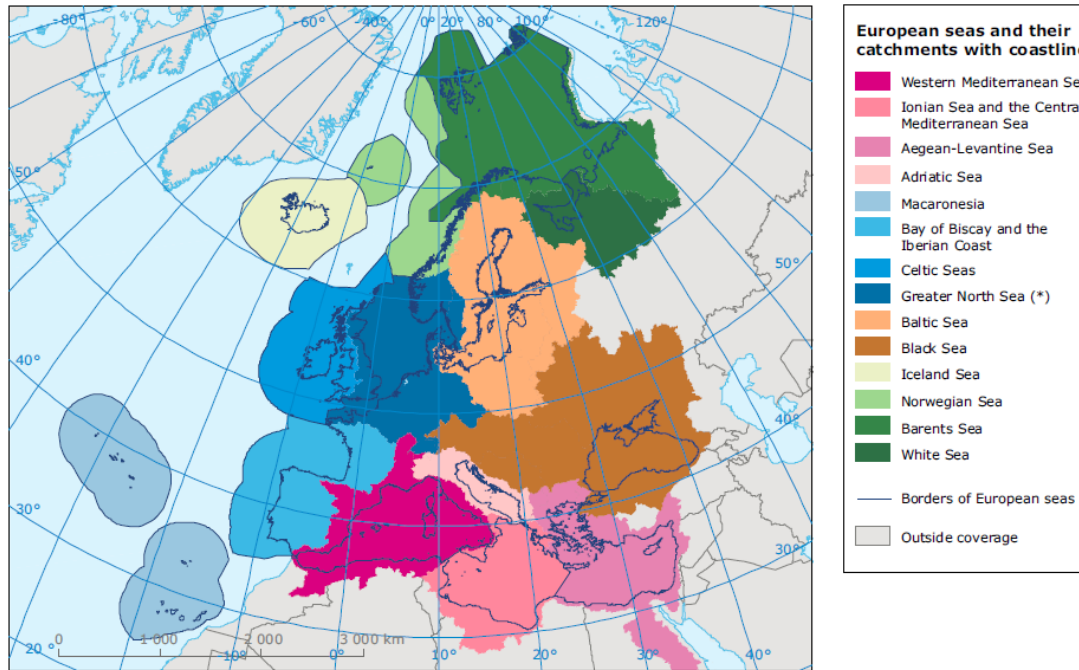
Coastal zone

- 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 km² 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

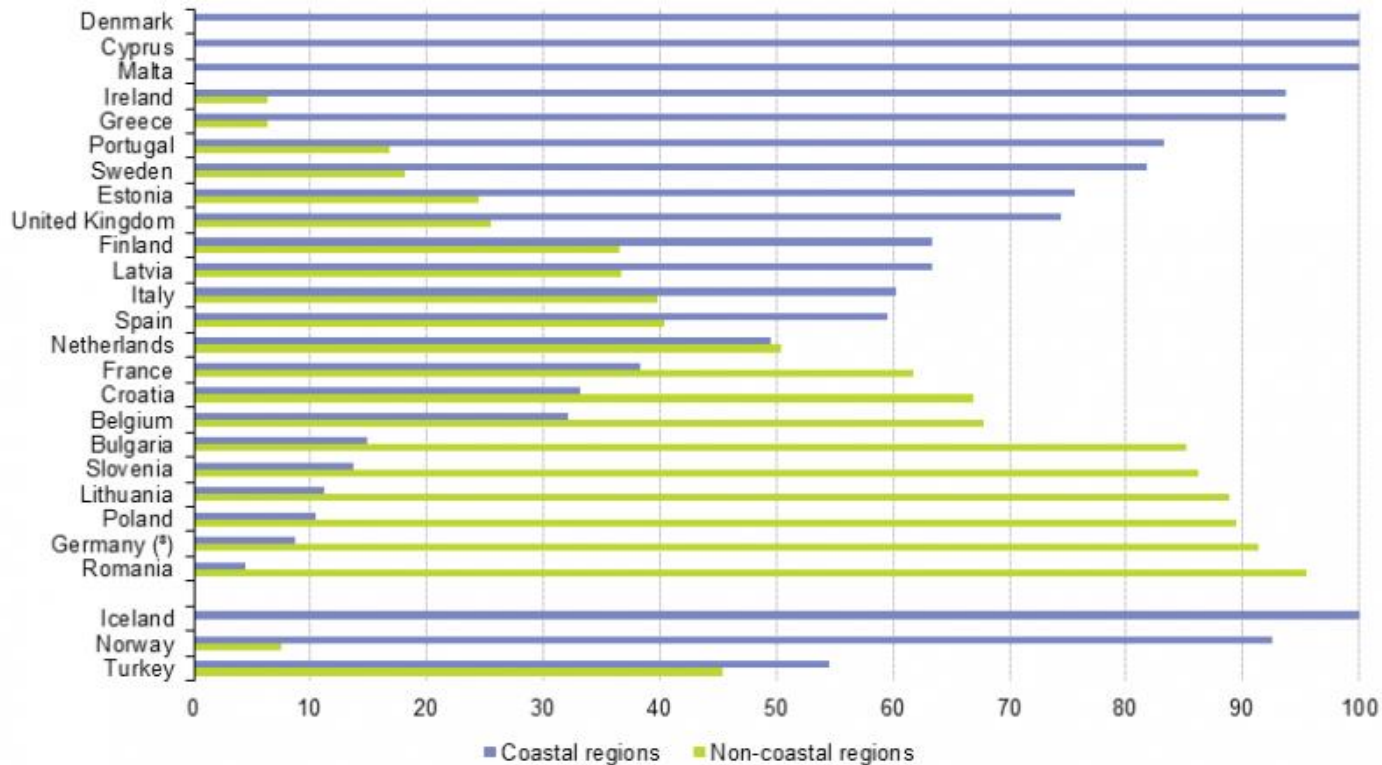
Key messages (EEA, 2010):

- 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 unfavourable 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)



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

(*) The Czech Republic, Luxembourg, Hungary, Austria and Slovakia are landlocked countries and are not presented.

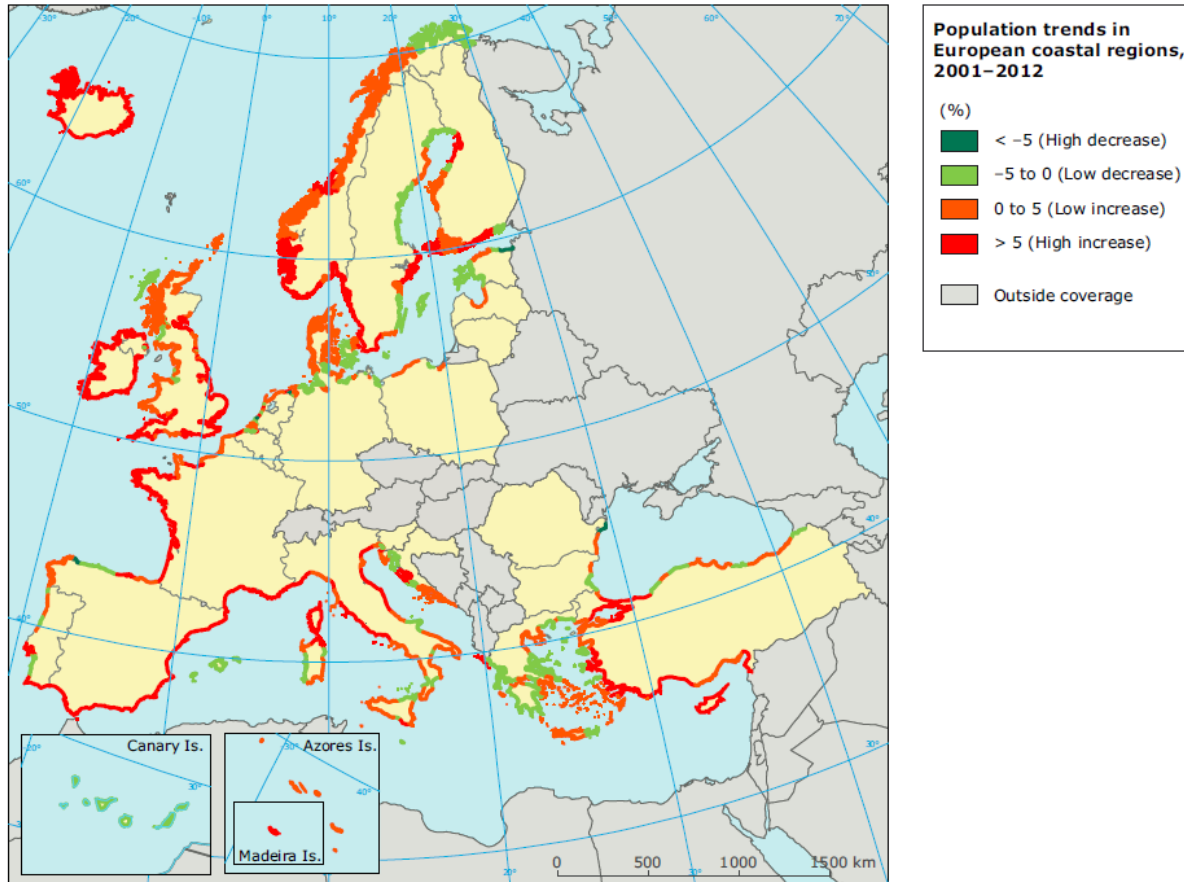
(*) Denmark, Cyprus and Malta are coastal areas in their entirety.

(*) Break in time series.



Coastal zone issues

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



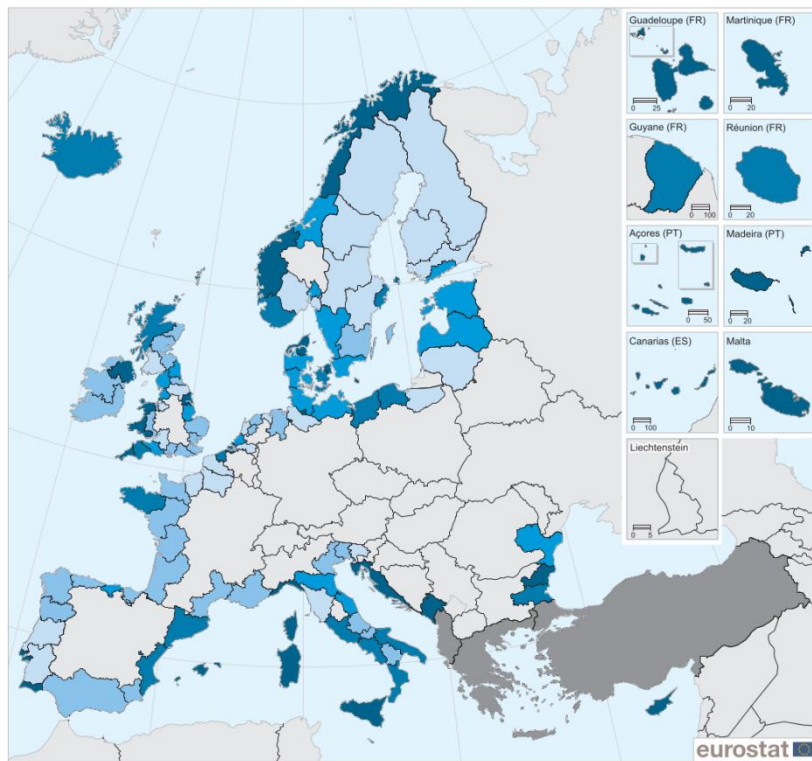
Source: ETC/SIA, population data by coastal region (NUTS 3) from Eurostat.



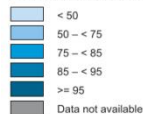
Coastal zone issues

➤ Overnight stay in coastal localities (Eurostat, 2013)

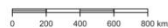
Nights spent in tourist accommodation establishments in coastal localities, by NUTS level 2 region, 2013 (*)
(% of total nights spent by residents and non-residents in the regions' tourist accommodation establishments)



(% of total nights spent by residents and non-residents in the regions' tourist accommodation establishments)



Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat — GISCO, 05/2015



(*) Tourist accommodation establishments: NACE Rev. 2 Groups 55.1 to 55.3. The United Kingdom, Norway and Montenegro: 2012.
Source: Eurostat (online data code: [tour_occ_nin2c](#))



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.



Coastal zone issues

➤ Maritime economic activities (EEA, 2013)

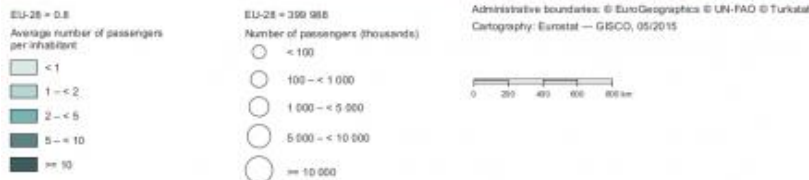
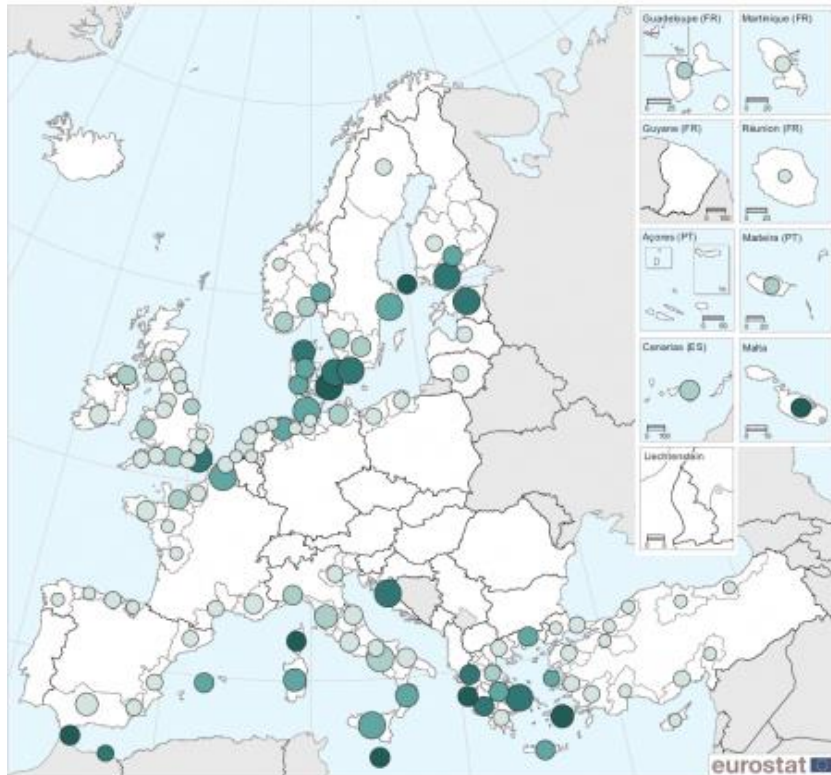
Maritime economic activity	Size today (billion EUR)	Recent trends	Estimated future potential	Comment (b)
Mature stage				
Short-sea shipping	57	5.8 %	2	100 % growth by 2050 (Tetraplan et al., 2009)
Offshore oil and gas	107-133	- 4.8 %	1	Globally only 20 % of exploitable oil and gas have been exploited
Coastal tourism and yachting	144	3-5 %	4	No data
Coastal protection	1-5.4	4.0 %	6	No data
Fisheries	4.8 (c)	- 25 % since 1993 (c)		Only 13 % of European fish stocks are fished at maximum sustainable yield (MSY). Many stocks are not assessed
Landings/production		Annual growth since mid-1990s		
Fishing fleet capacity		- 2 %		
Employment		- 4 to - 5 %		
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



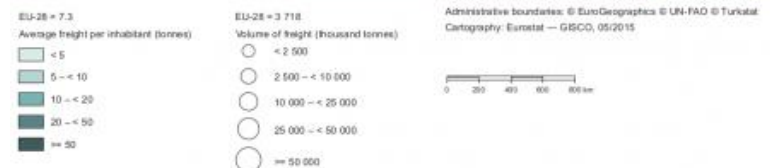
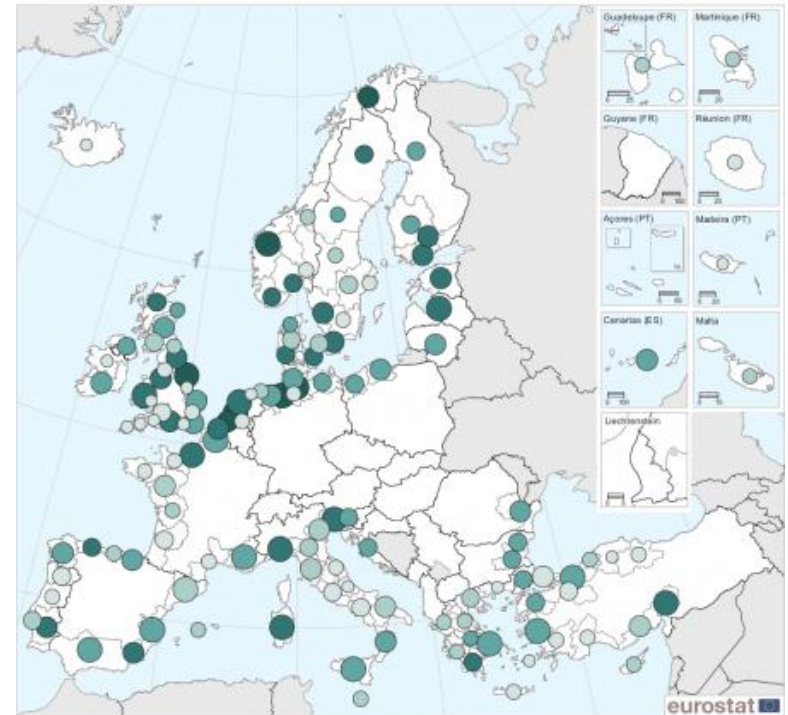
Coastal zone issues

➤ Maritime passengers and freight, 2013 (Eurostat, 2015b)

Number of maritime passengers, by NUTS level 2 coastal regions, 2013 (*)
(passengers per inhabitant and thousand passengers)



Maritime freight, by NUTS level 2 coastal regions, 2013 (*)
(tonnes per inhabitant and thousand tonnes)

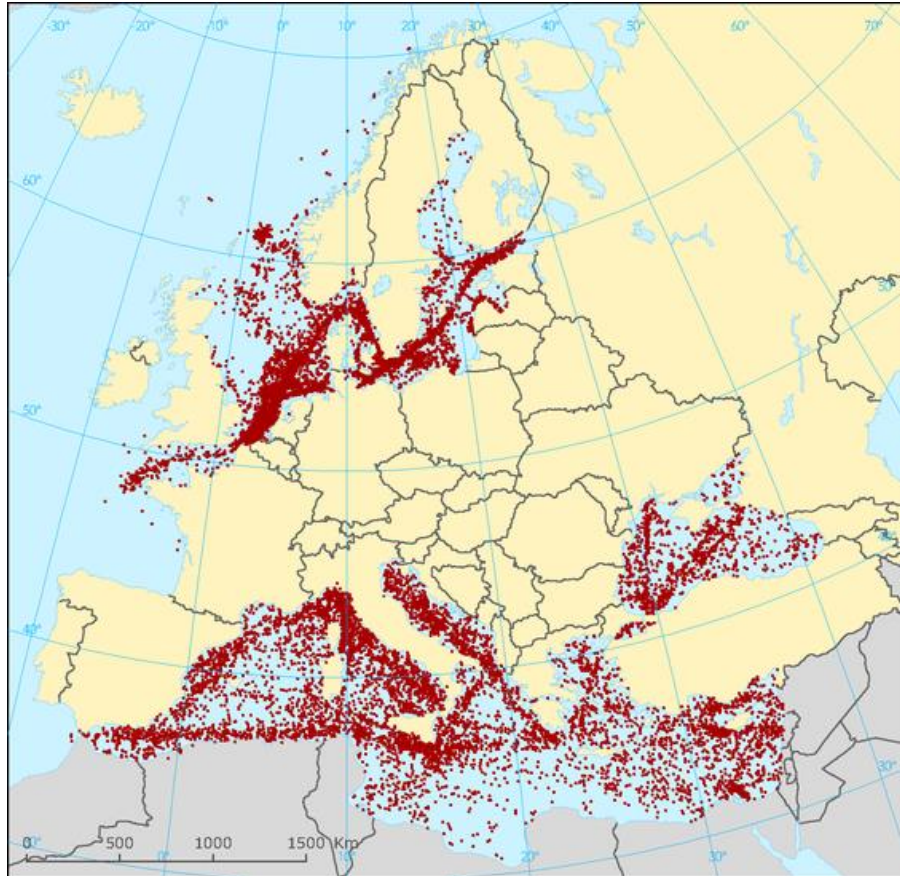


(*) Greece: tonnes per inhabitant estimated using population as of 1 January 2013.
Source: Eurostat (online data codes: tran_r_magn_rm, mar_po_as and demo_r_gsnaggr3)



Coastal zone issues

➤ Oil discharges in European seas (EEA, 2007)



Operational oil discharges detected in European seas, 2000–2004

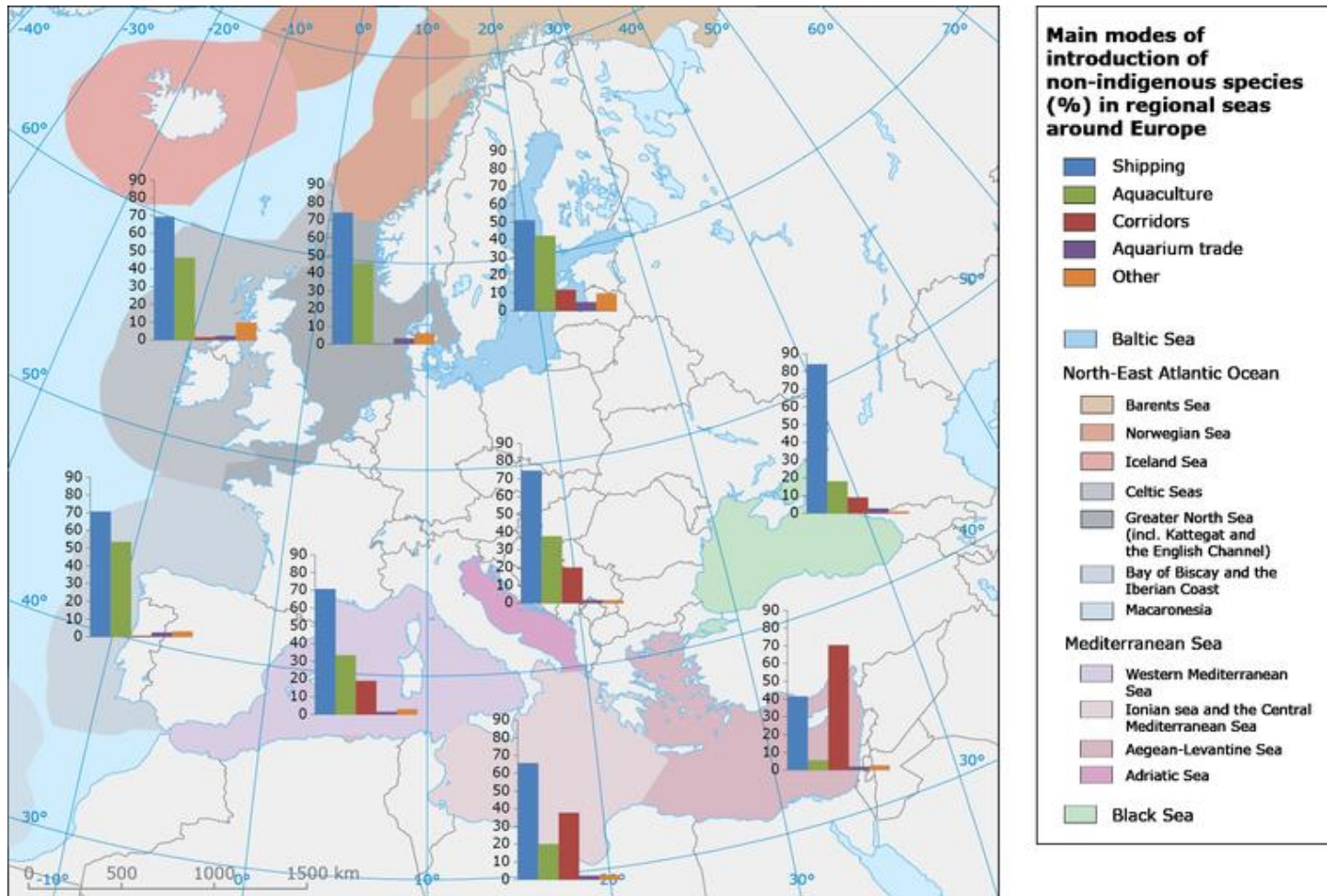
- Oil discharges

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.



Coastal zone issues

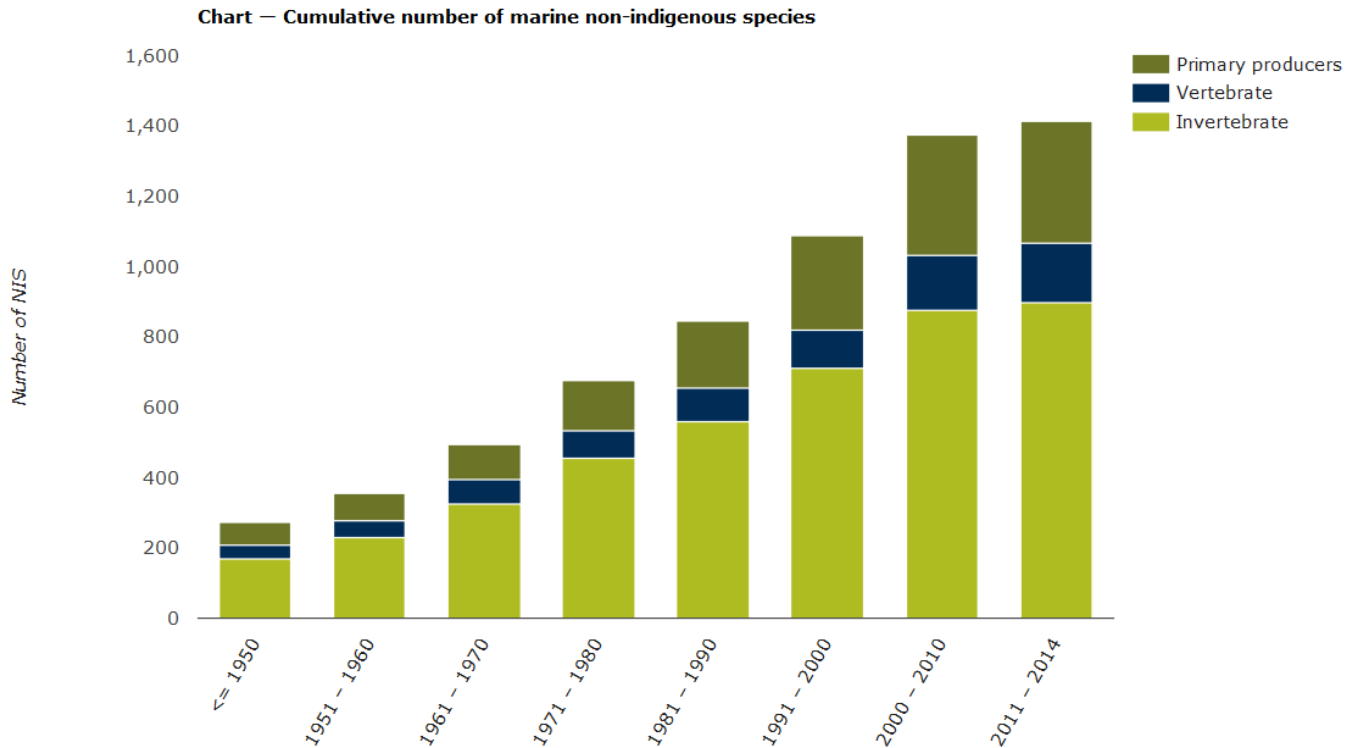
- Main pathways of introduction of marine non-indigenous species in 2014 (EEA, 2015i)





Coastal zone issues

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

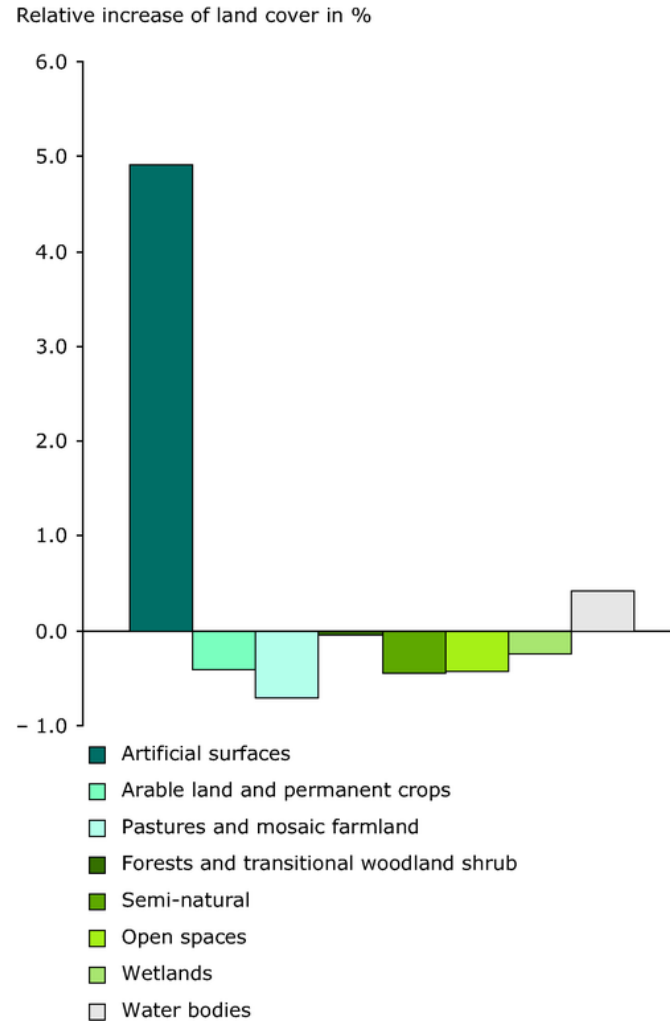


Note: This figure shows the cumulative number of marine Non-Indigenous Species (NIS). Analysis is made at Pan-European level and shown per decade. The most recent period only covers 2011 to 2014.



Coastal zone issues

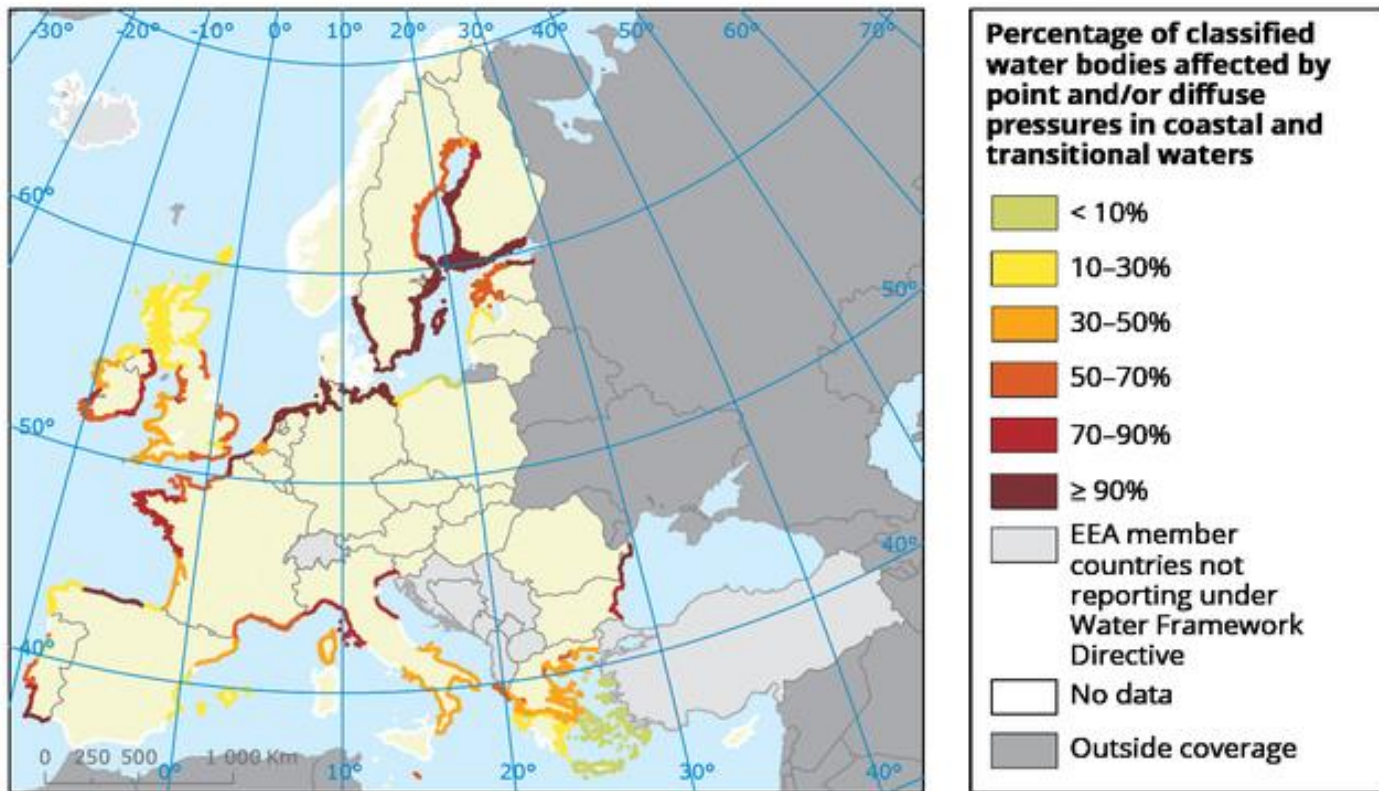
➤ Relative change in land cover 2000–2006 (EEA, 2010)





Coastal zone issues

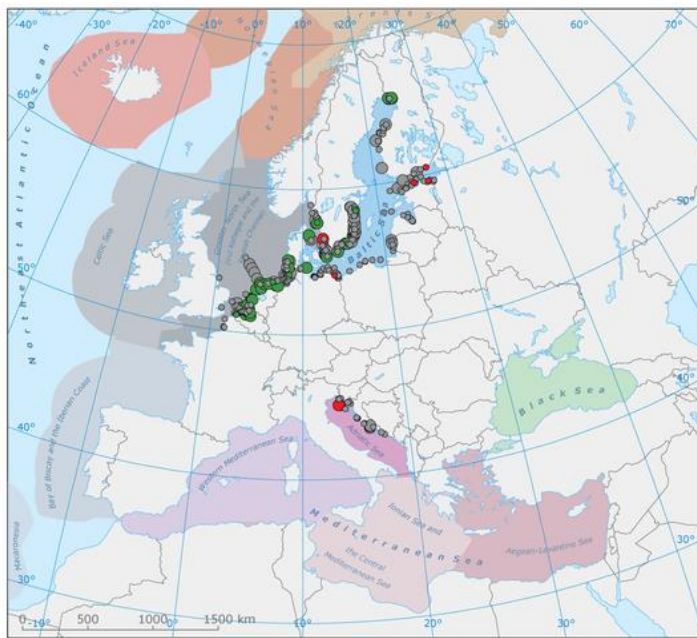
➤ Point or diffuse pollution (EEA, 2015)





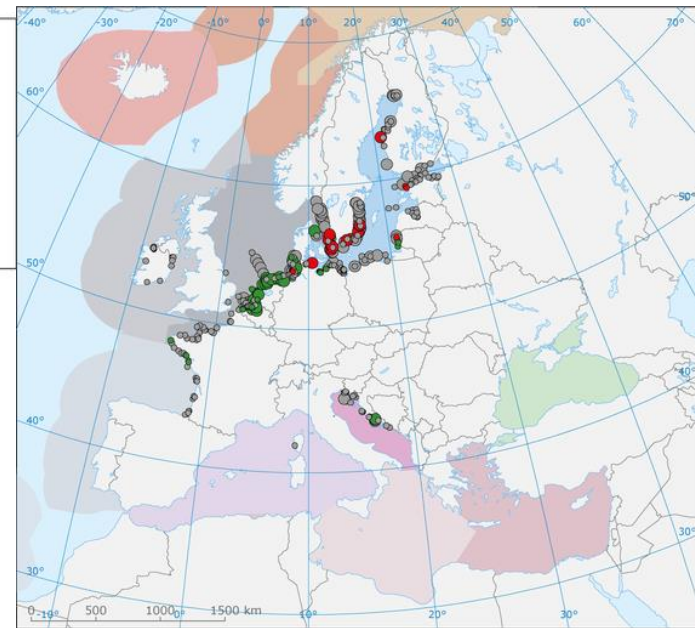
Coastal zone issues

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



Observed trends in winter DIN ($\text{NH}_4+\text{NO}_3+\text{NO}_2$) concentrations in European Seas, 1985-2012

- Decrease
- Increase
- No trend
- Time series ≤ 10 years
- Time series > 10 years



Observed trend in winter orthophosphate (PO_4) concentrations in European Seas, 1985-2012

- Decrease
- Increase
- No trend
- Time series ≤ 10 years
- Time series > 10 years

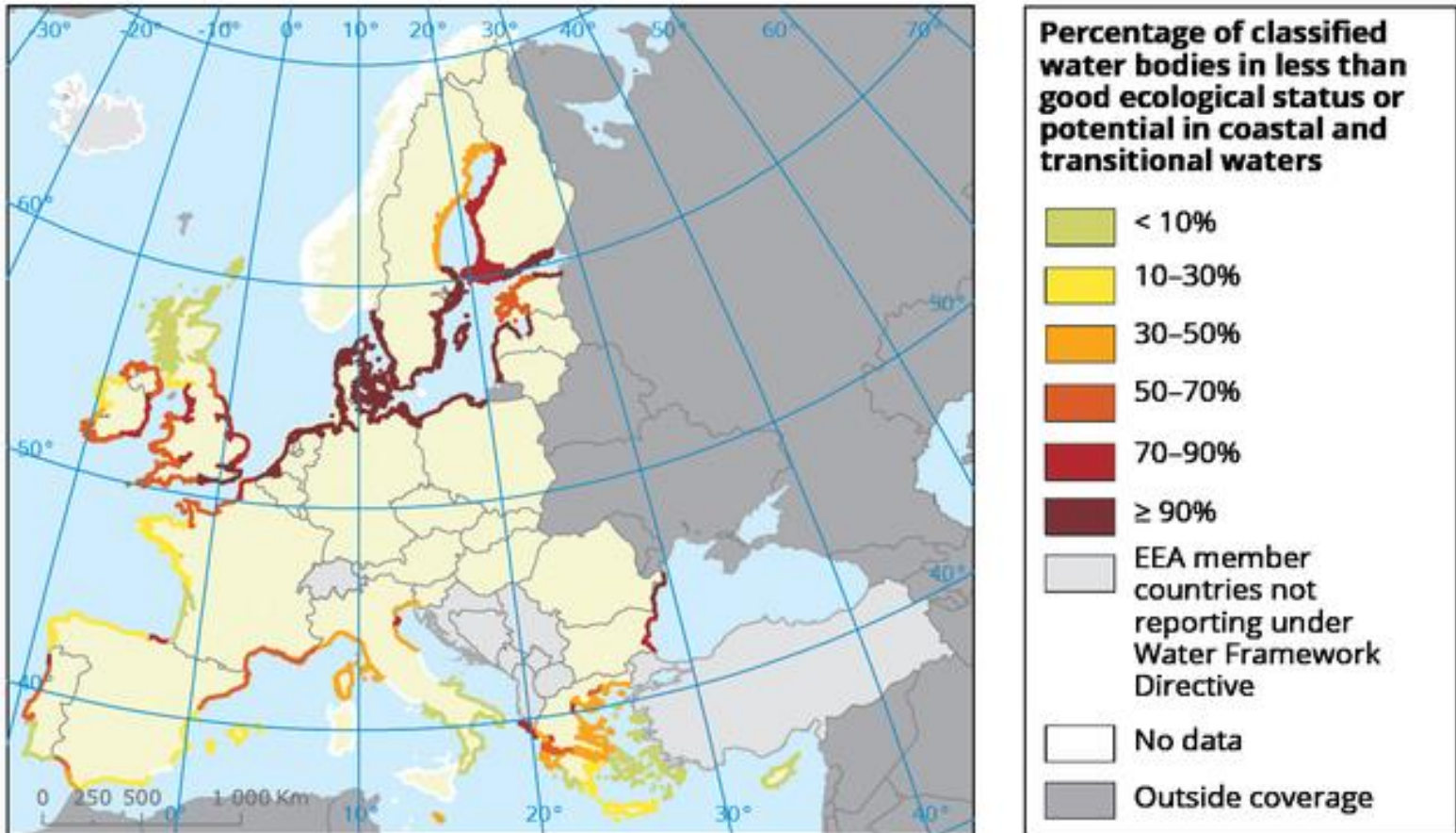
Legend for European Seas:

- North-East Atlantic Ocean
 - Baltic Sea
 - Barents Sea
 - Norwegian Sea
 - Iceland Sea
 - Celtic Seas
 - Greater North Sea (incl. Kattegat and the English Channel)
 - Bay of Biscay and the Iberian Coast
 - Macaronesia
- Mediterranean Sea
 - Western Mediterranean Sea
 - Ionian sea and the Central Mediterranean Sea
 - Aegean-Levantine Sea
 - Adriatic Sea
 - Black Sea



Coastal zone issues

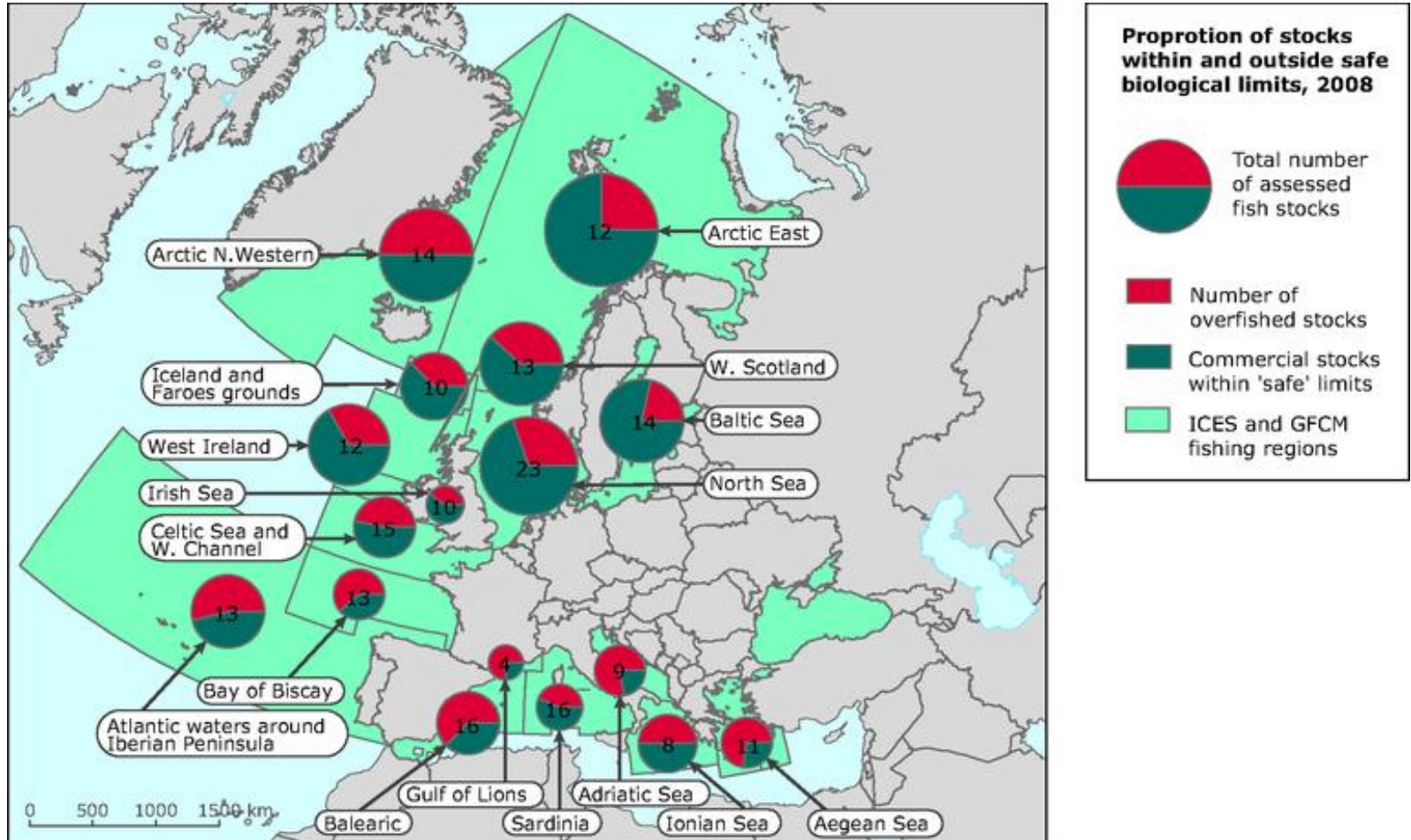
- Good ecological status or potential of classified coastal and transitional waters (bottom) in Water Framework Directive river basin districts (EEA, 2015)





Coastal zone issues

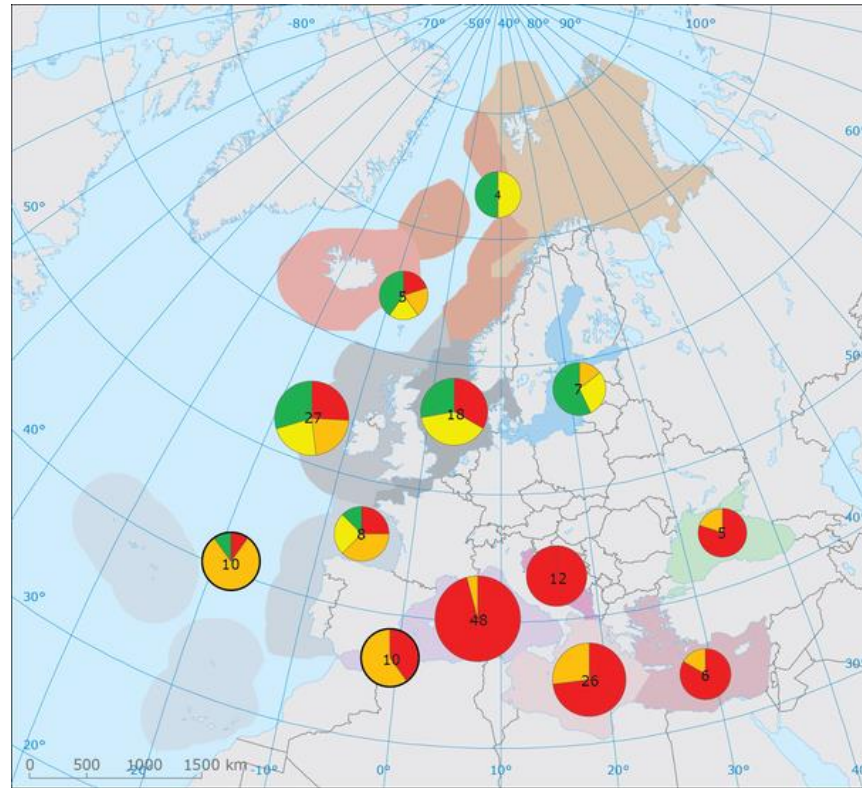
- Proportion of fish stocks within and outside safe biological limits (EEA, 2010b)





Coastal zone issues

➤ Status of fish stocks in relation to Good Environmental Status (EEA, 2015i)



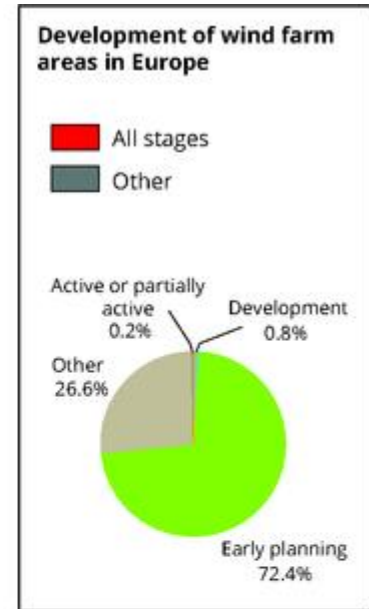
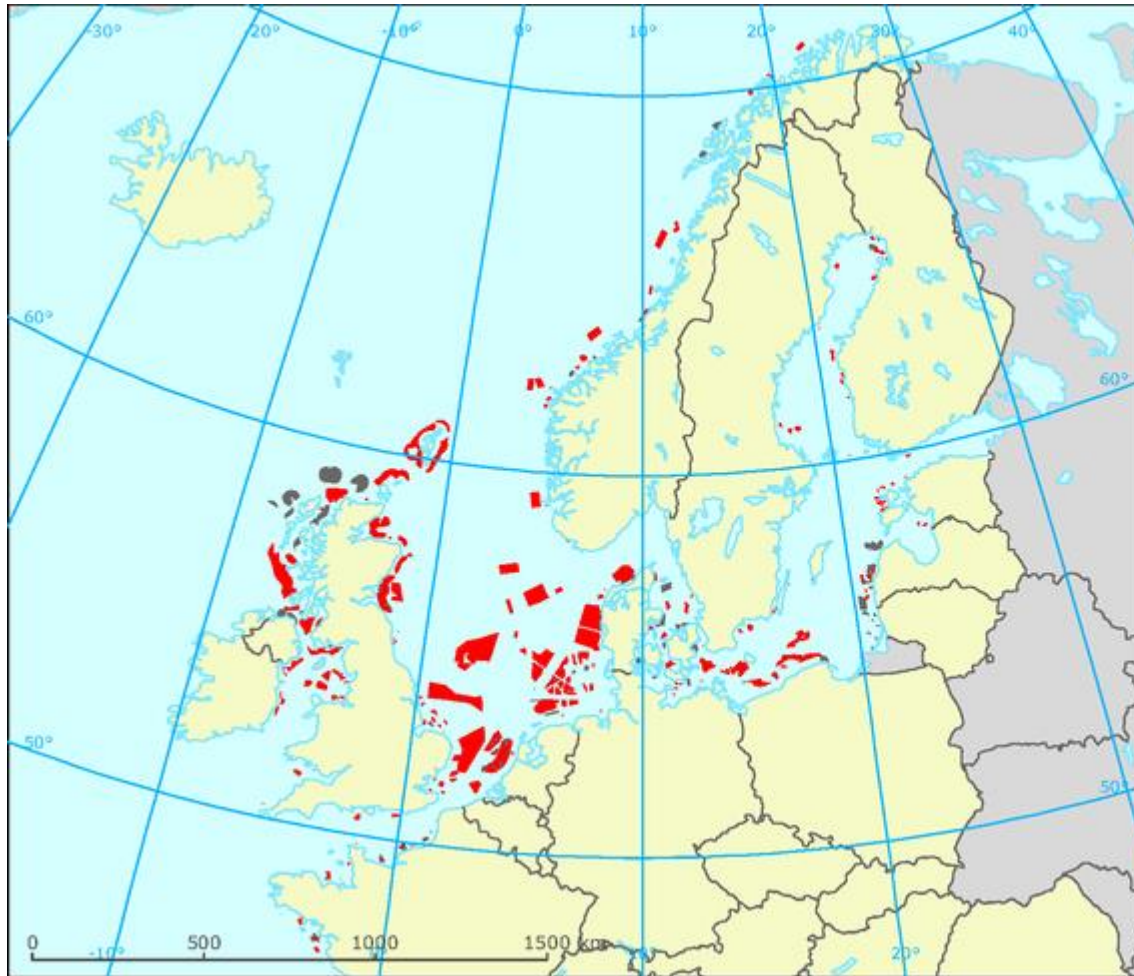
Status of assessed fish stocks from regional seas around Europe, with respect to Good Environmental Status (GES). Status refers to fishing mortality (F) and reproductive capacity (SSB) criteria, as defined by the Marine Strategy Framework Directive





Coastal zone issues

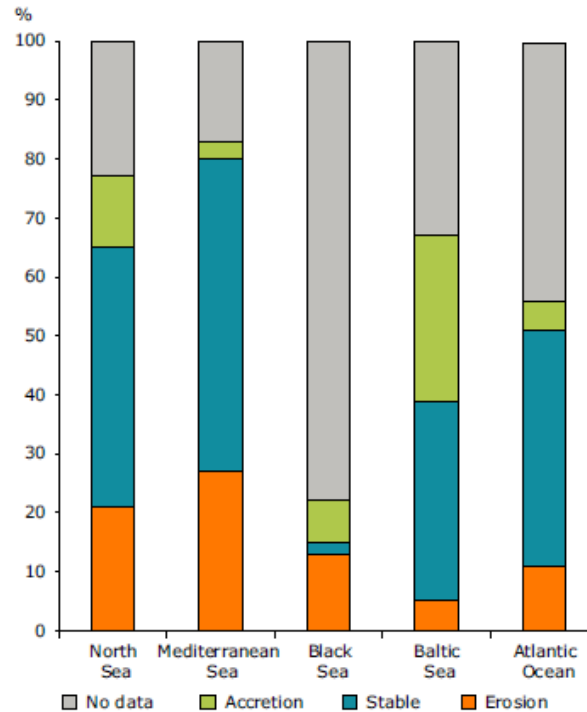
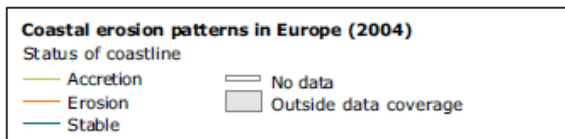
➤ Development of wind farm areas in Europe (EEA, 2015d)





Coastal zone issues

➤ Coastline dynamics in Europe (EEA, 2012)



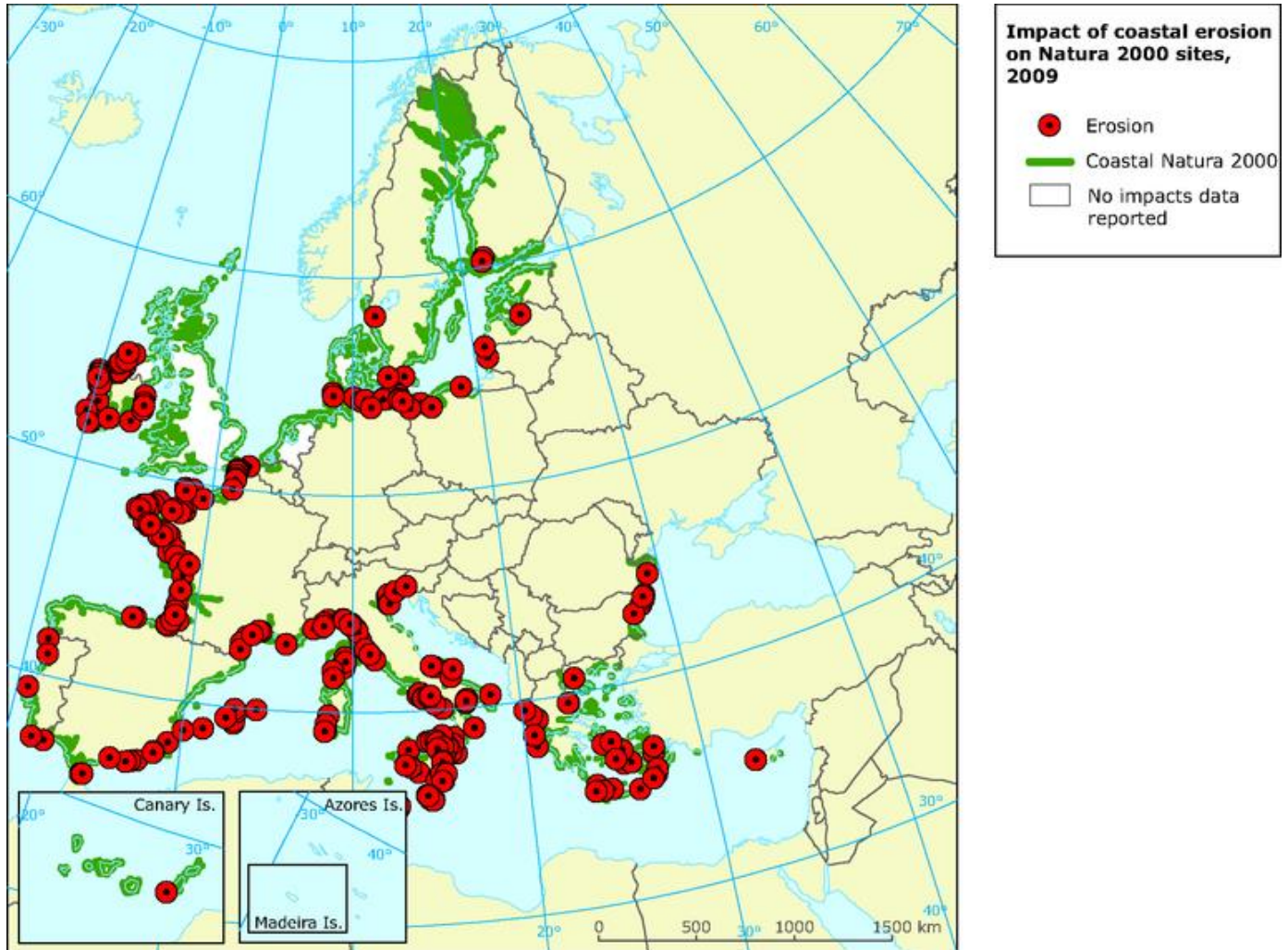
- Coastal erosion in Europe causes significant economic loss, ecological damage and societal problems.
- About one quarter of the European coastline for which data is available is currently eroding.
- Future climate change, in particular rising sea levels, is expected to accelerate coastal erosion.

Source: Deduce project (*) (<http://www.deduce.eu/IFS/IFS26.pdf>).



Coastal zone issues

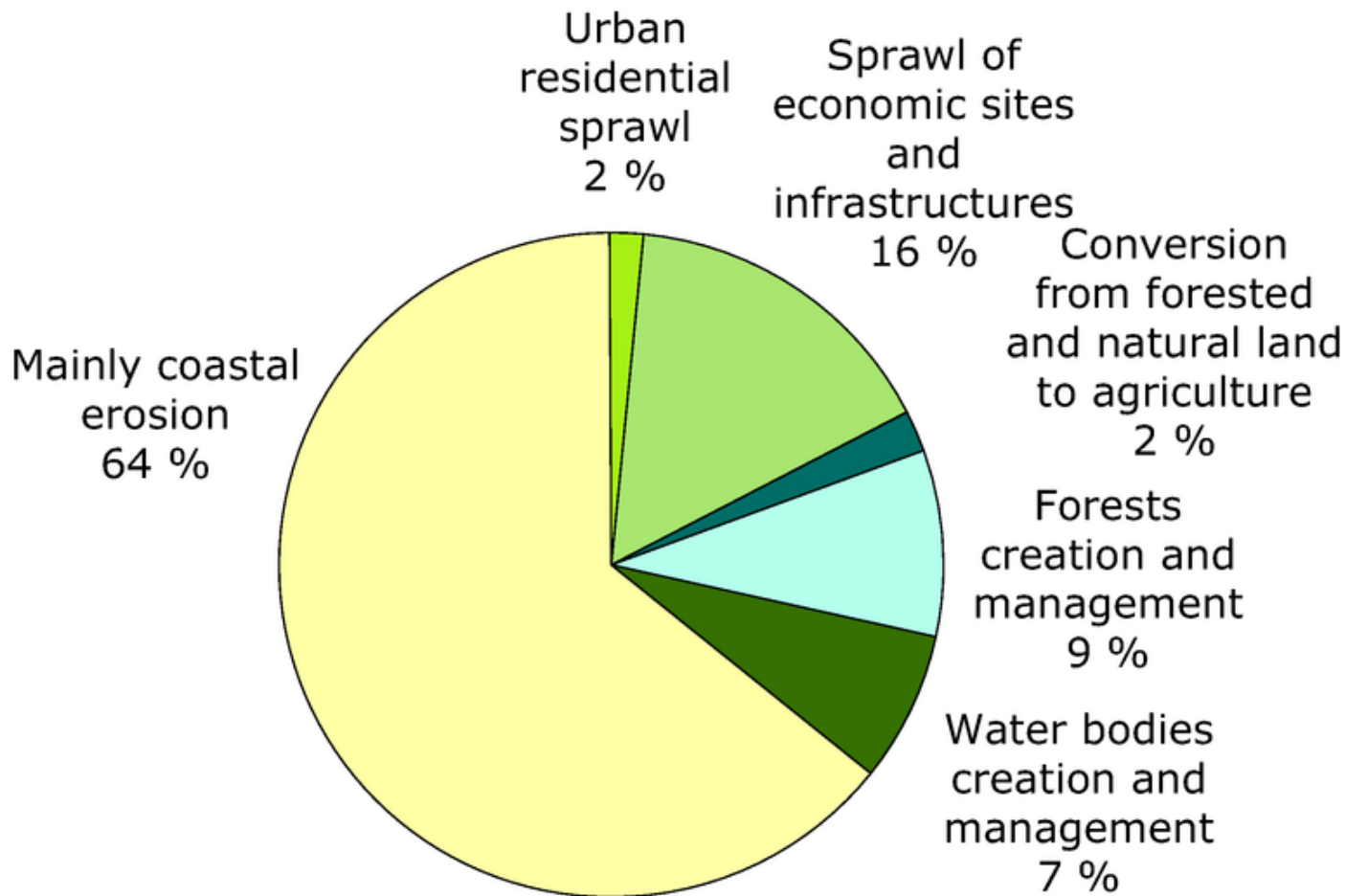
➤ Impact of coastal erosion on Natura 2000 sites (EEA, 2010)





Coastal zone issues

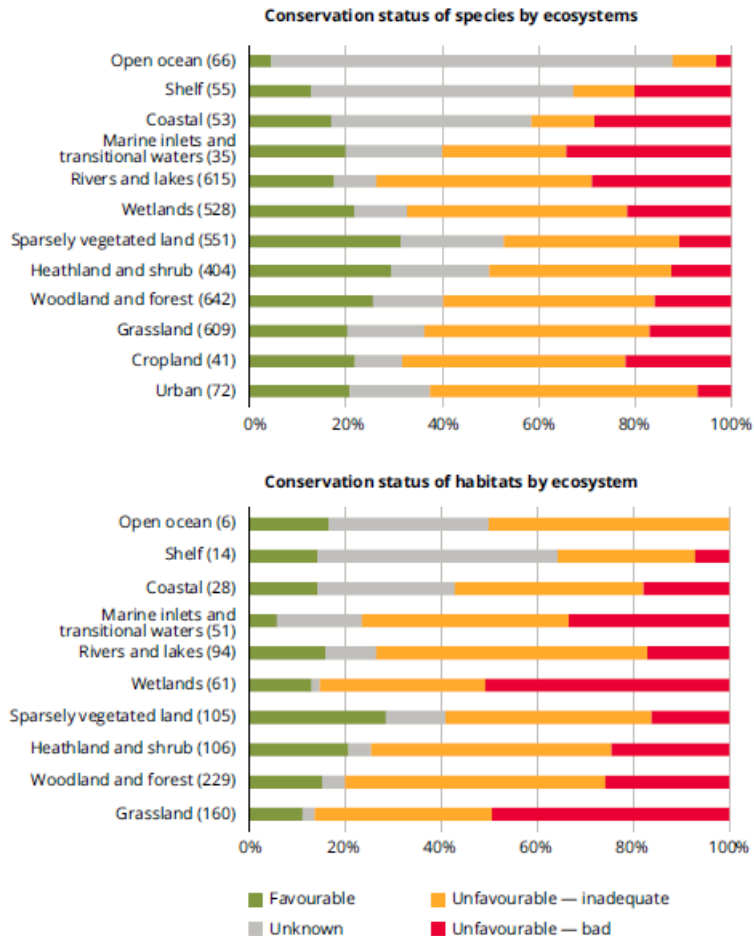
➤ Causes of loss of coastal ecosystems (EEA, 2010)





Coastal zone issues

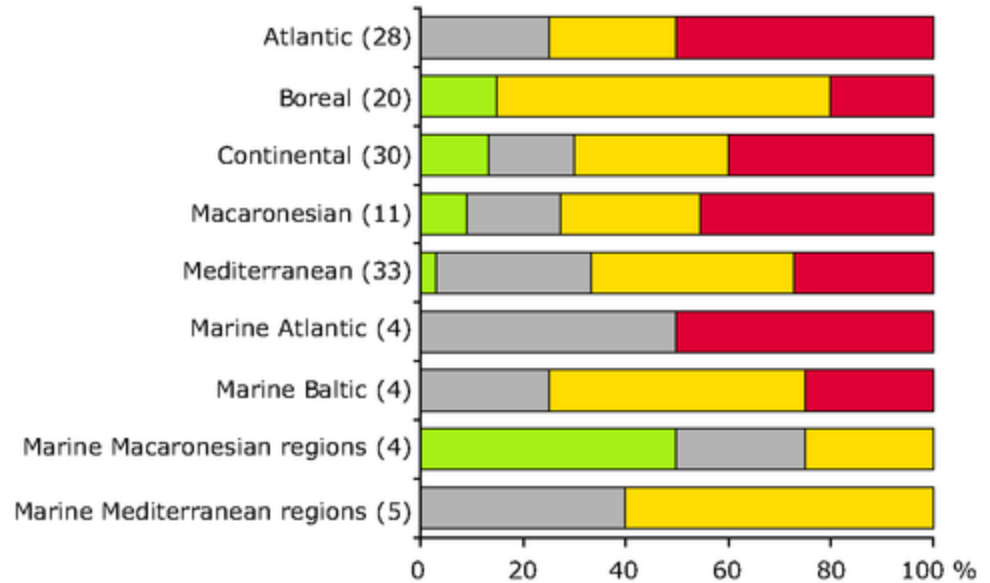
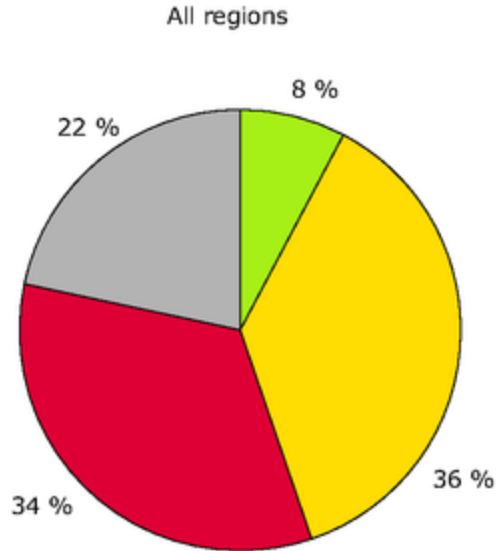
- Conservation status of species (top) and habitats (bottom) by ecosystem type (number of assessments in brackets) from Habitats Directive Article 17 reporting 2007–2012 (EEA, 2015)





Coastal zone issues

➤ Conservation status of coastal habitat types (EEA, 2010)

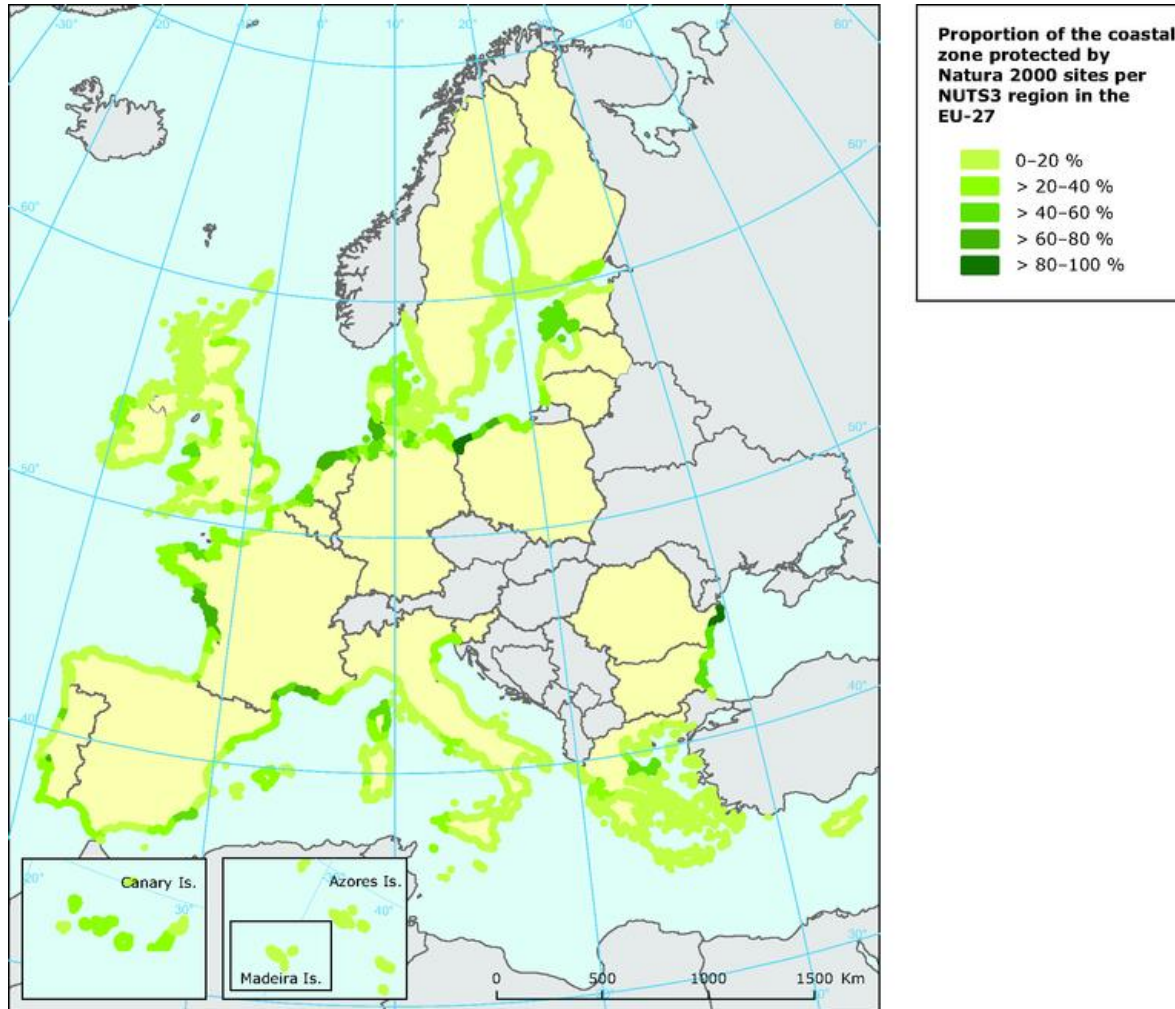


■ Favourable ■ Unknown ■ Unfavourable — inadequate ■ Unfavourable — bad



Coastal zone issues

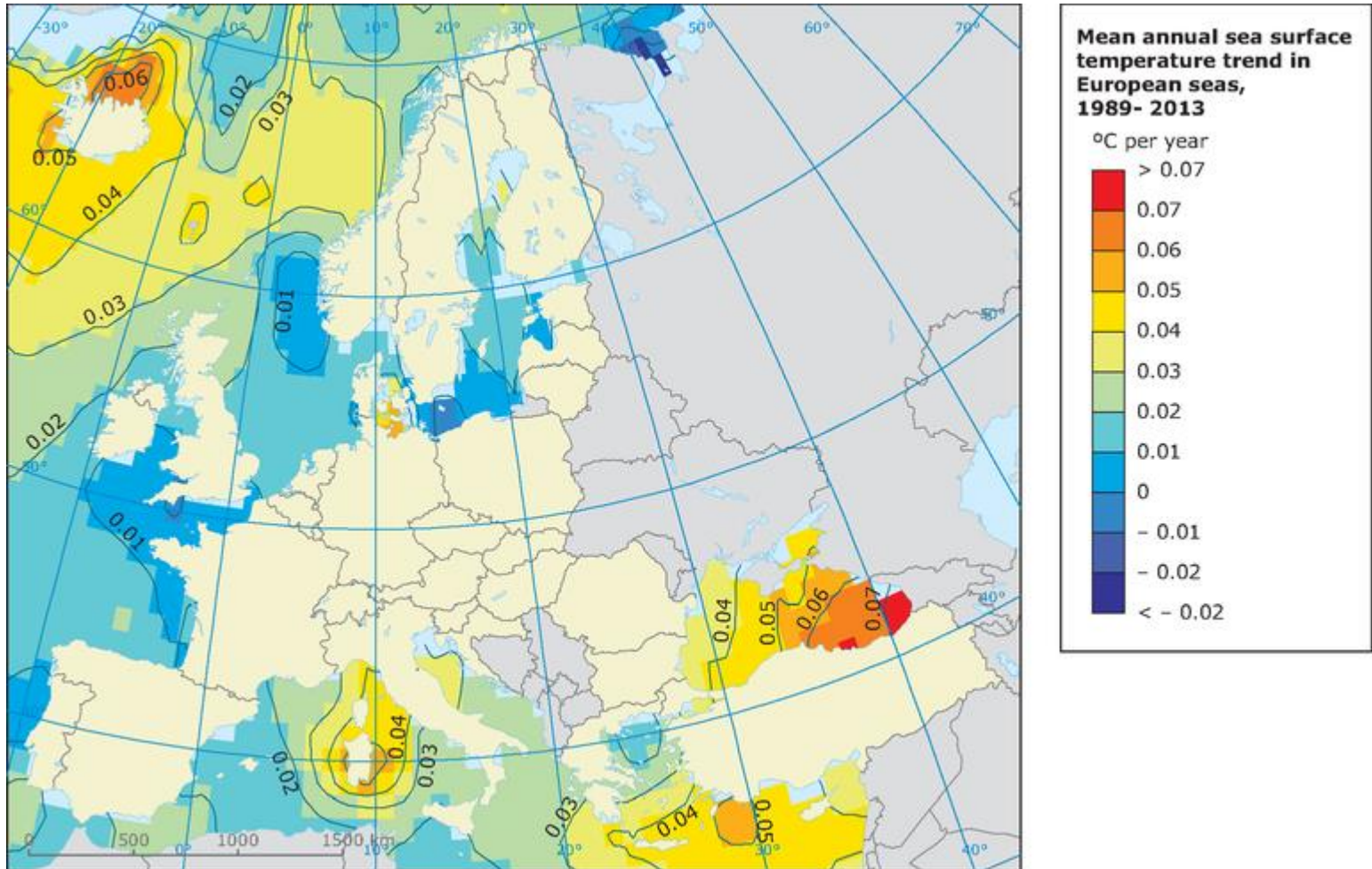
➤ Coastal zone protected by Natura 2000 sites % (EEA, 2010)





Coastal zone issues: adaptation to climate change

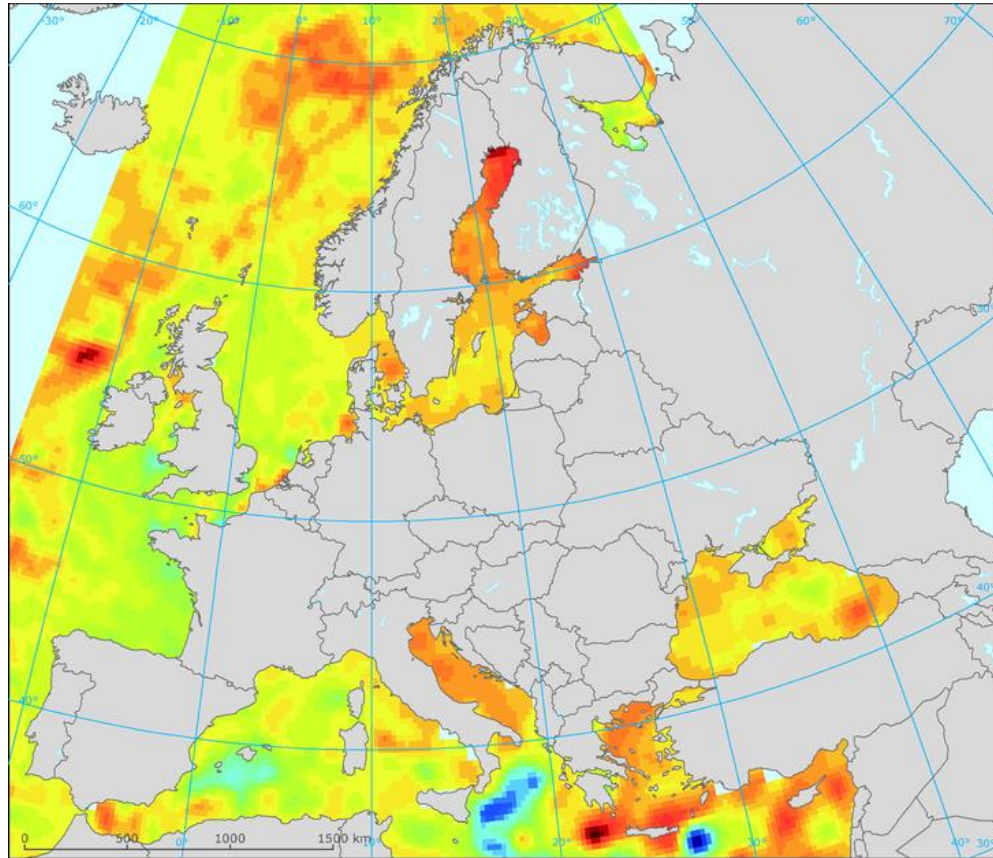
- Mean annual sea surface temperature trend in European seas (EEA, 2012)





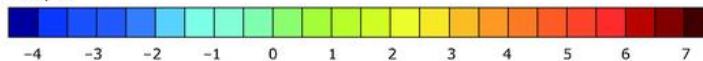
Coastal zone issues: adaptation to climate change

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



Trend in absolute sea level across Europe based on satellite measurements (1992–2013)

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

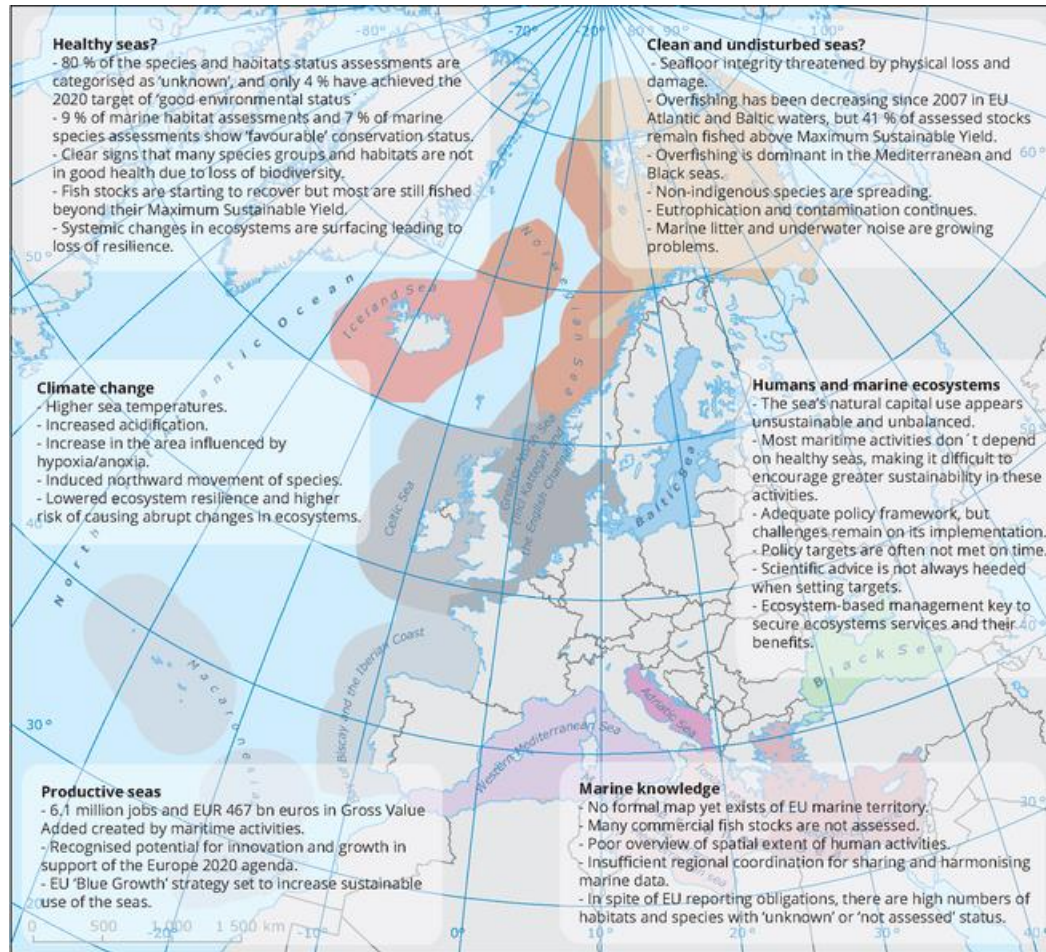
Socio-economical problems

- 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)



Regional seas surrounding Europe and the multiple challenges towards achieving sustainability



Integrated coastal zone management

- The UN **Earth Summit of Rio de Janeiro in 1992** kick-started the development of focussed EU policy on integrated coastal zone management.
 - 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

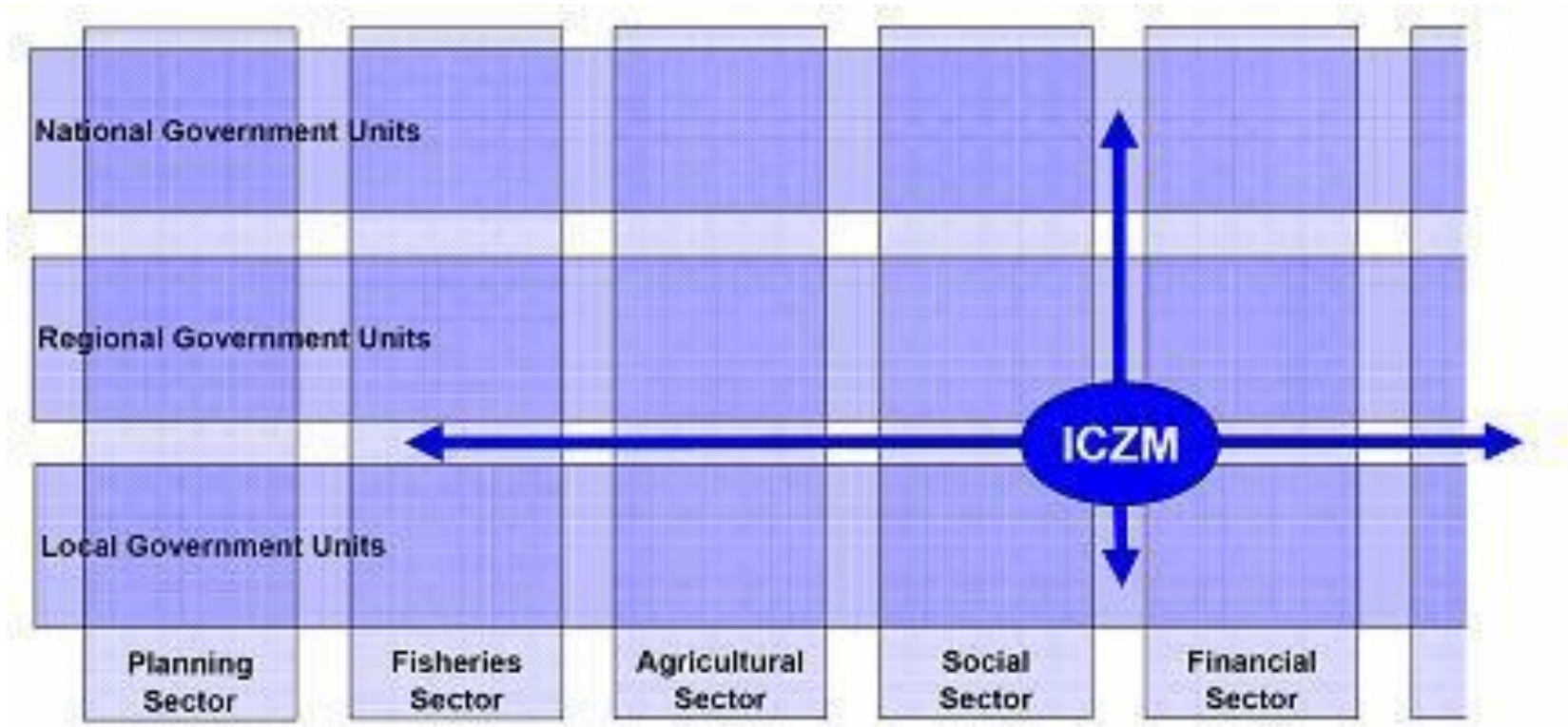
Management of European coastal zones, should be based on ([2002/413/EC](#)):

- **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 management

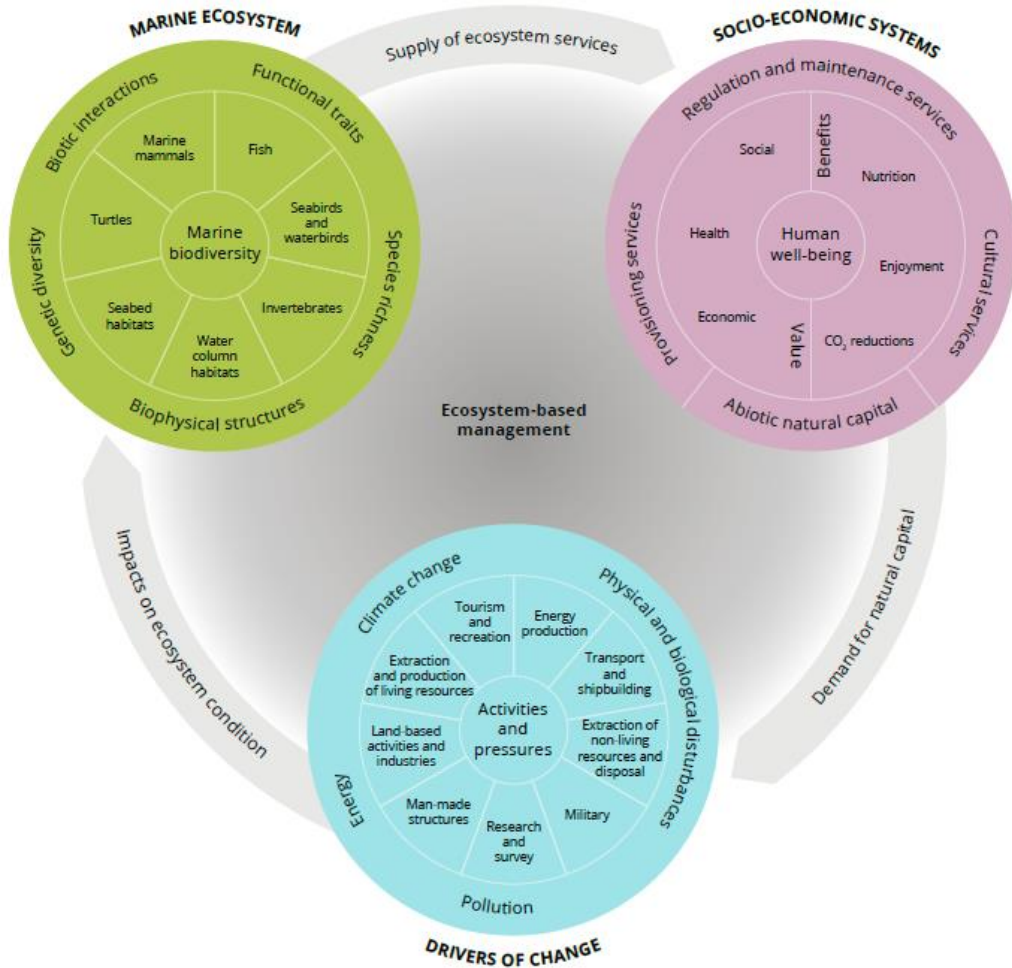
➤ Integration





Integrated coastal zone management

➤ Ecosystem-based management (EEA, 2015d)

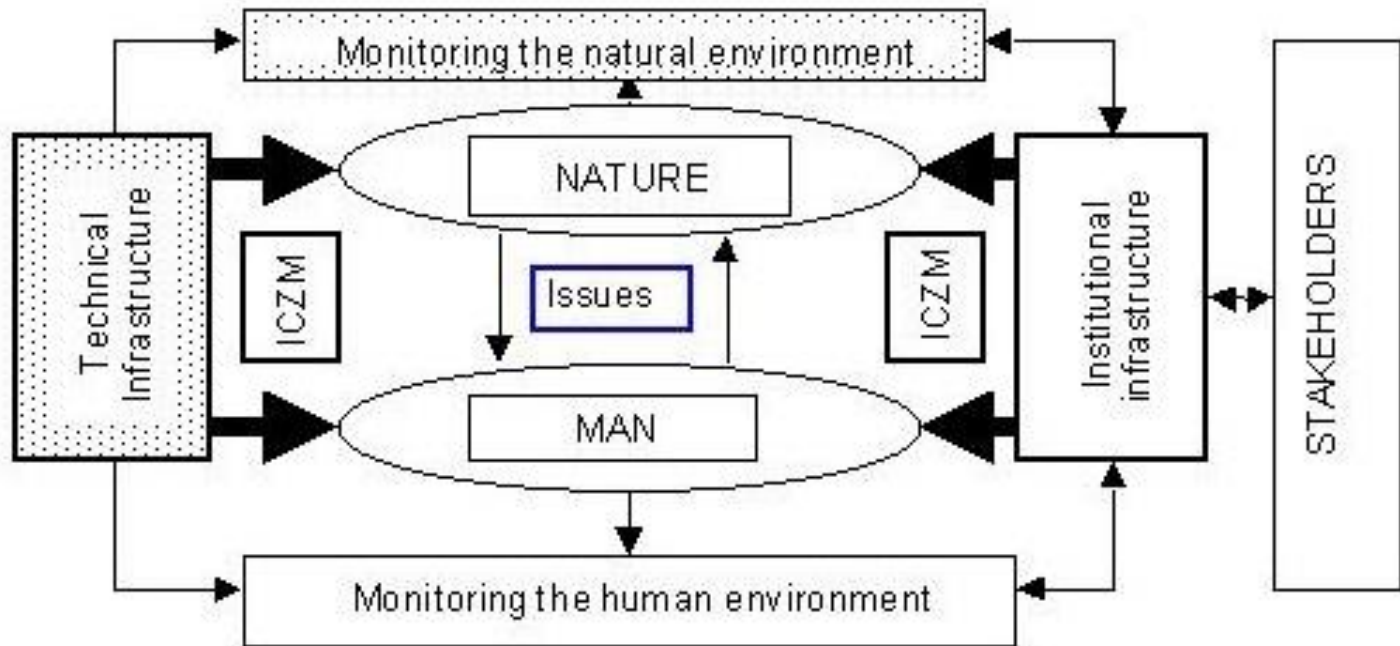


Ecosystem-based management is an integrated approach to management that considers the entire ecosystem including humans. The goal is to maintain ecosystems in a healthy, clean, productive, and resilient condition, so that they can continue to provide humans with the services and benefits upon which we 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

- ICZM framework (Graaf, 2008)



ICZM FRAMEWORK
The 5 i approach



Integrated coastal zone management

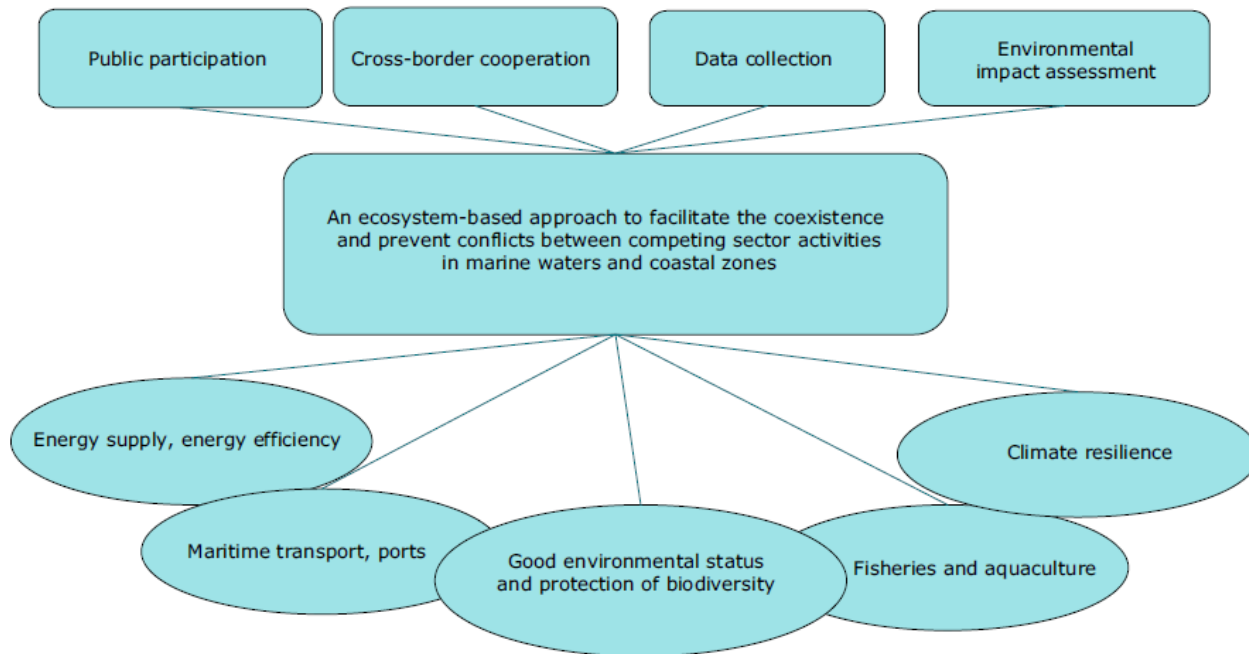


- 350 ICZM case studies analysed (2009-2012)
 - Implementation of ICZM was only 50% across the EU
 - Shortcomings:
 - lack of clear administrative responsibility for the implementation of ICZM
 - absence of commonly agreed objectives and timeframes in which these objectives should be achieved.



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.

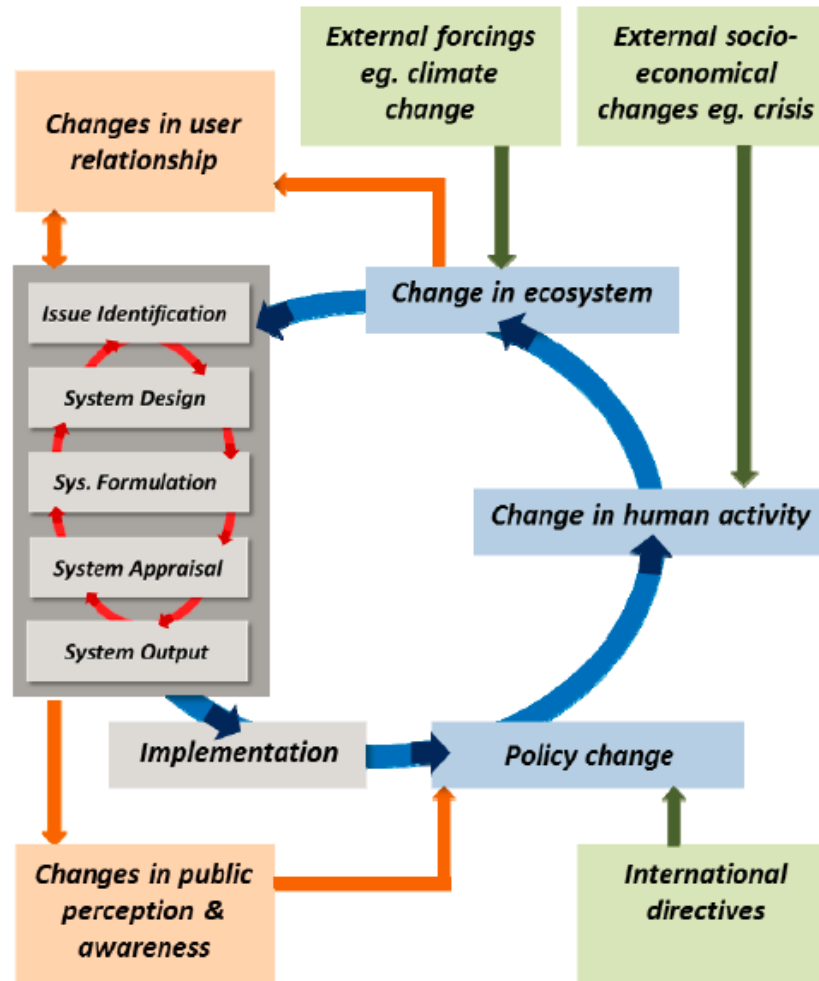


Integrated coastal zone management

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.



A SYSTEM APPROACH FRAMEWORK FOR COASTAL RESEARCH & MANAGEMENT



Literature

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