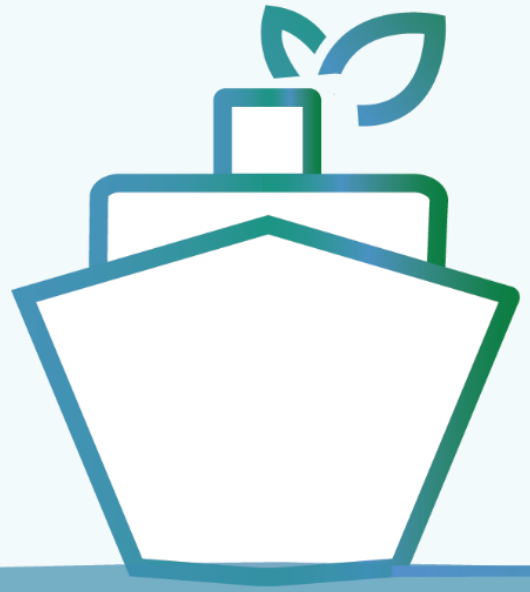
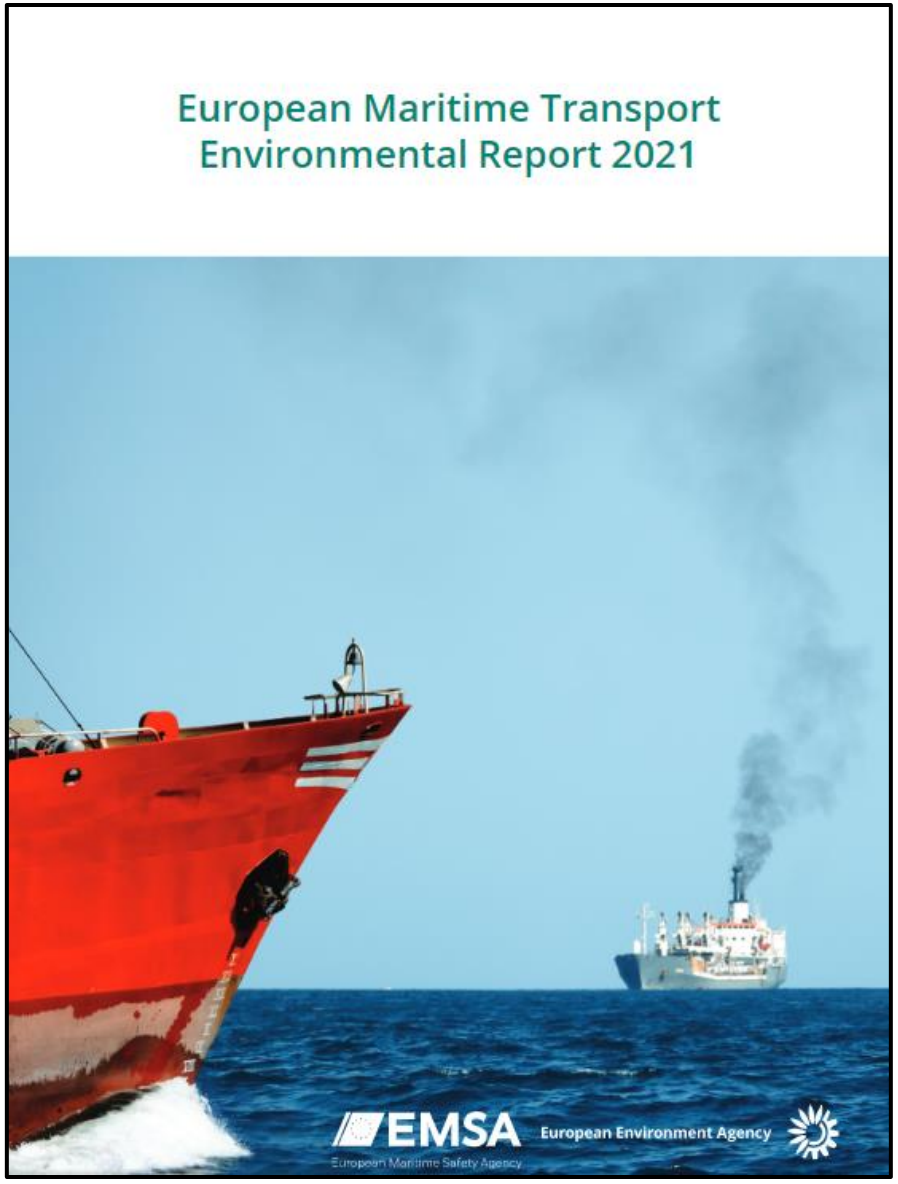


European Maritime Transport Environmental Report

EMTER 2024 – Stakeholders Consultation Workshop
14 February 2024
Samy Djavidnia (EMSA) & Stéphane Isoard (EEA)

Session 1: The EMTER 2024 Report

EMTER-2021 (1st Edition)



- A collaboration between the EEA and EMSA
- Extensive stakeholder consultation process in 2020
- Joint launch 1st September 2021 at EMSA in Lisbon
- Outreach activities towards EEA and EMSA's stakeholders

What is EMTER?

EMTER is a stock-taking exercise providing a baseline

It is a factual report

It focuses on the EU dimension with a global perspective

Objectives of EMTER 2024

European Environment Agency

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Update on the regulatory monitoring framework

Support the European Green Deal, Fit For 55 package, and decarbonisation transition process

Provide a knowledge-based assessment of the maritime sector's environmental footprint

Identify data and information gaps and R&D priorities

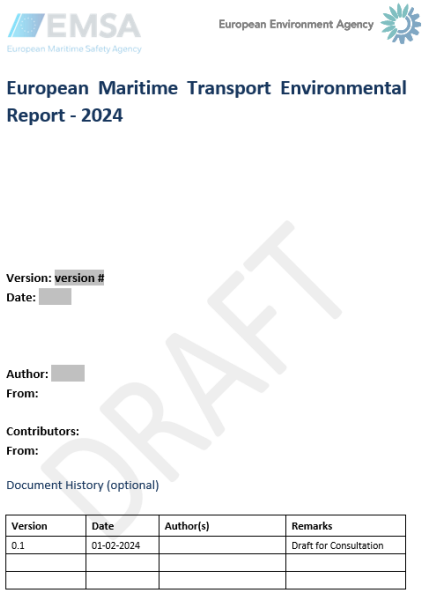
Chapter headings

01 Introduction

- Aim and Objective
- From EMTER 2021 to EMTER 2024
- Status of the Maritime Sector

02 Trends, Status & Prospects

- Emissions to Atmosphere
- Water Pollution
- Marine Litter and Waste Generation
- Hazards and physical disturbances of the seabed



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European Maritime Transport Environmental Report - 2024

Version: version #
Date:

Author:
From:

Contributors:
From:

Document History (optional)

Version	Date	Author(s)	Remarks
0.1	01-02-2024		Draft for Consultation

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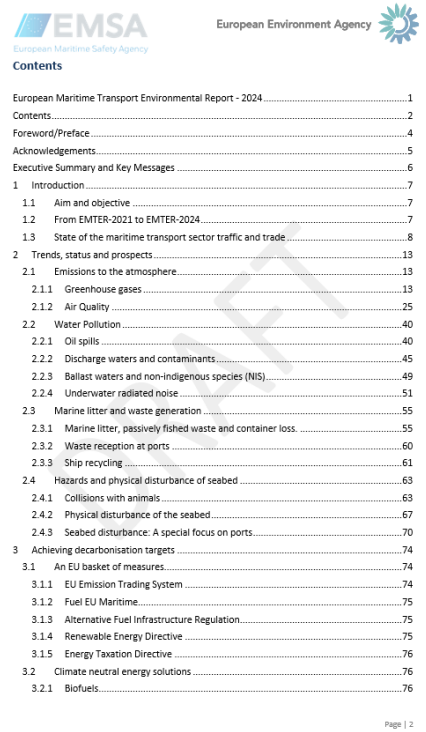

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DRAFT

Chapter headings

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03 Achieving decarbonization targets

- EU Basket of Measures
- CO_2 Emission Outlook
- Climate Neutral Energy Solutions
- Energy Transition Foresight (2030 and 2050)
- Green Corridors

04 Knowledge Gaps

- Gaps
- The role of Research & Innovation
- A New Integrated Monitoring Infrastructure

Annex Regulatory & monitoring frameworks

- International
- European Union

What is new?

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Added-value of EMTER 2024

- Biodiversity indicators
- Marine litter
- Fishing vessels
- Air quality observational & modelling data
- Underwater radiated noise data
- Waste reception (PRF)
- Alternative carbon-free energy sources (biofuels, ammonia, hydrogen, methanol, wind, synthetic, batteries, fuel cells, nuclear, CCS & OPS)
- CO_2 emission outlook
- Energy transition foresight (2030 & 2050)

Examples of remaining gaps

- Water quality observational data
- Air quality data in ports
- Mismanaged waste leakages

Data and Information used

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• EMTER IN FIGURES

- **90** pages of actual content
- **142** total pages
- **65** figures
- **12** maps
- **6** tables
- **210** references
- **1** annex

• DATA USED IN EMTER

- EEA and EMSA's data as provided by EU MSs
- Data from modelling services
- EU publicly available databases
- Data from stakeholders
- Data from commercial sources
- Data from peer-reviewed literature

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WISE MARINE MARINE INFORMATION SYSTEM FOR EUROPE

European Union emission inventory report 1990-2020 Under the UNECE Air Convention

ECMWF

Atmosphere Monitoring Service atmosphere.copernicus.eu

FINNISH METEOROLOGICAL INSTITUTE

eurostat

European Alternative Fuels Observatory

Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping

EMODnet European Marine Observation and Data Network

EMTER Coordination Group

European Environment Agency

EMSA

EMSA
European Maritime Safety Agency

European Environment Agency

MOVE *

ENV *

SCIENCE & INNOVATION

Joint Research Centre JRC

CLIMATE ACTION

MARE

EFCA
European Fisheries Control Agency

Stakeholders

Regional Sea Conventions

Environmental aspects of maritime transport

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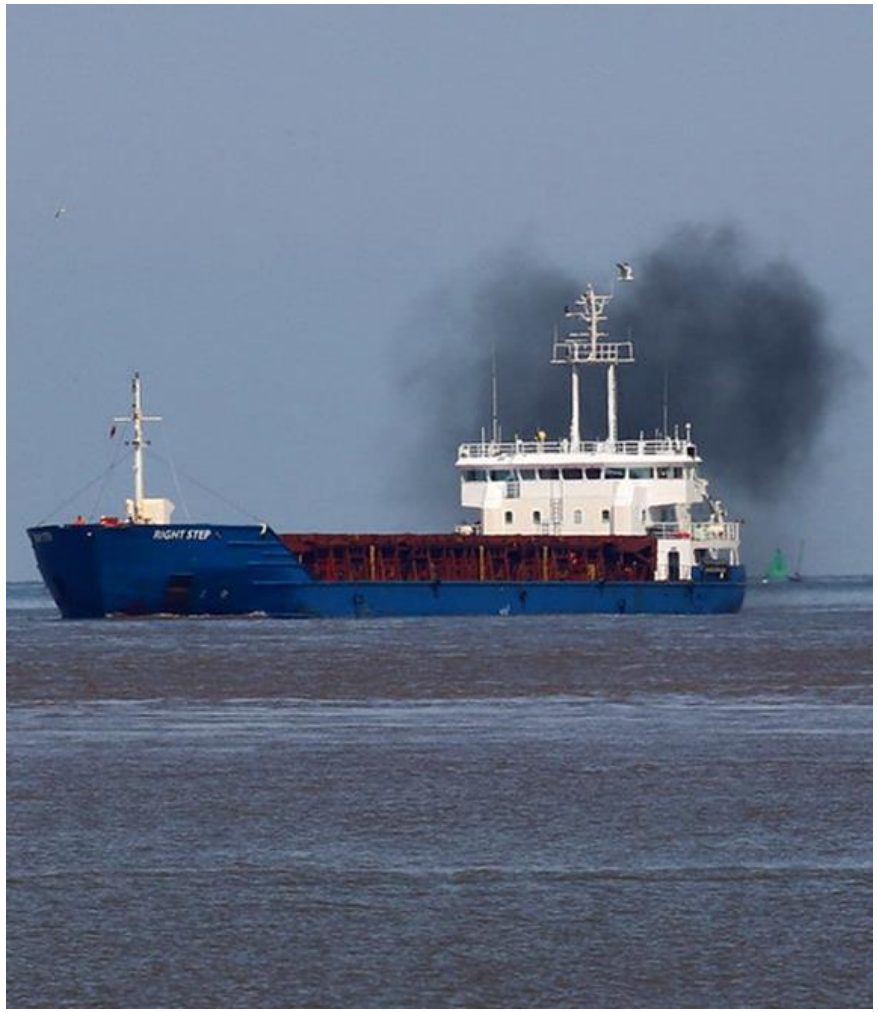
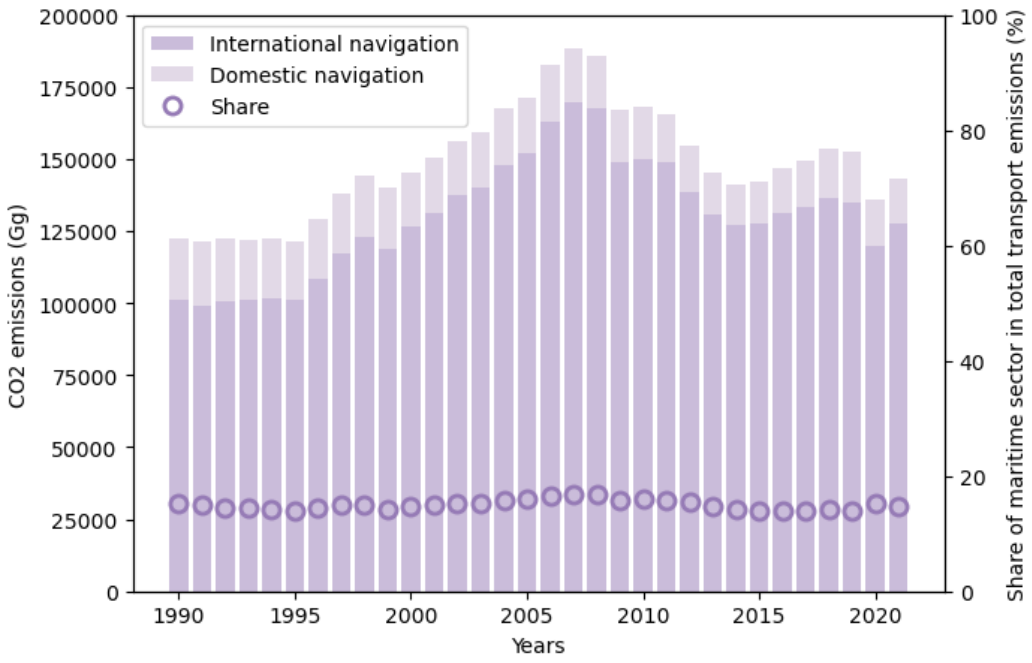
- **Emissions to Atmosphere**
  - GHG; Air Quality
- **Water Pollution**
  - Oil Spills; Discharge Waters & Contaminants; Ballast Waters & NIS; Underwater Radiated Noise
- **Marine Litter and Waste Generation**
  - Marine Litter, PFW, Container Loss; Waste Reception at Ports; Ship Recycling
- **Hazards, physical and disturbances of the seabed**
  - Collision with Animals; Physical Disturbance of the Seabed



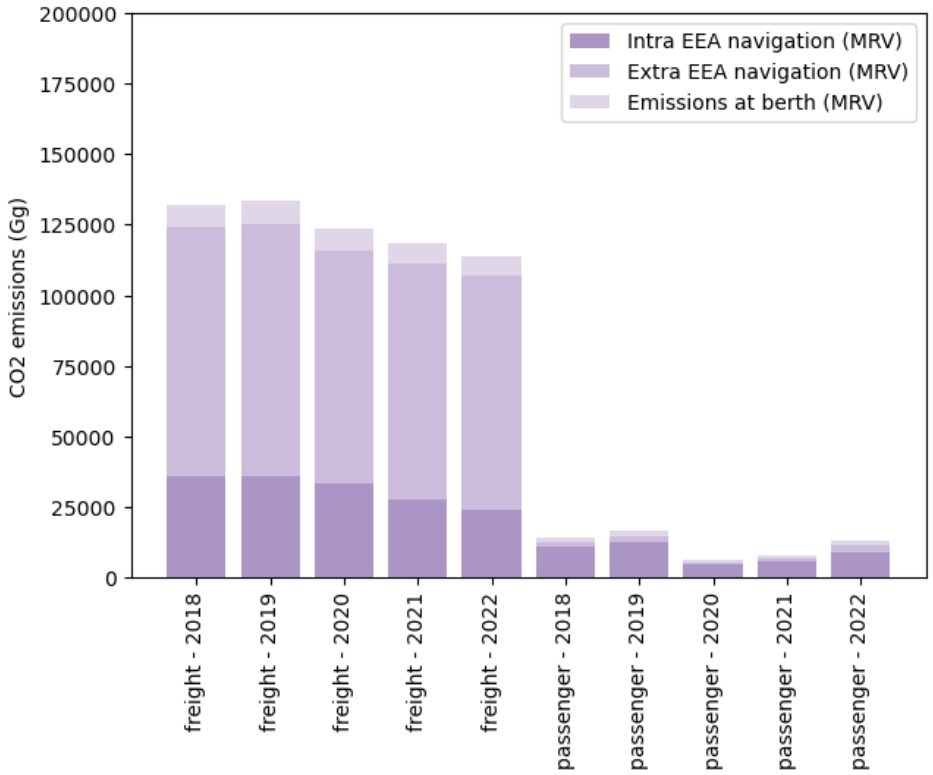
Greenhouse Gases

- Analysis of different datasets: MRV, inventories and models.
- The overall emissions from the sector are slightly increasing, mainly driven by an increase in activity (a).
- CO_2 emission of freight vessels and passenger vessels are decreasing (b).



(a) CO_2 emissions from the maritime sector (Gg) and their share in total transport emissions (%) between 1990 and 2021 in EU-27.

Source: UNFCCC (EEA, 2022c).

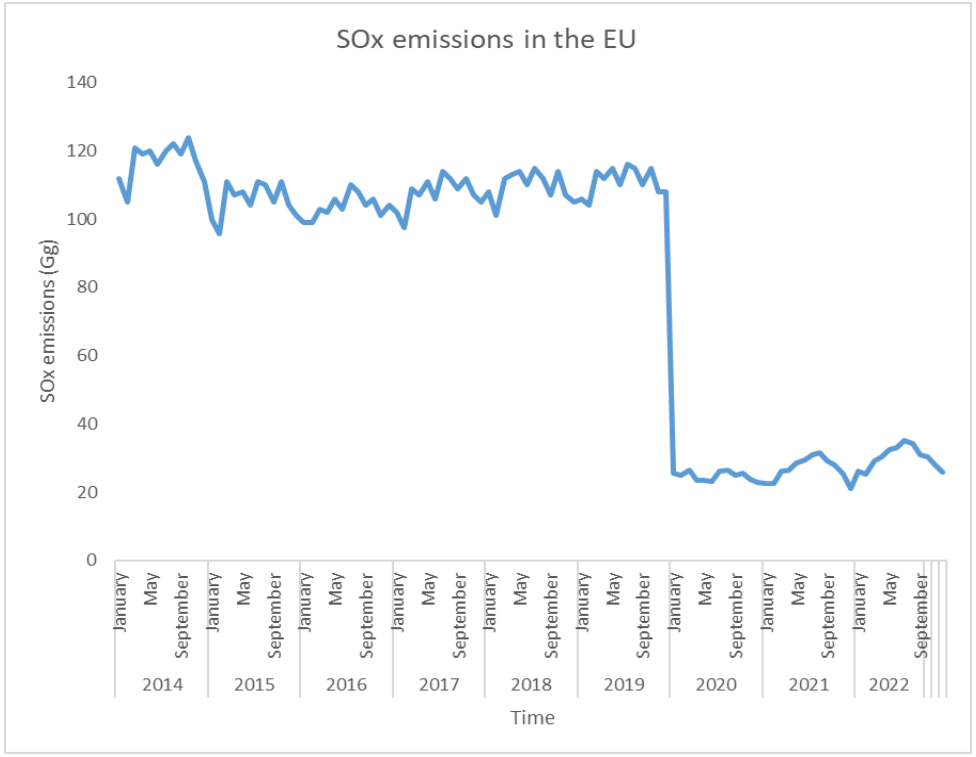


(b) Distribution of CO_2 emissions from freight and passenger vessels (Gg) between 2018 and 2022 in the EEA (2021 onwards without UK).

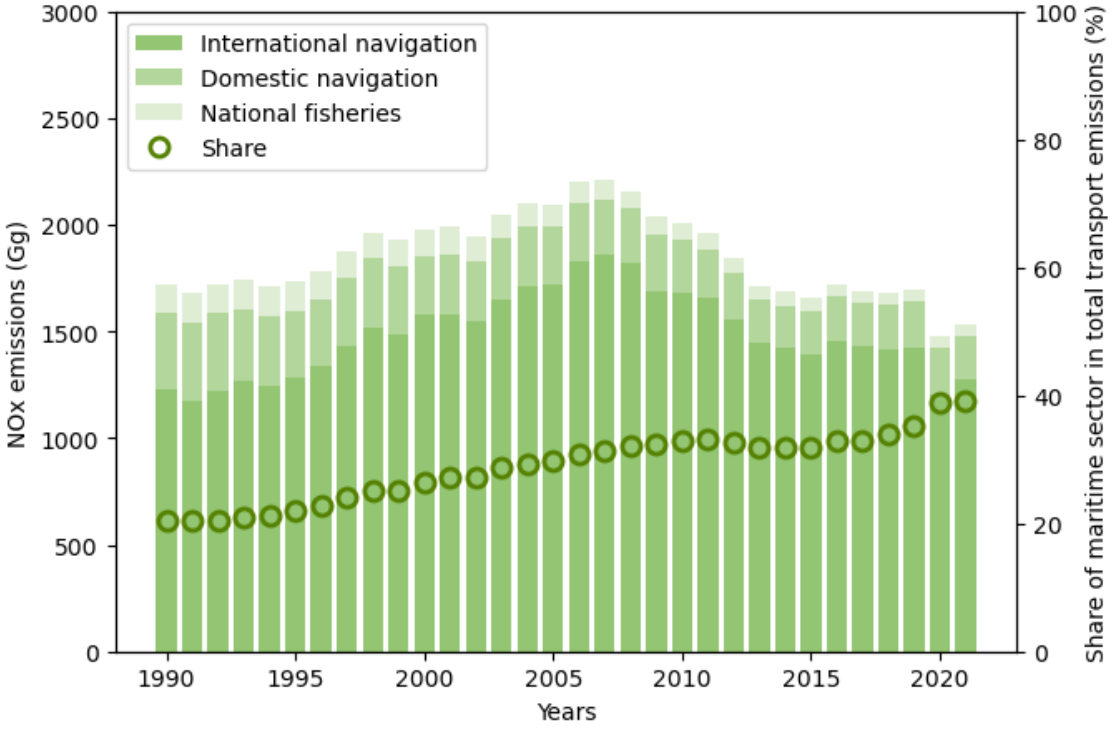
Source: EMSA, THETIS-MRV.

Air Quality

- Significant reduction in SOx emissions, small decrease in NOx (less than in other sectors).
- Difference in the emissions reduction performance also related to different stringencies of the emission standards for SOx and NOx.
- PM & Black carbon emissions, although not directly regulated, have seen an overall reduction in the 1990-2021 period, even if less compared to other sectors. The progressive introduction of cleaner fuels have contributed to this result. PM emissions show a similar trend.



(a) SOx emissions for EU, 2014-2022.
Source: STEAM, FMI.



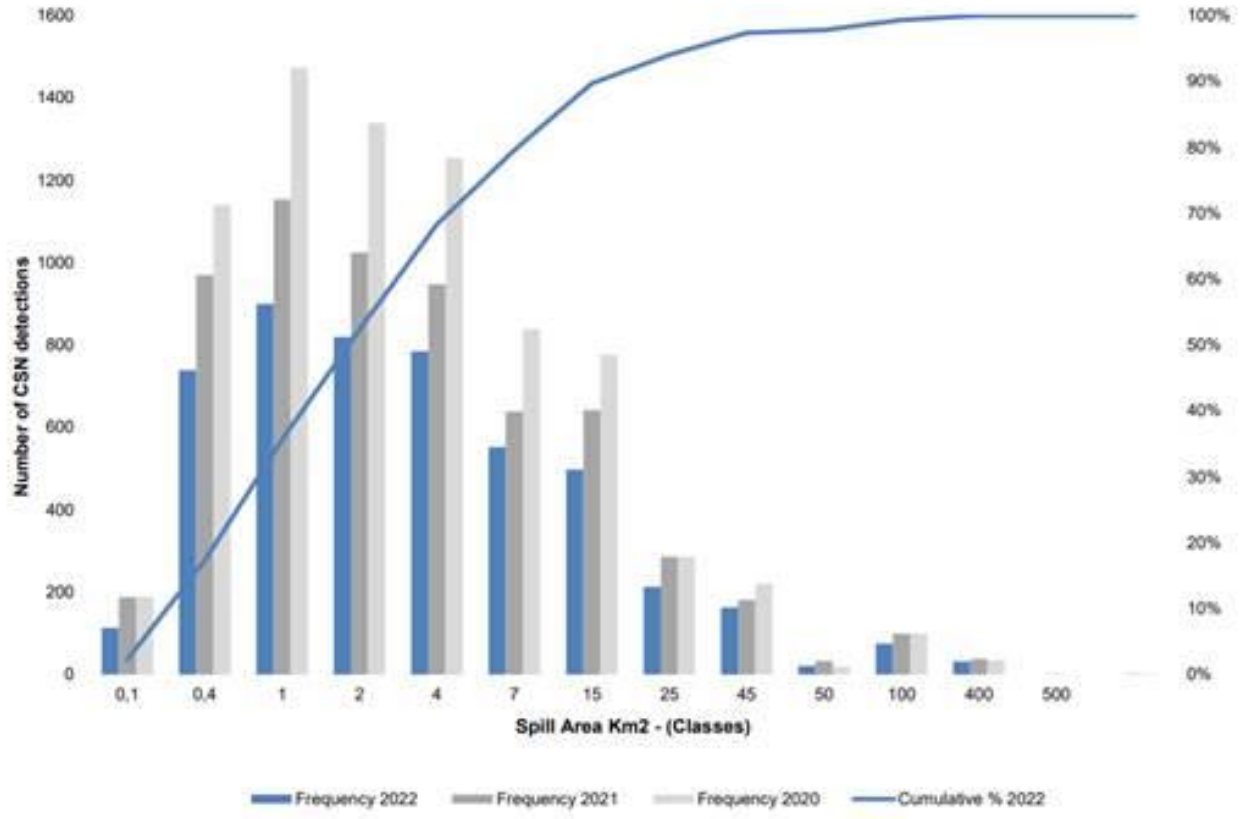
(b) NOx emissions from the maritime sector (Gg) and their share in total transport emissions (%) between 1990 and 2021 in the EU-27.
Source: LRTAP.

Oil Spills

- CleanSeaNet data shows a higher incidence of potential oil spills in the North Sea and Mediterranean Sea compared to other areas.

- Since 2018 there is a decreasing trend in the number of CleanSeaNet potential oil spill detections per million square kilometres, the average falling from 7.56 to 4.01.

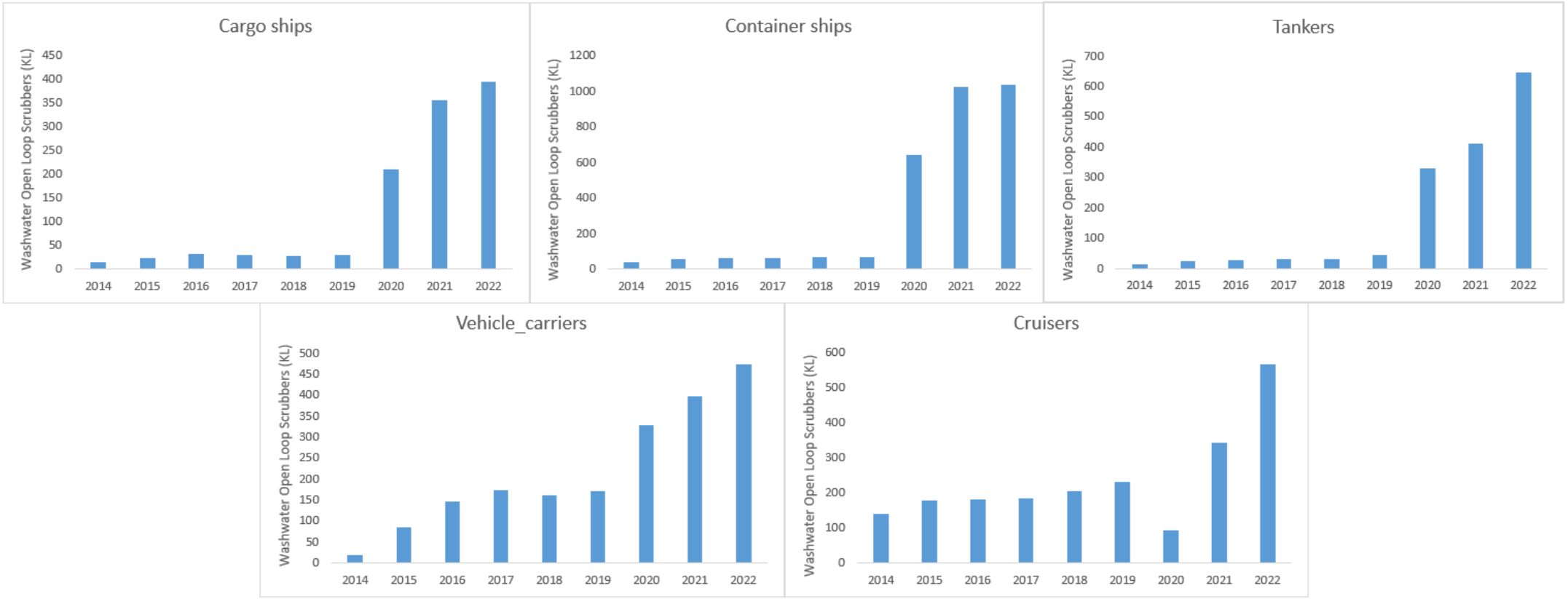
- In 2022 80% of the CleanSeaNet detected potential pollution incidents were of small area (lower than 7 km2), while large potential pollution incidents (higher than 50km2) represented approximately 10%.



Histogram of CSN Oil spill detections according to areas classes (km2) 2020-2022.
Source: EMSA, CleanSeaNet (2023).

Discharge waters and contaminants

- 98% of the water discharges from ships come from open-loop scrubbers. From the remaining 2%, 75% come from grey waters.
- A clear increase occurred from 2020, following the application of the IMO Global sulphur cap.
- Member States are restricting/banning the discharge of scrubber wash-waters.



Wash water discharges from Open Loop scrubbers per ship type in EU waters.
Source: FMI, STEAM.

Water Pollution

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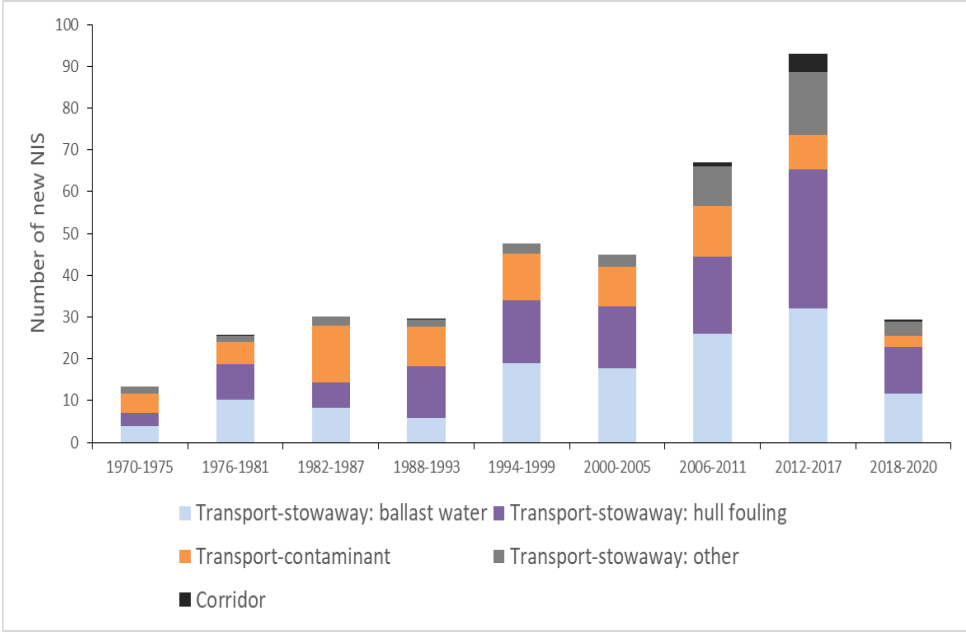
Ballast water and non-indigenous species

- The share of NIS introduced by shipping in Europe is 60%, whereas the share for invasive alien species is 56%.

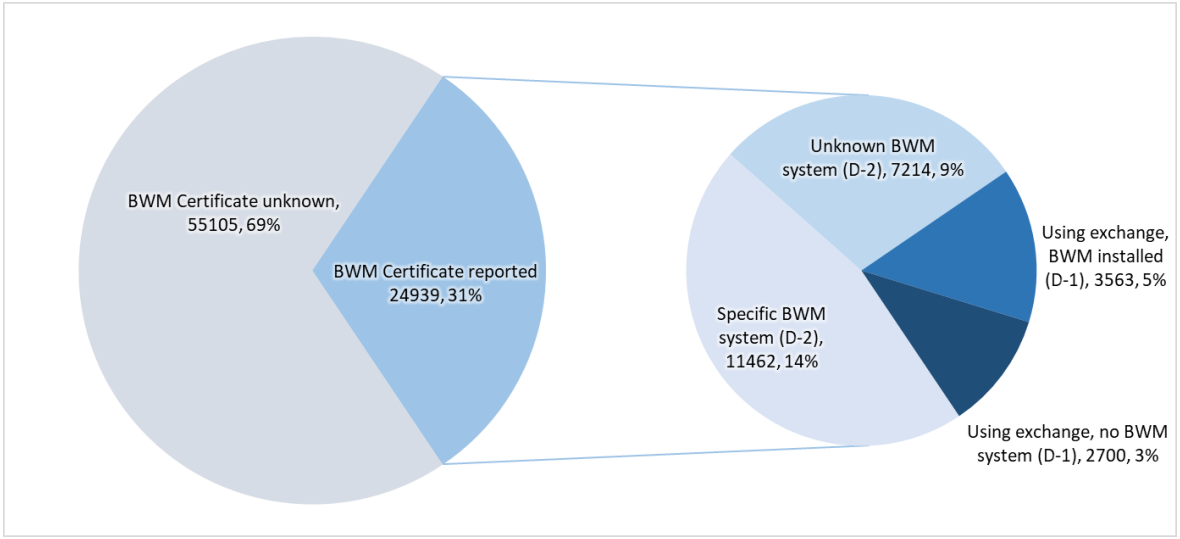
- Only 18-21% of the MSFD assessed marine areas are in good environmental state regarding NIS.

- While the number of NIS keeps increasing, the introductions of invasive alien species (IAS) peaked between 2000-2005 and have since decreased.

- 90% of reported ships (31% of the global fleet) are ready to conform with the Ballast Water Management Convention D-2 standard.



Number of new NIS introduced by maritime transport, by 6-year cycles.
Source: EEA, MAR002 indicator 2023.



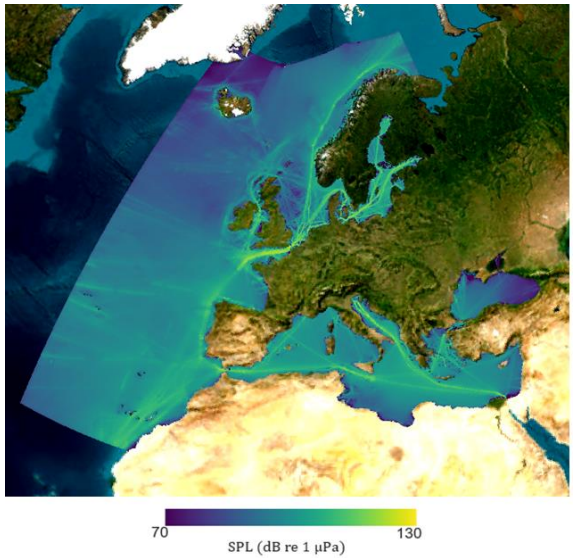
Reported Ballast Water Management (BWM) Certificates and BWM standard compliance of global vessel fleet (> 400 GT)
Source: EMSA, 2023.

Underwater Radiated Noise

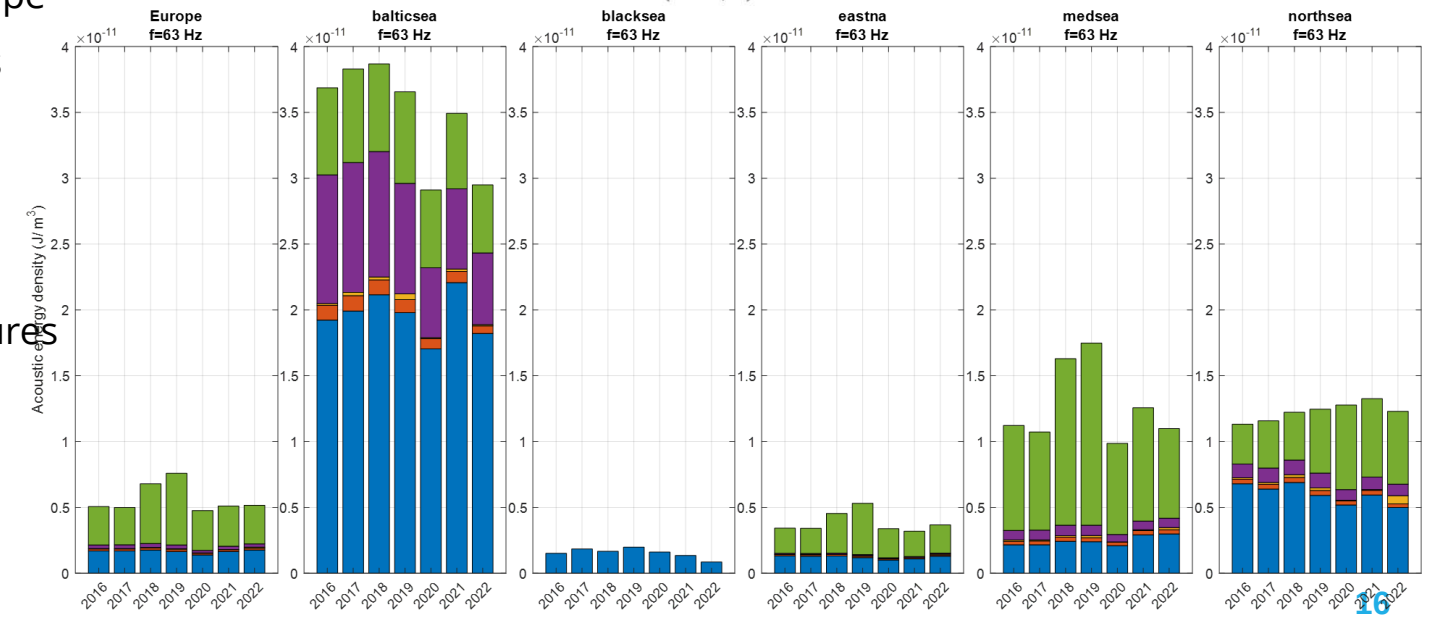
- The region with the highest sound energy density is the Baltic Sea, due to its shallow water and relatively high shipping density. In the Baltic Sea the sound energy density is dominated by cargo vessels, followed by Ro-Ro and tankers.

- When looking at the sound energy densities per ship type over the whole European seas, tankers and cargo ships have the highest contribution at 63 Hz.

- The first forecast exercise building on GHG and URN scenarios shows that effectiveness of mitigation measures depends on ship type and operational profile.



Sound pressure level maps for different years for all ship types at 63 Hz.
Source: EMSA, NAVISON (2024).



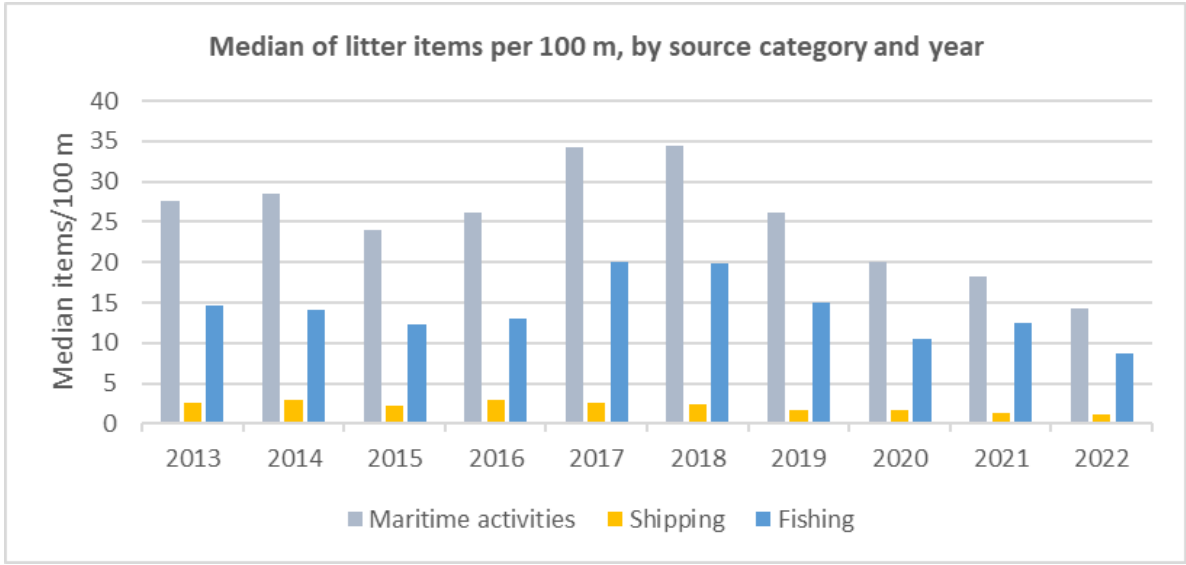
URN sound energy density at 63 Hz in Europe (Europe leftmost chart and regional seas) from 2016 to 2022.
Source: EMSA, NAVISON (2024).

Marine litter and passively fished waste

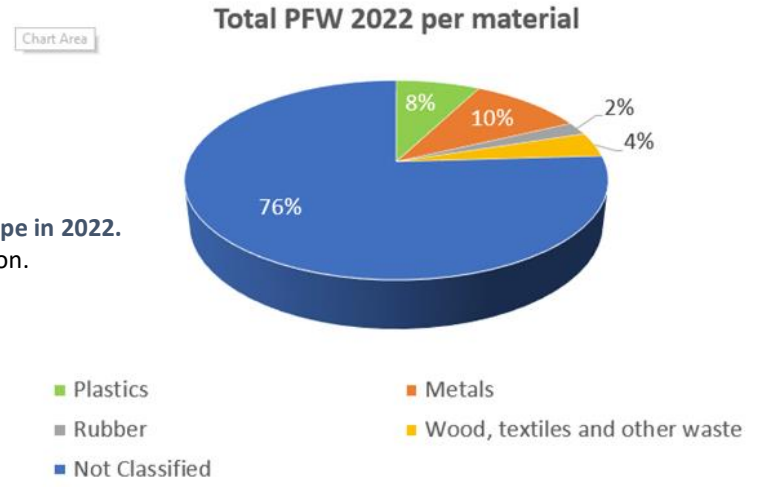
- With up to 3% from shipping and up to 19% from fisheries, the beach litter attributed to these sources are between one fifth and one quarter of all marine litter.

- In a decade, the abundance of such litter has more than halved from 28 items per 100m in 2013 to 14 items per 100m in 2022.

- In 2022, 72% of the waste collected in fishing nets was reported as non-classified, 26% was reported as plastics and the remaining was split into Metal, Rubber, and Wood/Textiles.



Temporal distribution of litter items likely originating from maritime activities, 'shipping' and 'fisheries and mariculture', by year.
Source: Compiled survey data of 'EMODnet European beach litter standardized, harmonized and validated datasets 2001/2022 v2023' and 'EEA MarineLitterWatch v2023'



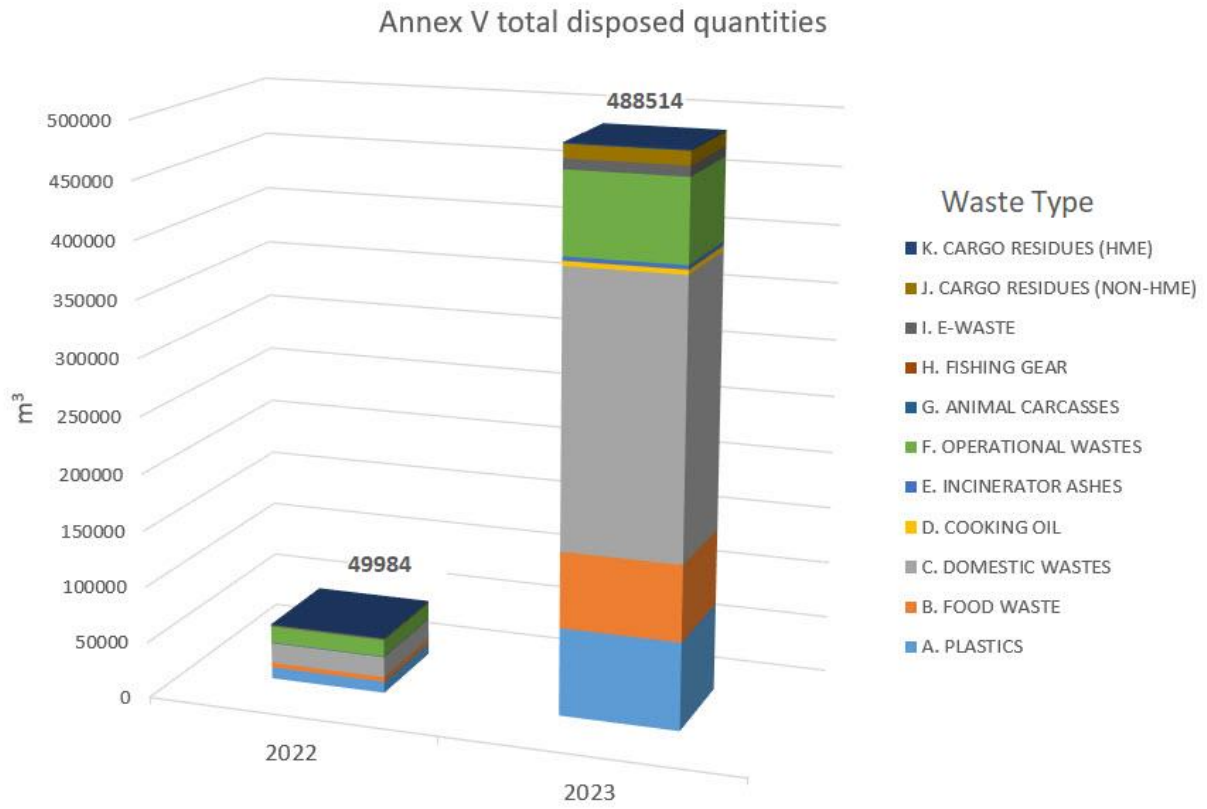
Total reported volume of passively fished waste per waste type in 2022.
Source: DONA and dataset of the European Commission.

Waste Reception at Ports

- From the analysis of the waste receipts notified electronically by the Member States, it is possible to discriminate the types of garbage and analyse the amounts delivered at EU and EFTA ports by vessels.

- For example, when looking at garbage, domestic waste, plastics, operational waste and food waste are the types which are disposed to port reception facilities most often.

- By analysing the total of waste from ships from all categories disposed at PRFs in European ports, it is possible to identify the top ports in terms of reception of volumes: Rotterdam first with twice volume than following 4 ports combined (Antwerp-Bruges, Copenhagen, Amsterdam and Trapani).



Garbage (MARPOL Annex V) total amount disposed at port reception facilities (reference waste receipt) in EU ports as well as Norway and Iceland in the period 2022 to 2023.
Source: EMSA, SafeSeaNet.

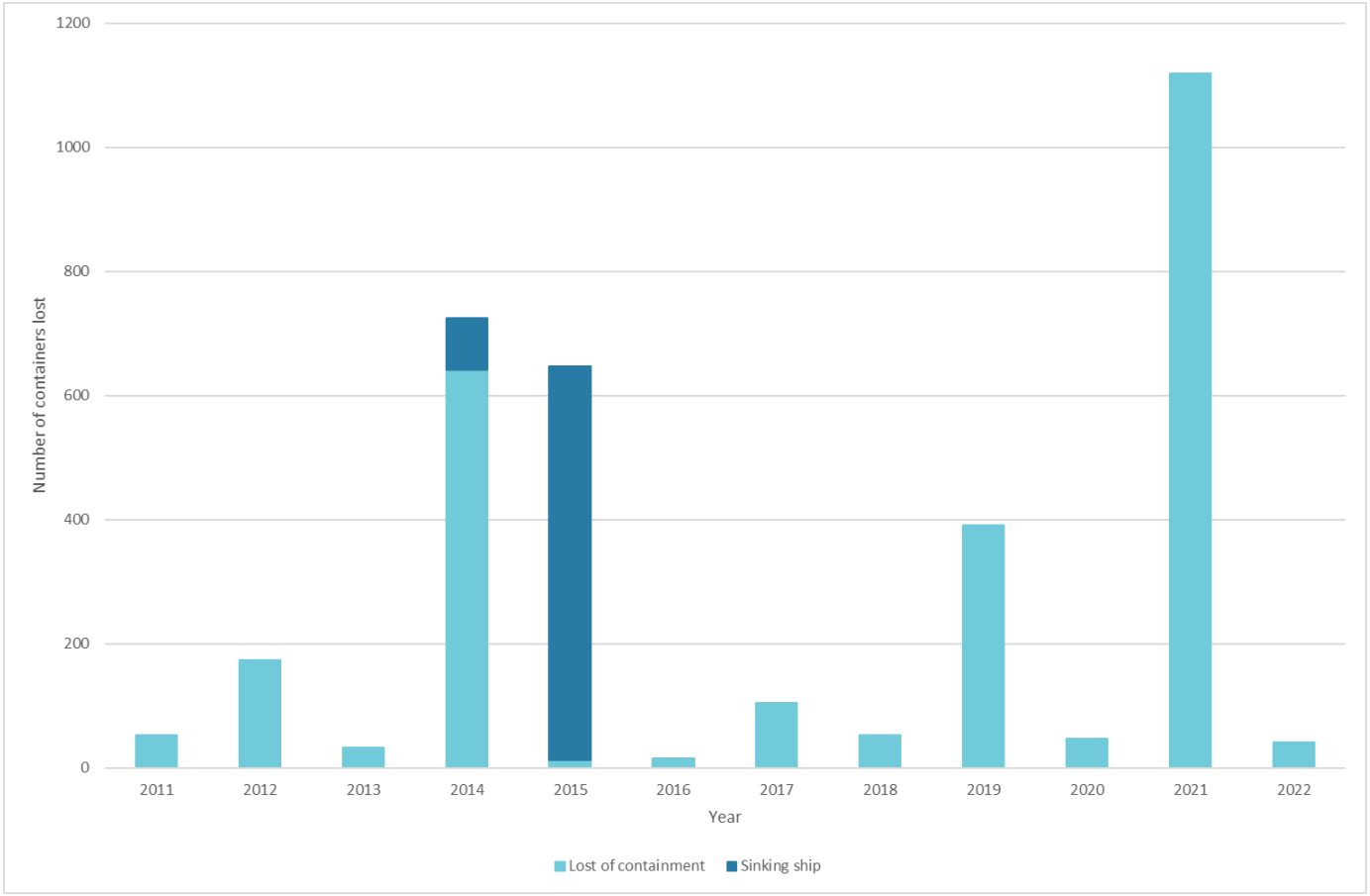
Disclaimer: not all countries reported waste receipts in 2022 and 2023 electronically and those that reported did it only for part of the disposal operations.

Container Loss

- According to the World Shipping Council's (WSC), in 2022, an average of approximately 2,000 containers are lost at sea every year (in 2022 250 million packed and empty containers were shipped).

- In the EU, for the period from 2011 until 2022, 76 single occurrences have been reported, resulting in a total of over 3,460 containers lost overboard.

- However, since 2019 there have been notable incidents involving container loss, which have resulted in considerable impact on the marine environment. The impact of these incidents cannot be under-estimated – see plastic pellets release from Toconaco on Galician coast.



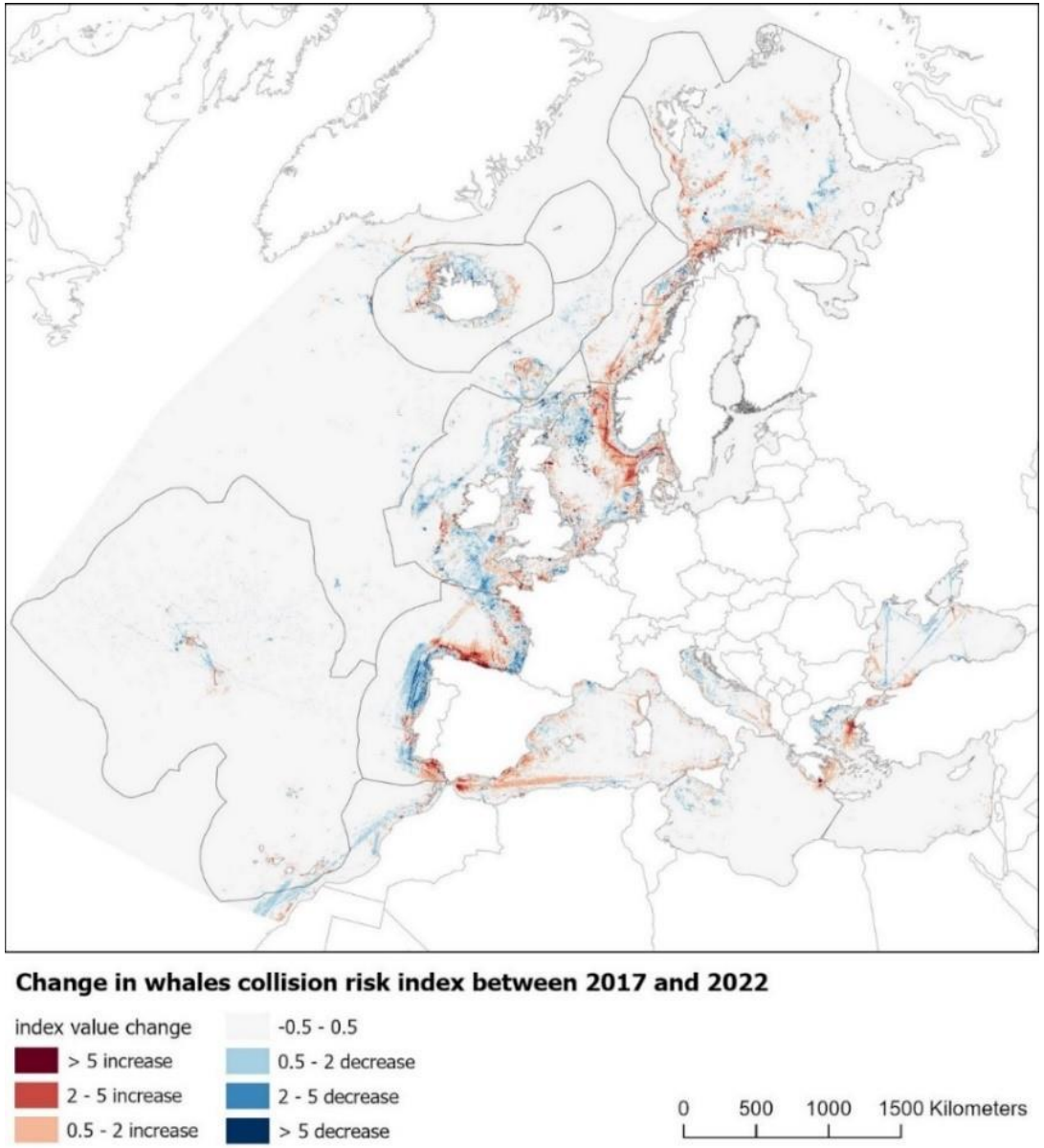
Total number of containers lost at sea events in the EU.
Source: EMSA, EMCIP (2023).

Collision with sea-mammals

- Eastern parts of the Greater North Sea, the south coast of the Bay of Biscay, the Gibraltar region, and parts of the Aegean Sea are hotspots in Europe's regional seas for sea-mammals with significant increases in collision risk.

- Decrease in collision risk is noticeable in western coast of Iberian Peninsula, partially in Celtic Seas, Adriatic Sea, and Black Sea.

- There has been a significant increase in collision risk in Natura 2000 areas in all marine subregions between 2017 and 2022.



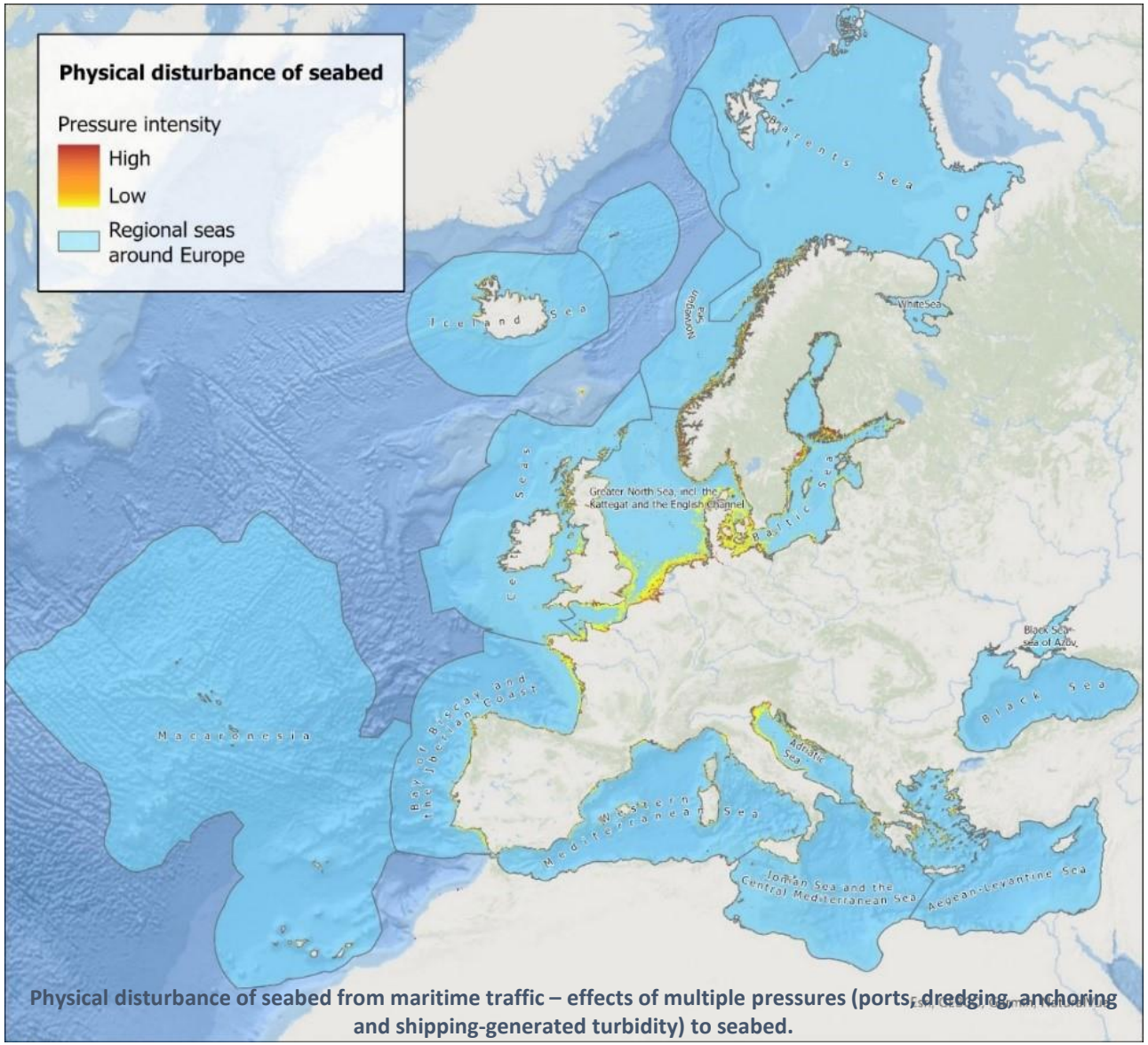
Changes in collision risk index for whales between 2017 and 2022.
Source: Aquamaps, EMODnet.

Physical disturbance of the seabed

- The MSFD threshold value for seabed disturbance is 2% of the marine area. Overall (turbidity, expansion of port facilities, dredging and anchoring), maritime transport is estimated to impact 1.2 % of Europe's seabed.

- 27 % of the seabed in near-shore marine waters, extending up to one nautical mile from the coastline, experiences physical disturbance of some sort, with 5% of the area being subject to high impact.

- The widest aggregated disturbance (10 % of sea area) is found in the Greater North Sea, incl. the Kattegat and the English Channel subregion.



Physical disturbance of seabed from maritime traffic – effects of multiple pressures (ports, dredging, anchoring and shipping-generated turbidity) to seabed.

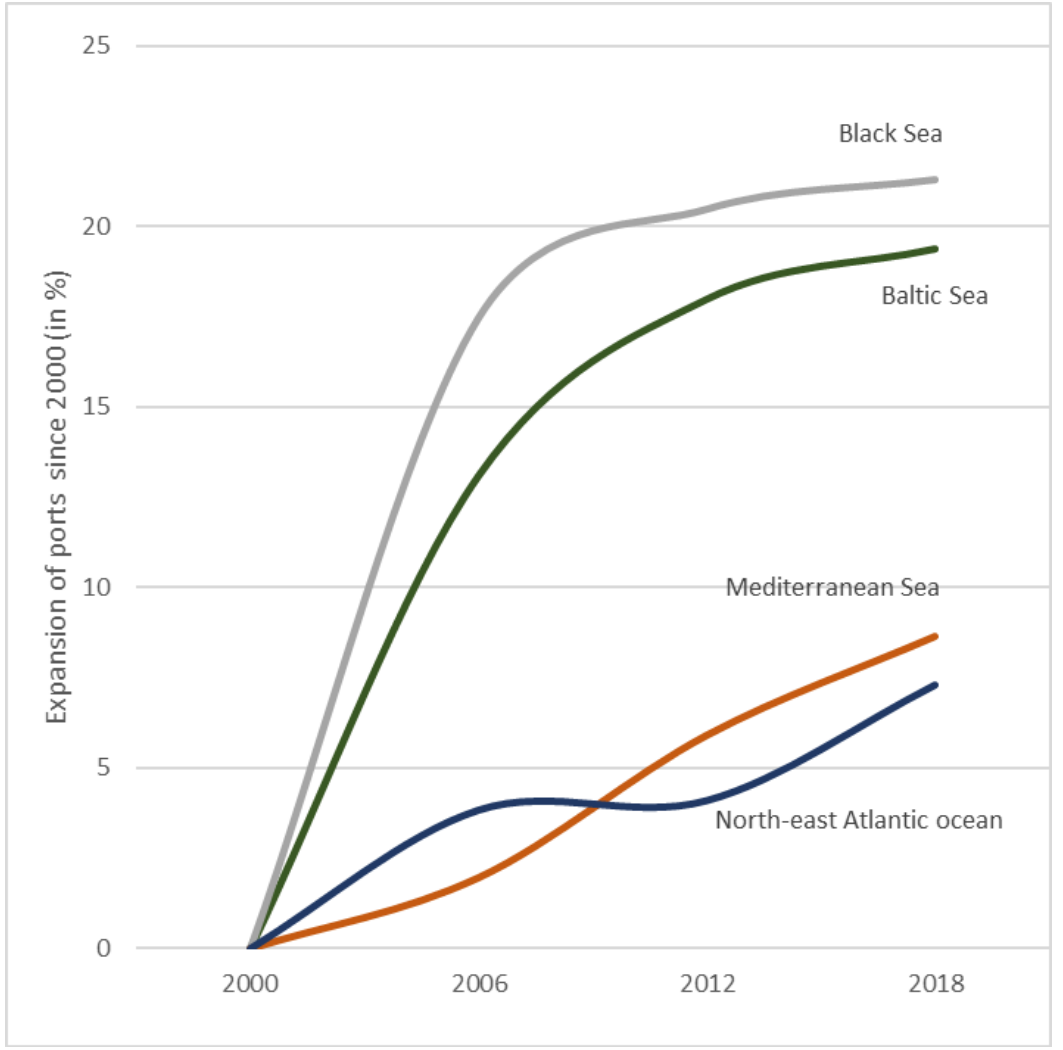
Source: EMODnet

Seabed disturbance: A special focus on ports

- Between 2000-2018, there has been a 13 % increase in port areas. The expansion has been the most prominent in North-East Atlantic Ocean in absolute terms (35 km^2) and in the Black Sea in relative terms (21 %).

- The highest percentage of coastline affected by port development is in the Black Sea (5.9% or 249 km) while the highest in absolute terms is in the North-East Atlantic Ocean (1.5% or 1800 km).

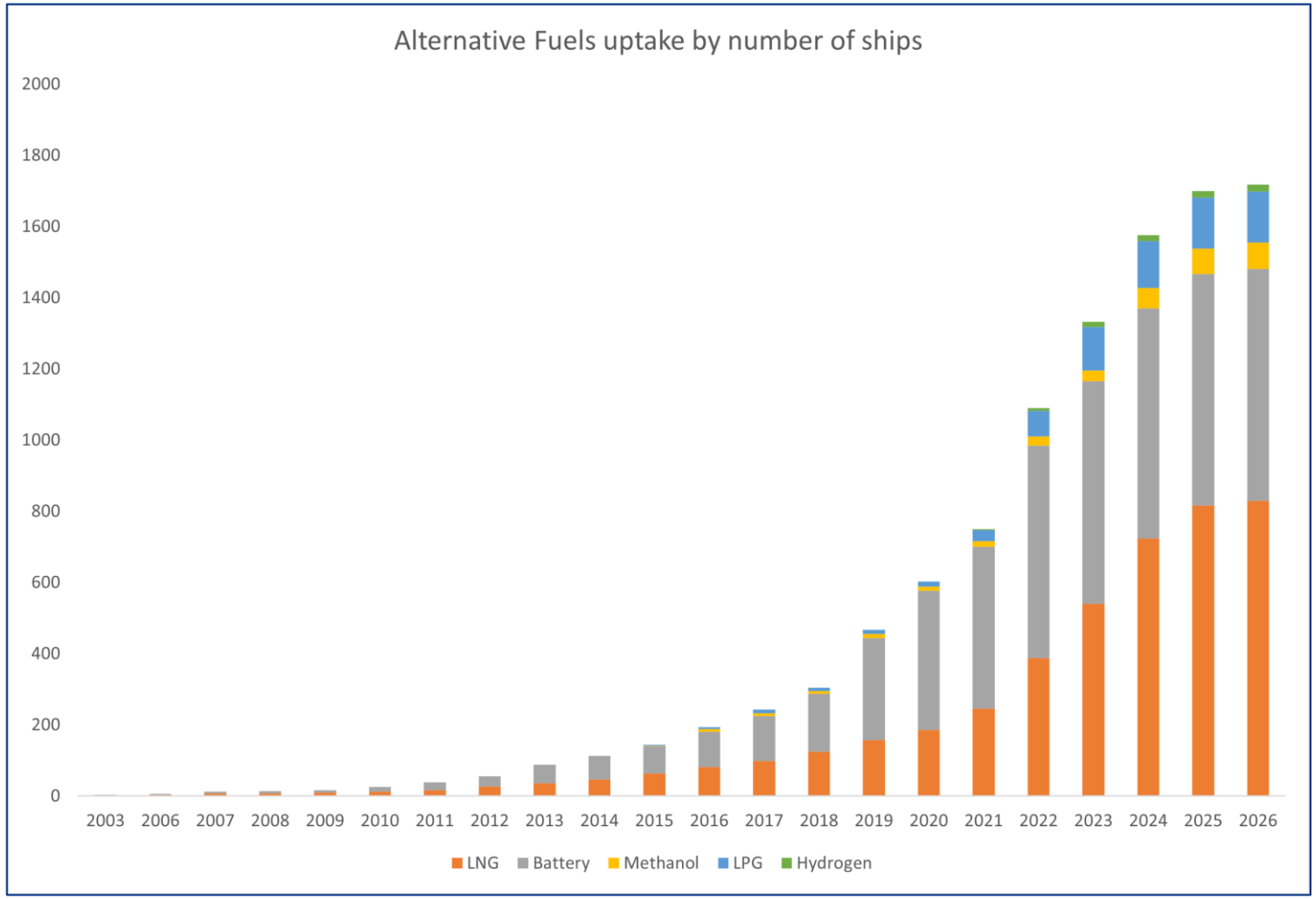
- The most impacted habitat types by ports and port activity-related pressures are sands and muds in shallow water closest to the shore. These sediments are vital for specific sea habitats and organisms.



Expansion of ports between 2000-2018 per marine region.
Source: Copernicus Corine Land Cover (2018, 2012, 2006, 2000)

Climate neutral energy sources

- Clear GHG reduction regulatory framework
  - ETS, FuelEU Maritime, AFIR, RED, ETD
- Sustainable alternative power for shipping
  - Biofuels, methanol, hydrogen, synthetic fuels, ammonia, WAPSs, batteries, fuel cells, nuclear, OPS
- Meeting sustainable criteria:
  - Limited biomass availability
  - Limited electrolyser capacity
  - Increasing OPS in ports

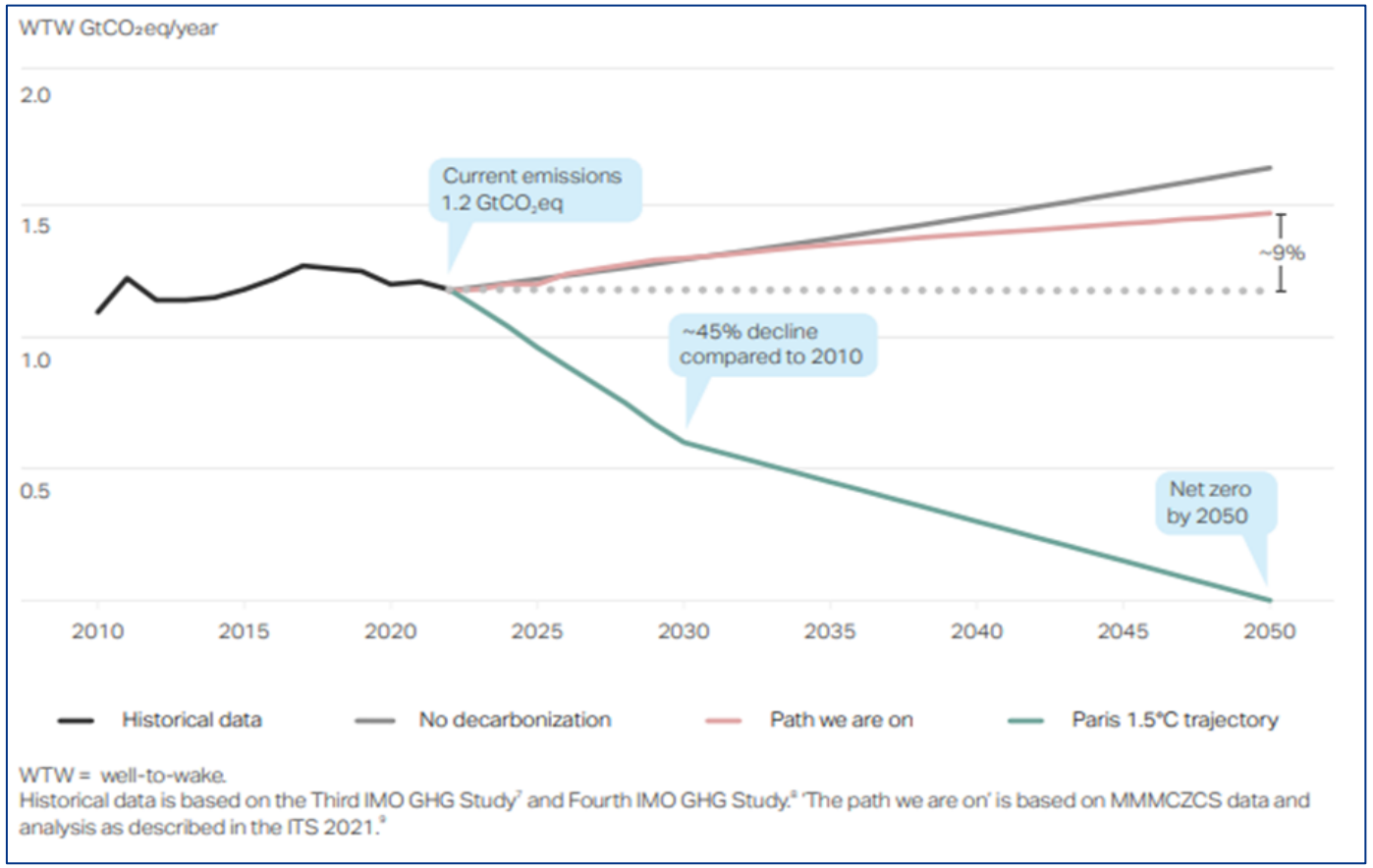


Alternative power solutions by number of ships in the EU (2003-2023) and forecast (2024-2026).
Source: EAFO, 2023.

Energy transition foresight (2030 – 2050)

- Outlook on CO_2 emissions
    - Estimated increases for 2030 (14%) and 2050 (34%)

- To reach IMO targets by 2030, fossil fuel consumption should be decreased by 30-40%:
    - Projected energy demand of global fleet ranging between 12.1 and 14.2 EJ in 2030.



Emissions based on three scenarios, 'no decarbonisation' 'business as usual' 'Paris 1.5 trajectory'' between 2010 and 2050 based on IPCC global trajectory.

Source: Maritime Decarbonisation Strategy 2022, Maersk Mc-Kinney Moller Centre.

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