Baltic Sea - Pressures & State

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Overview

1. Background
2. Policies and concepts
3. Baltic Sea - pressures and state
4. Baltic Sea - cumulative assessment
5. Conclusions

Helcom: http://stateofthebalticsea.helcom.fi/in-brief/our-baltic-sea/

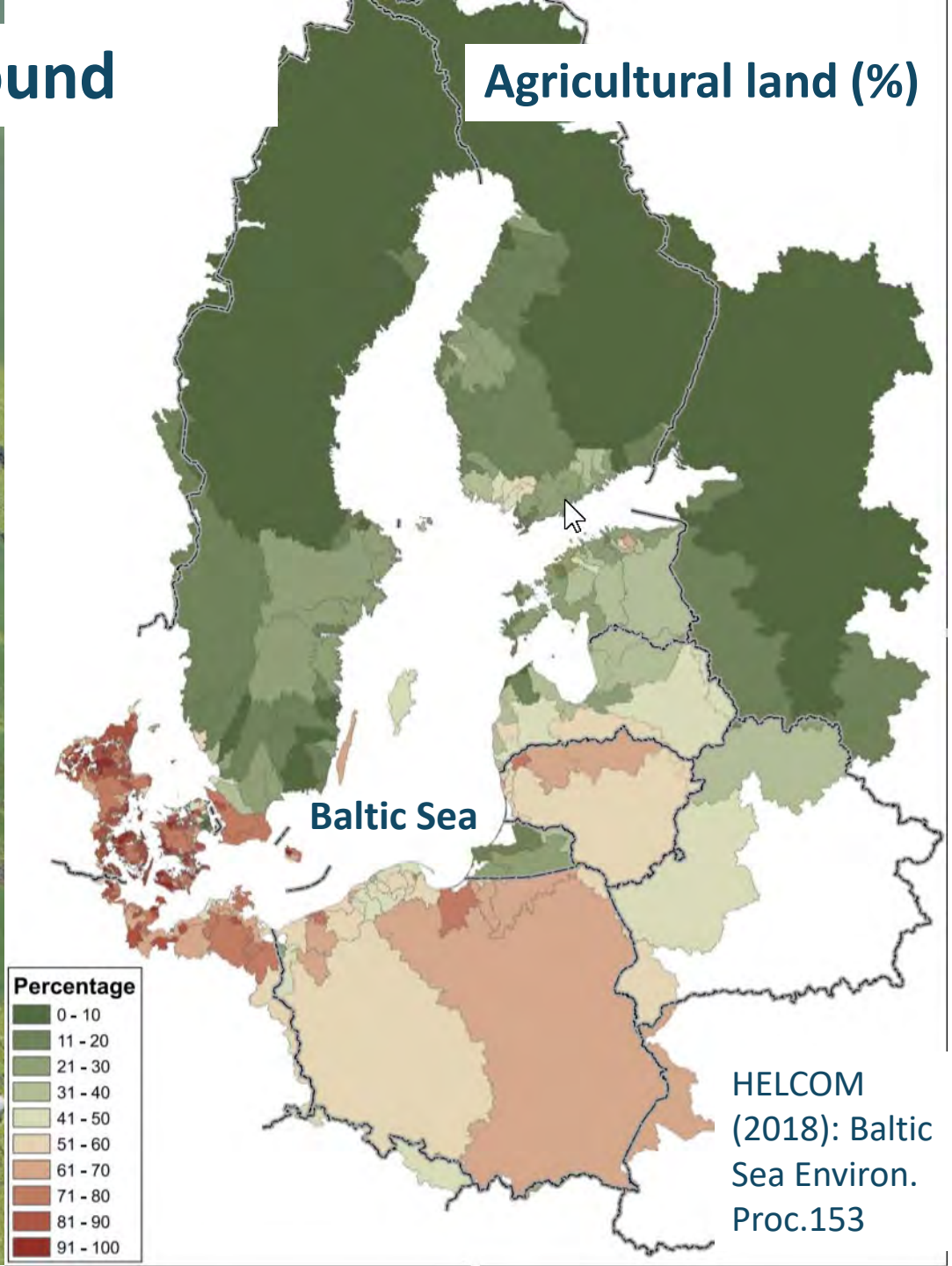
1. The Baltic Sea – background

It is bordered by 9 countries (Denmark, Sweden, Finland, Russia, Estonia, Latvia, Lithuania, Poland and Germany).

Area:	412 560 km²
Volume:	21 631 km³
Water residence time:	25-30 years
South-north-spread:	ca. 1300 km
West-east-spread:	ca. 1000 km
Average depth:	52 m
Maximum depth:	460 m
Catchment:	1 734 000 km²
Population:	85 millions

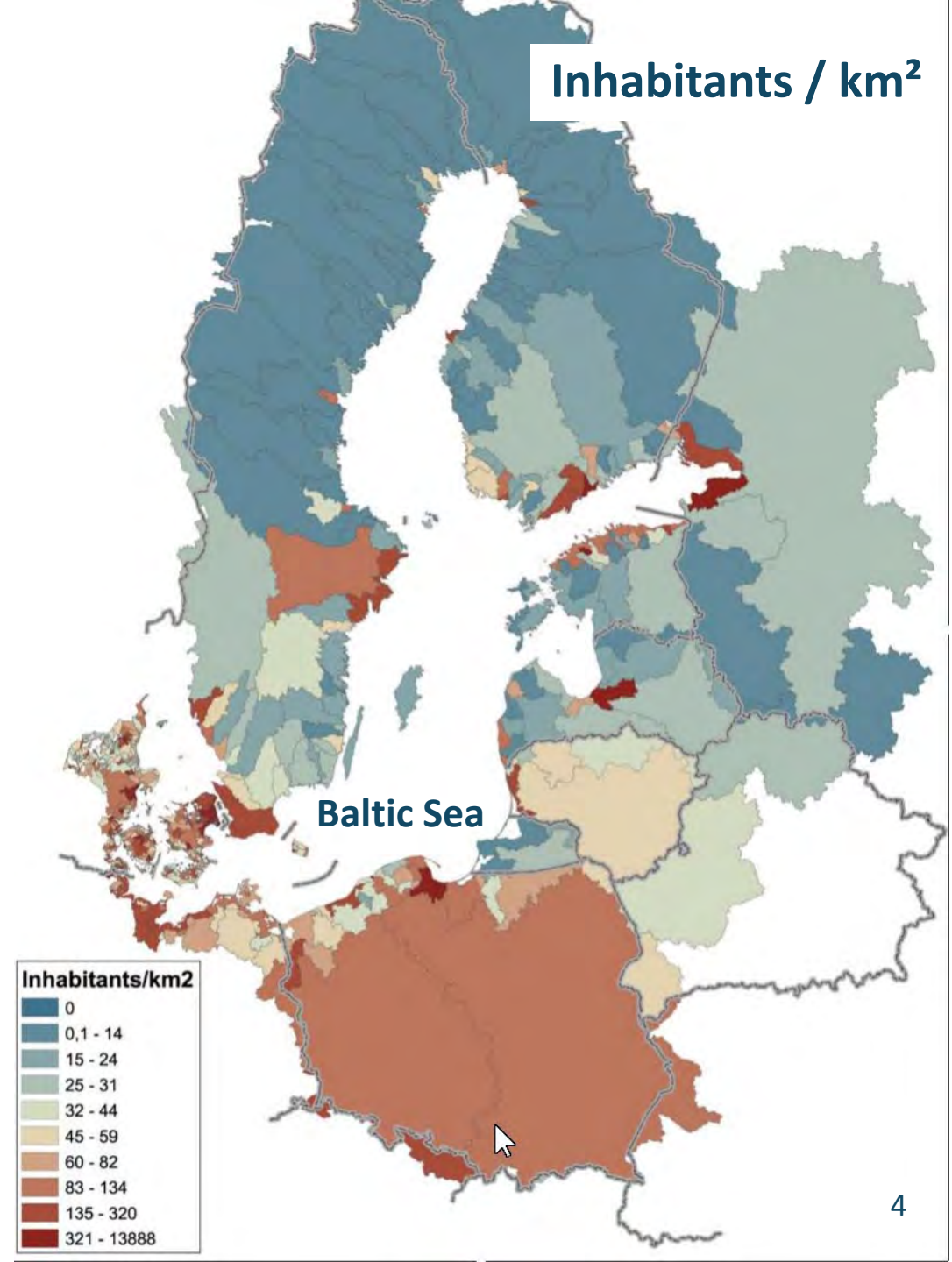
1. Background

Agricultural land (%)



HELCOM (2018): Baltic Sea Environ. Proc.153

Inhabitants / km²



2. Policies: The Marine Strategy Framework Directive (MSFD)

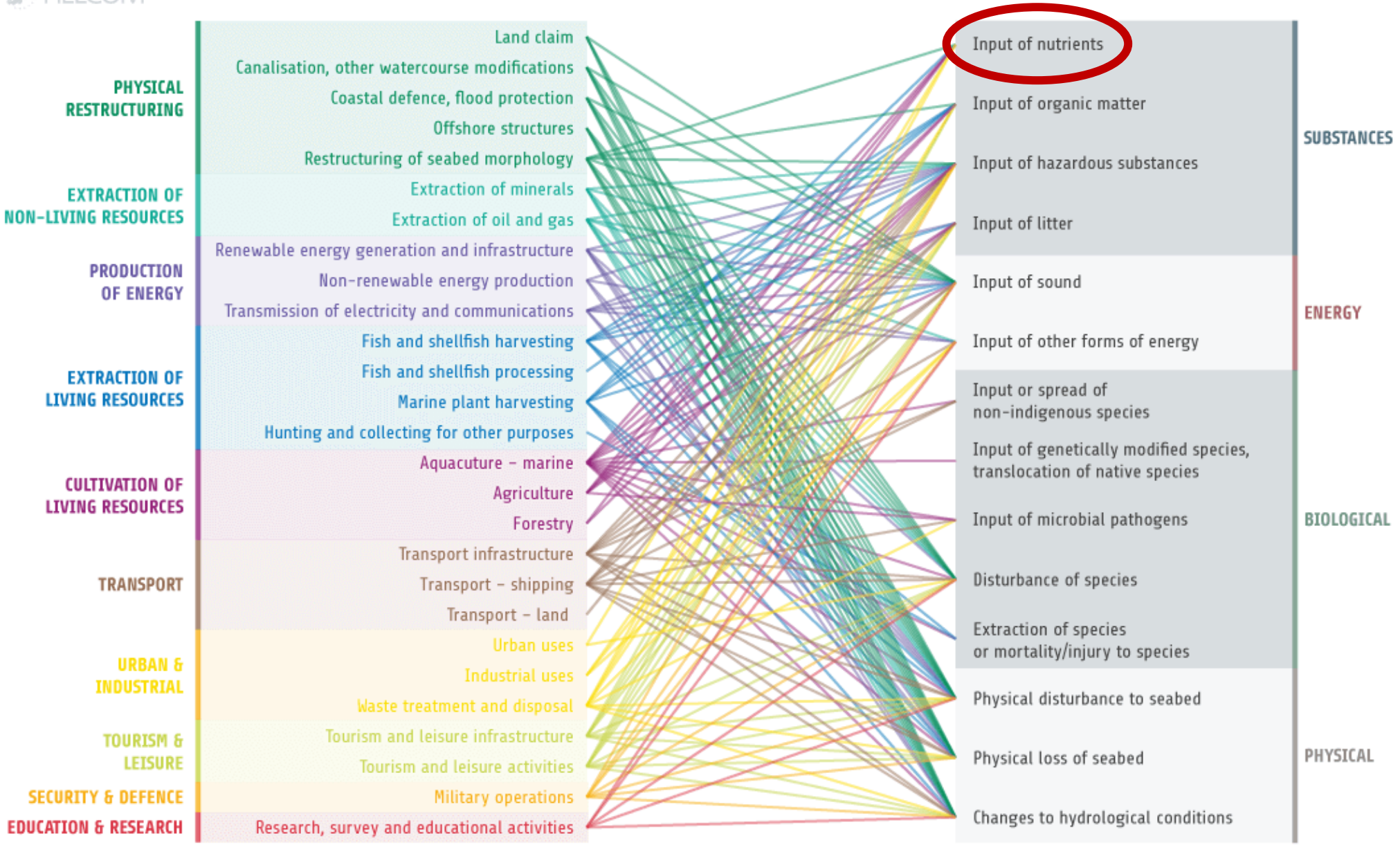
- aims to achieve Good Environmental Status (GES) of the European Unions marine waters and wants to protect the resource base upon which marine-related economic and social activities depend,
- provides a legislative framework based on the ecosystem approach to the management of human activities,
- defines a stepwise implementation strategy and timetable and
- defines 11 qualitative descriptors defining the GES.

Baltic Sea: Helsinki Commission (HELCOM)

https://ec.europa.eu/environment/marine/

3. Baltic Sea driver & pressures

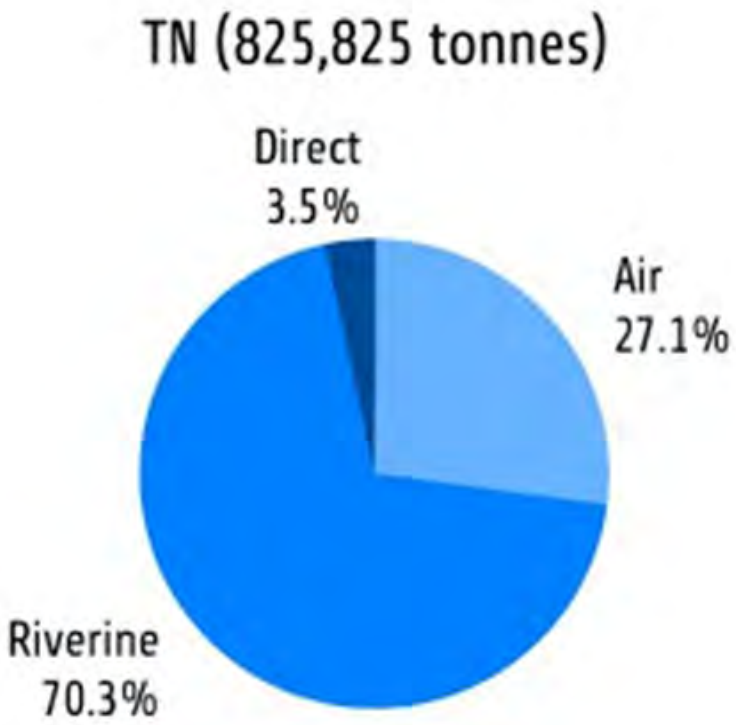
HELCOM

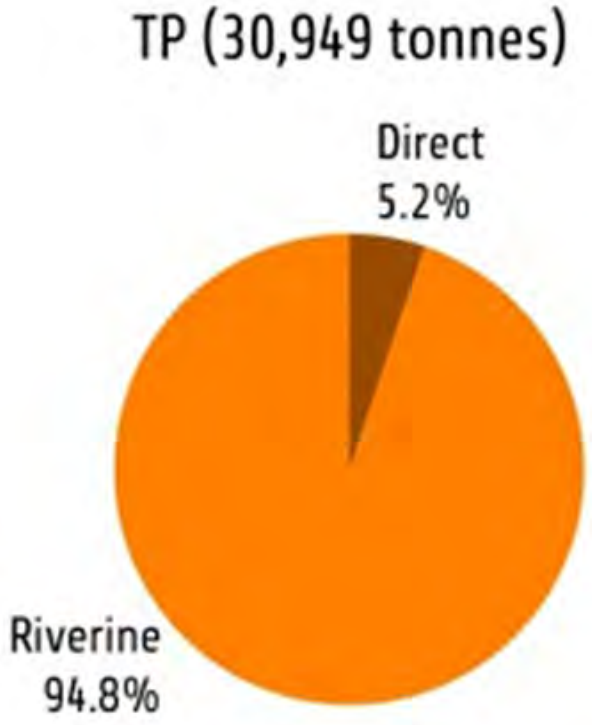


HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Eutrophication

Sources and loads of nitrogen and phosphorus in 2014



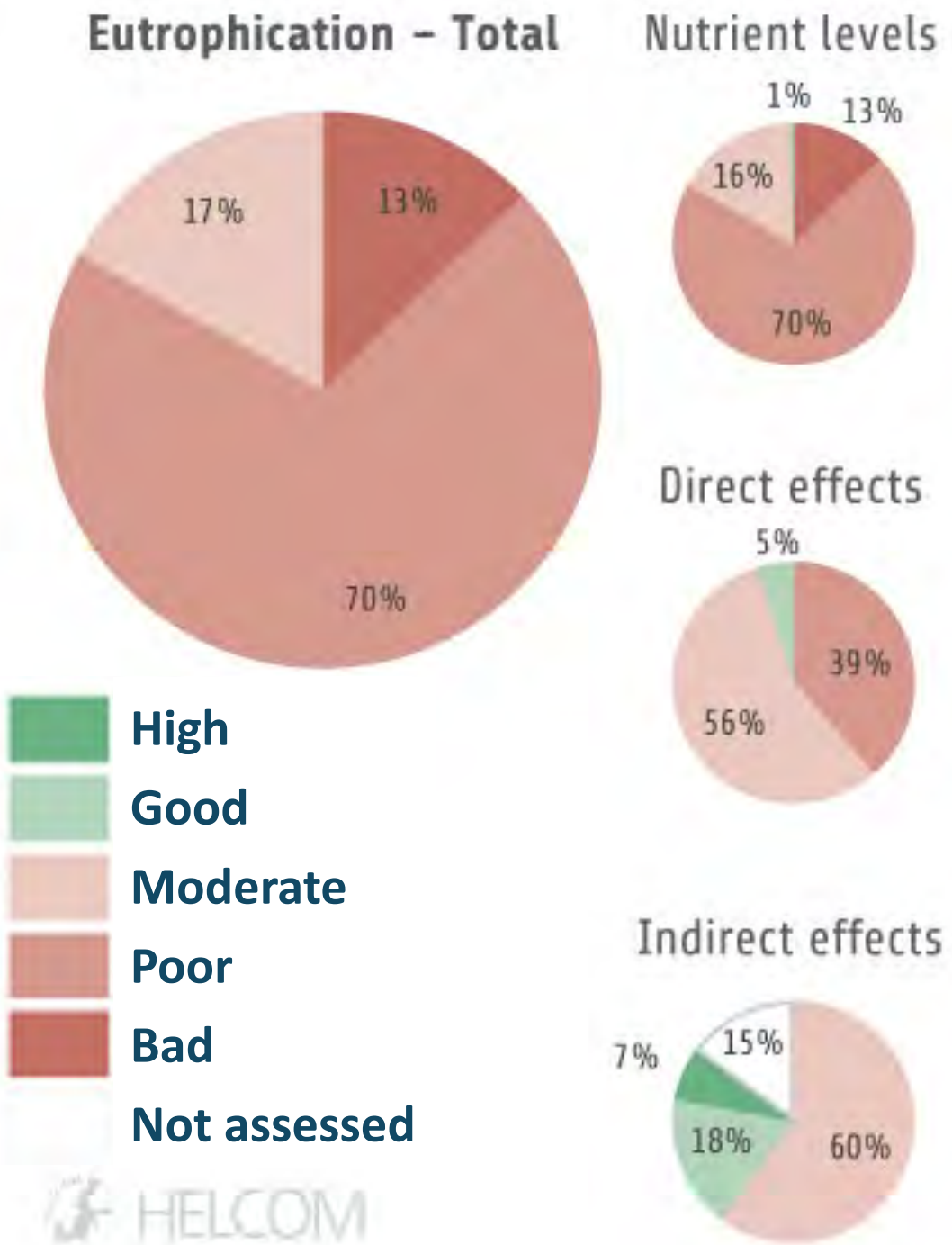


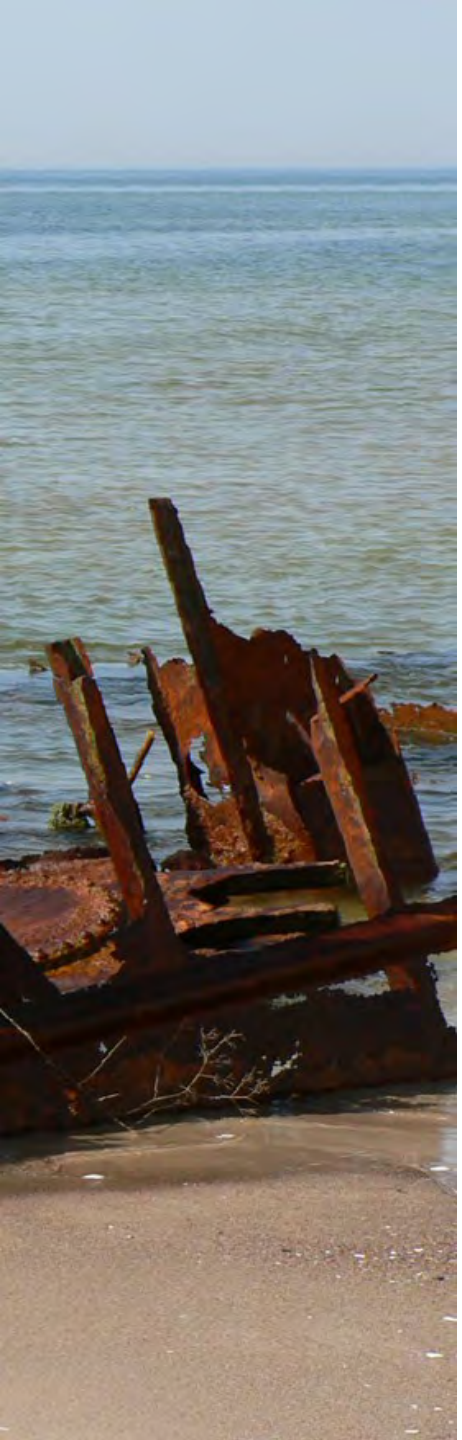
HELCOM (2018): Baltic Sea Envir. Proc. 155
http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Eutrophication

Proportion of open sea area within each of the five status categories of the integrated assessment of eutrophication (based on km2).

HELCOM (2018): Baltic Sea Envir. Proc. 155
http://stateofthebalticsea.helcom.fi/





3. Baltic Sea pressures & state: Hazardous substances

According to HELCOM, hazardous substances cover **organic chemicals**, **heavy metals** and **radionucleids**) that are

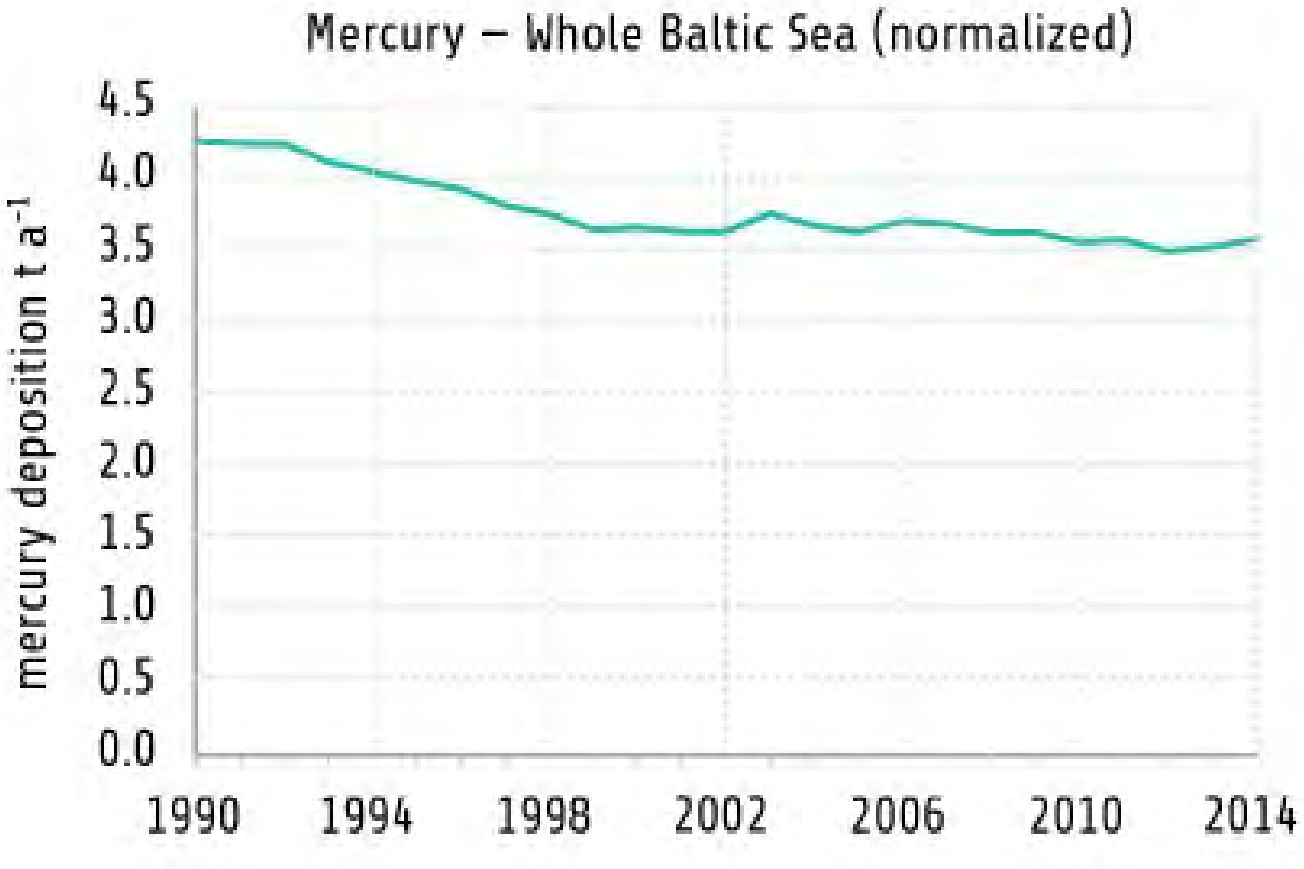
- toxic, persistent and bioaccumulate, or
- have effects on hormone and immune systems in marine organisms.

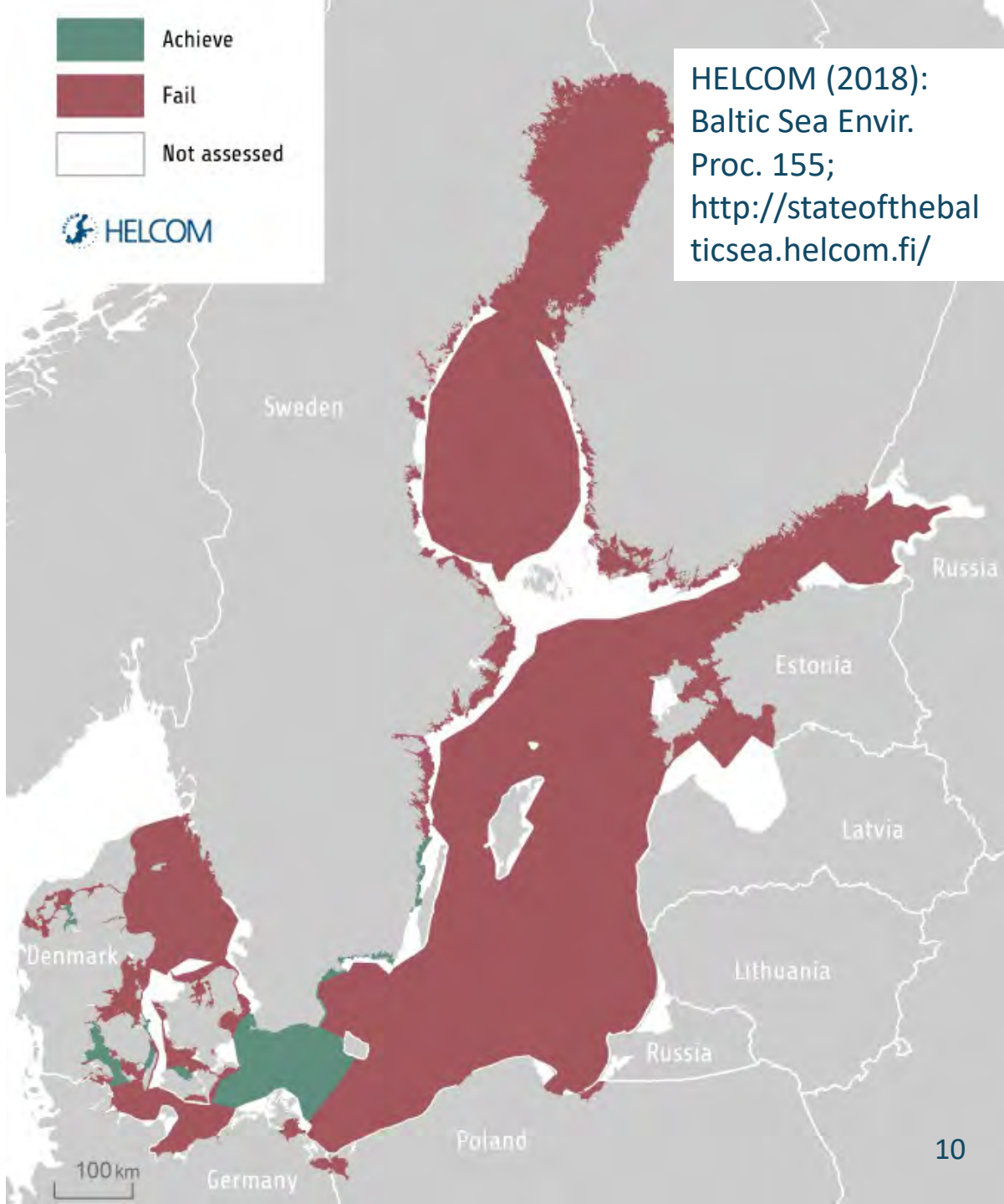
- Heavy metal indicators are **cadmium, mercury and lead**.
- A major current source for these metals is the burning of fossil fuels.
- Pathway to the sea is atmospheric deposition.

HELCOM (2018): Baltic Sea Envir. Proc. 155
http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Hazardous substances Mercury

- Mercury has still elevated concentrations in the Baltic Sea environment.

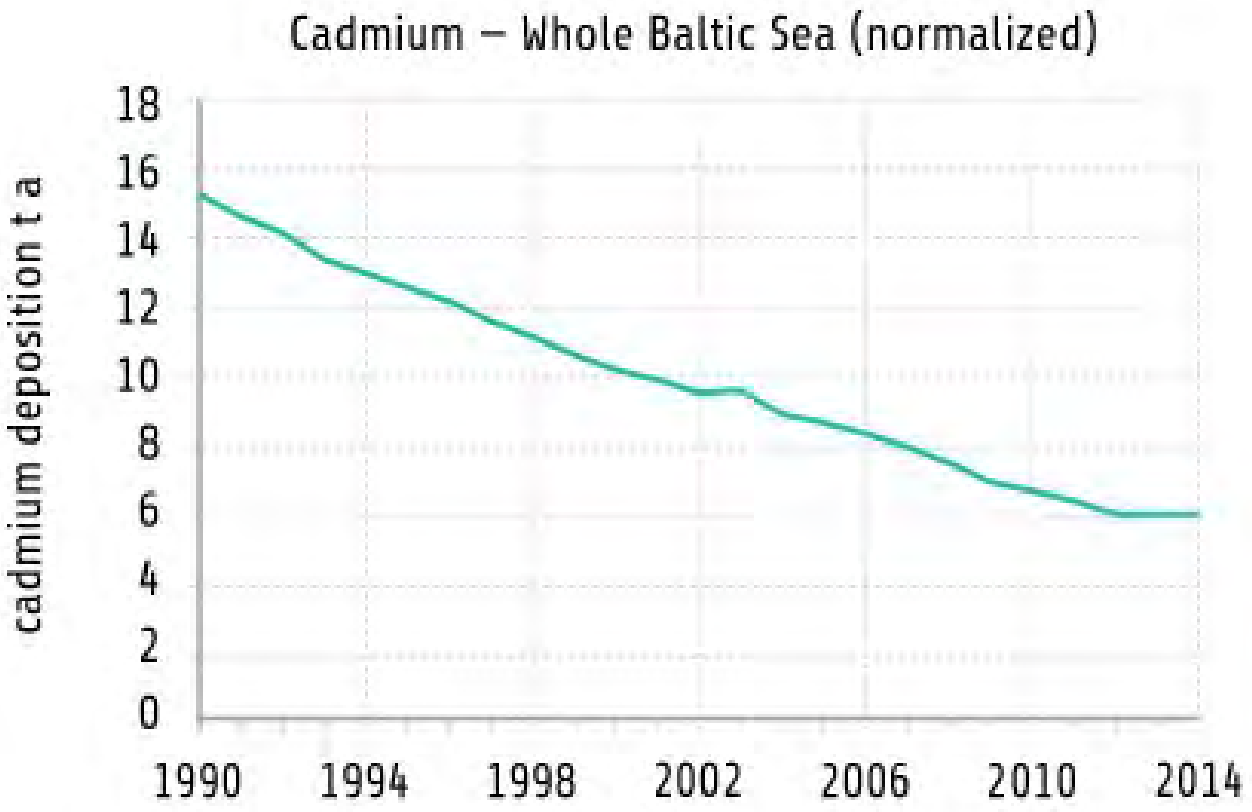


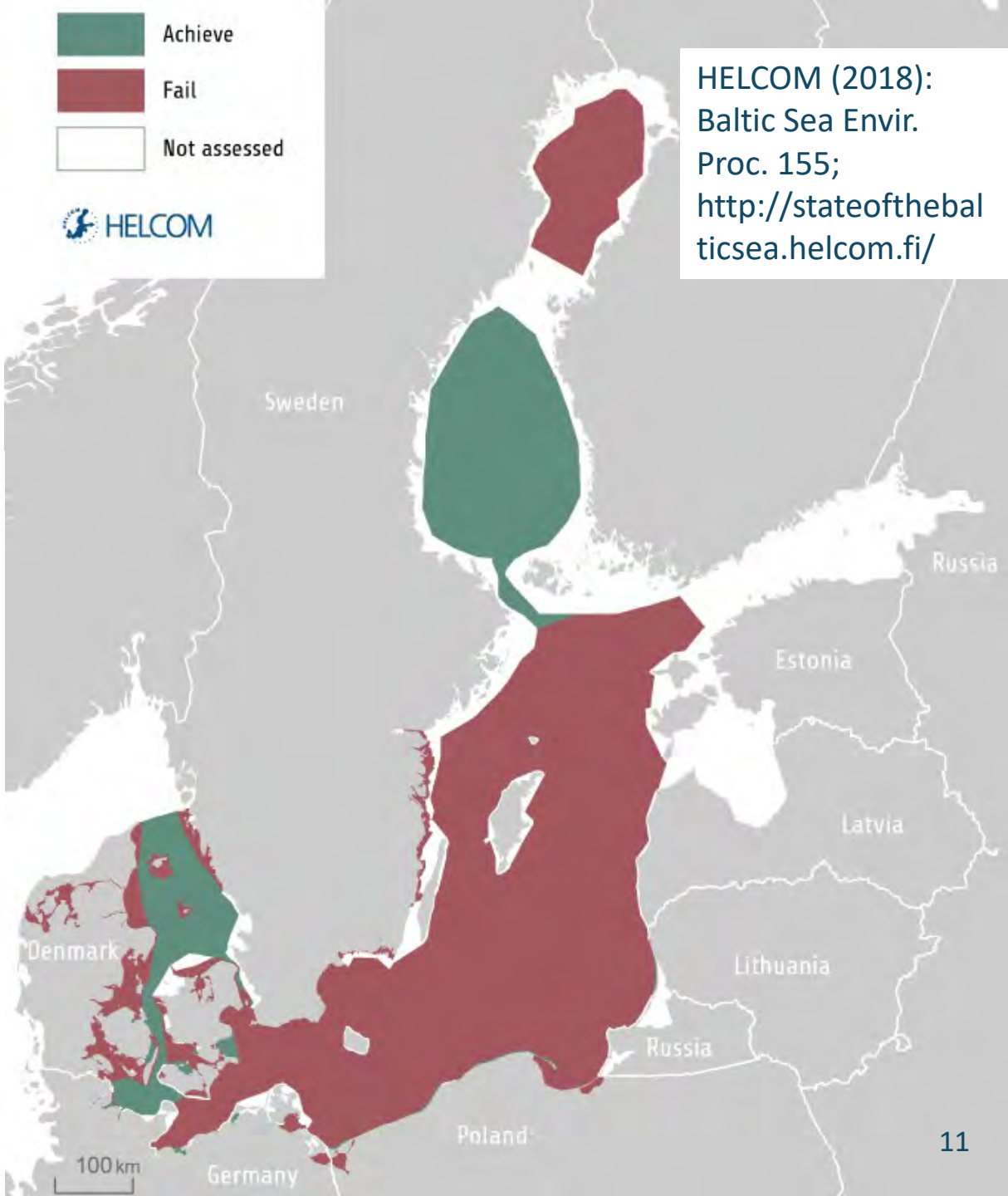


HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Hazardous substances Cadmium

- Legislation is in place to decrease inputs of mercury, cadmium and lead to the Baltic Sea.



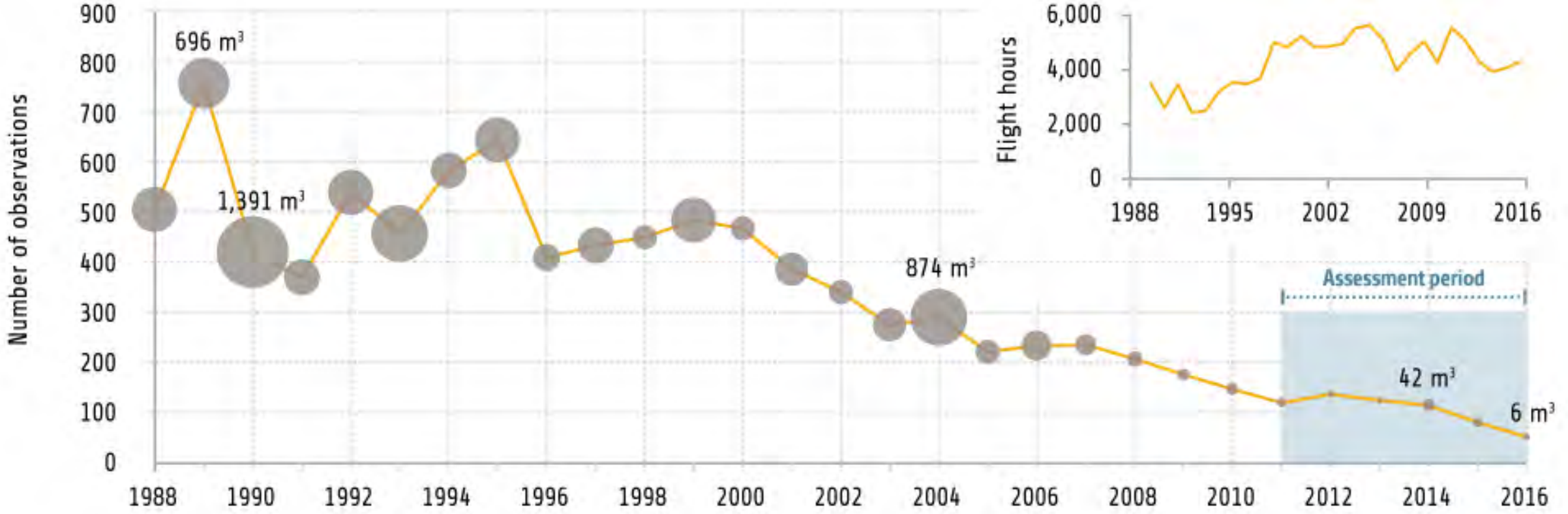


HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Hazardous substances

The number of oil-spills detected in aerial surveillance by the Baltic Sea countries between 1988 and 2016

➡ Oil spills have decreased in all sub-basins of the Baltic Sea.



HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

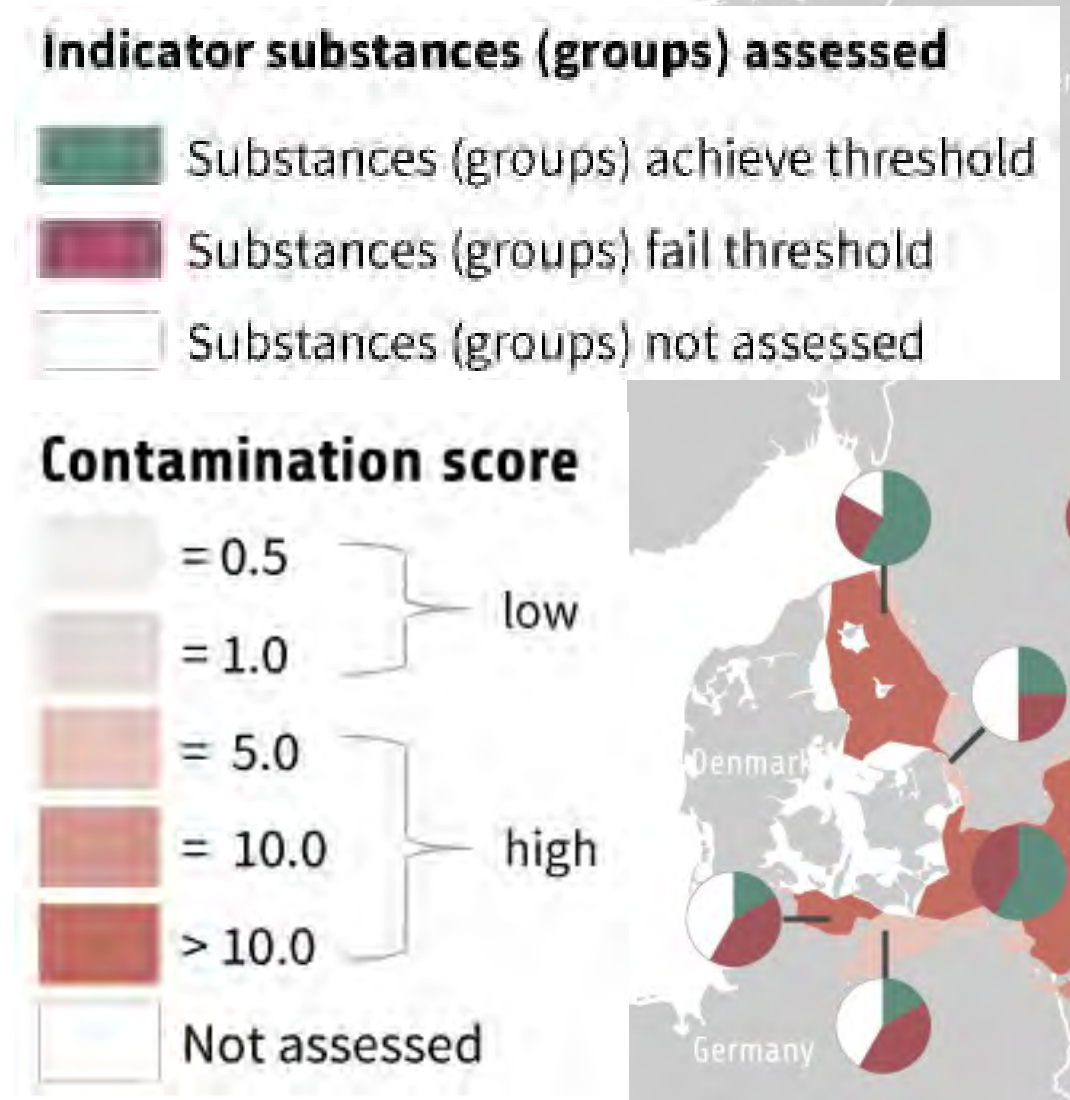
3. Baltic Sea pressures & state: Hazardous substances

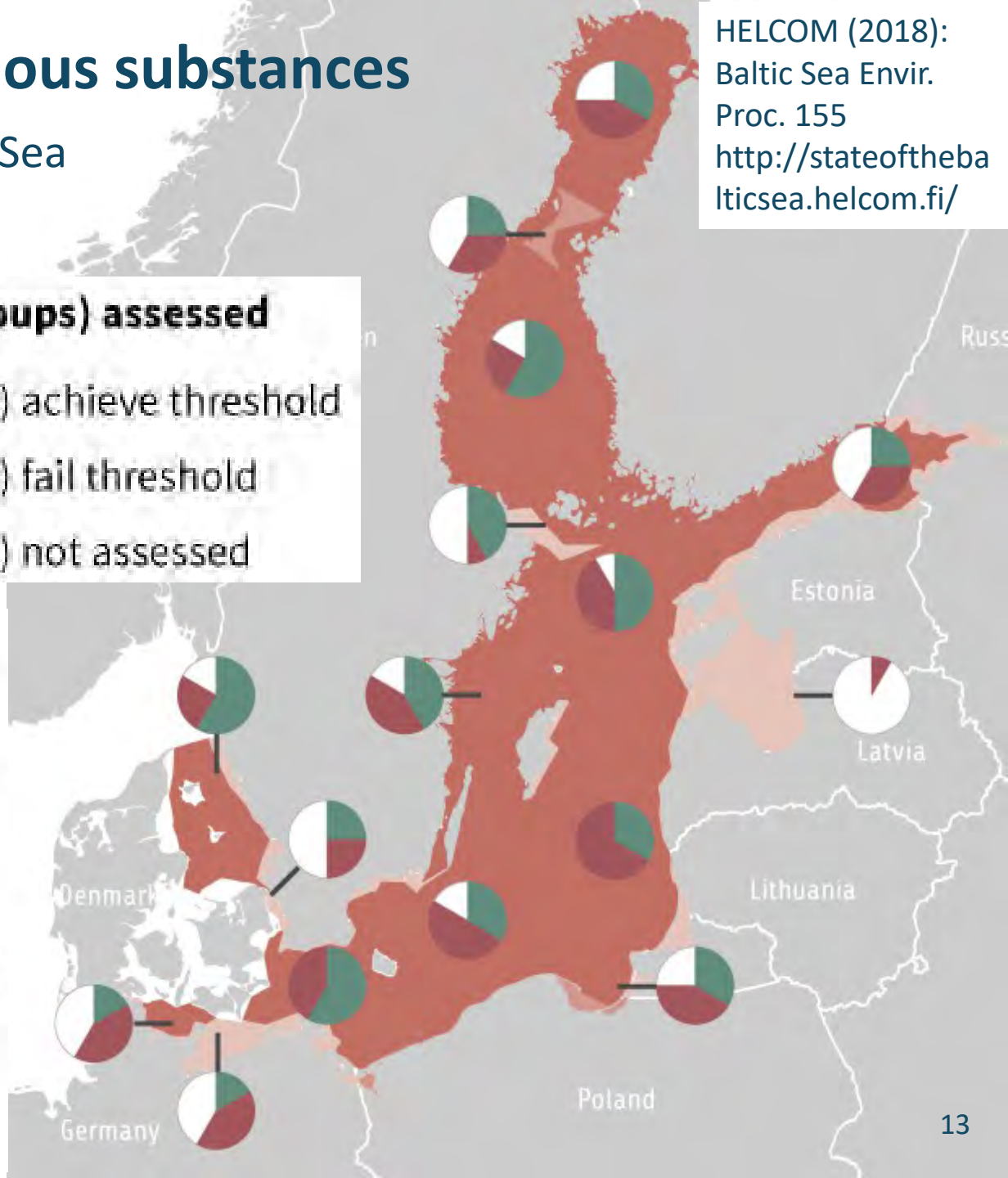
The integrated contamination status of the Baltic Sea assessed using the CHASE tool.

HELCOM (2018): Baltic Sea Envir. Proc. 155 http://stateofthebalticsea.helcom.fi/

Indicator substances (groups) included:

- HBCDD
- PBDEs
- Benzo(a)pyrene
- Anthracene
- Fluoranthene
- Non-dioxin-like PCBs
- Dioxins and dioxin-like PCBs
- PFOS
- Mercury
- Cadmium
- Lead
- Cesium-137

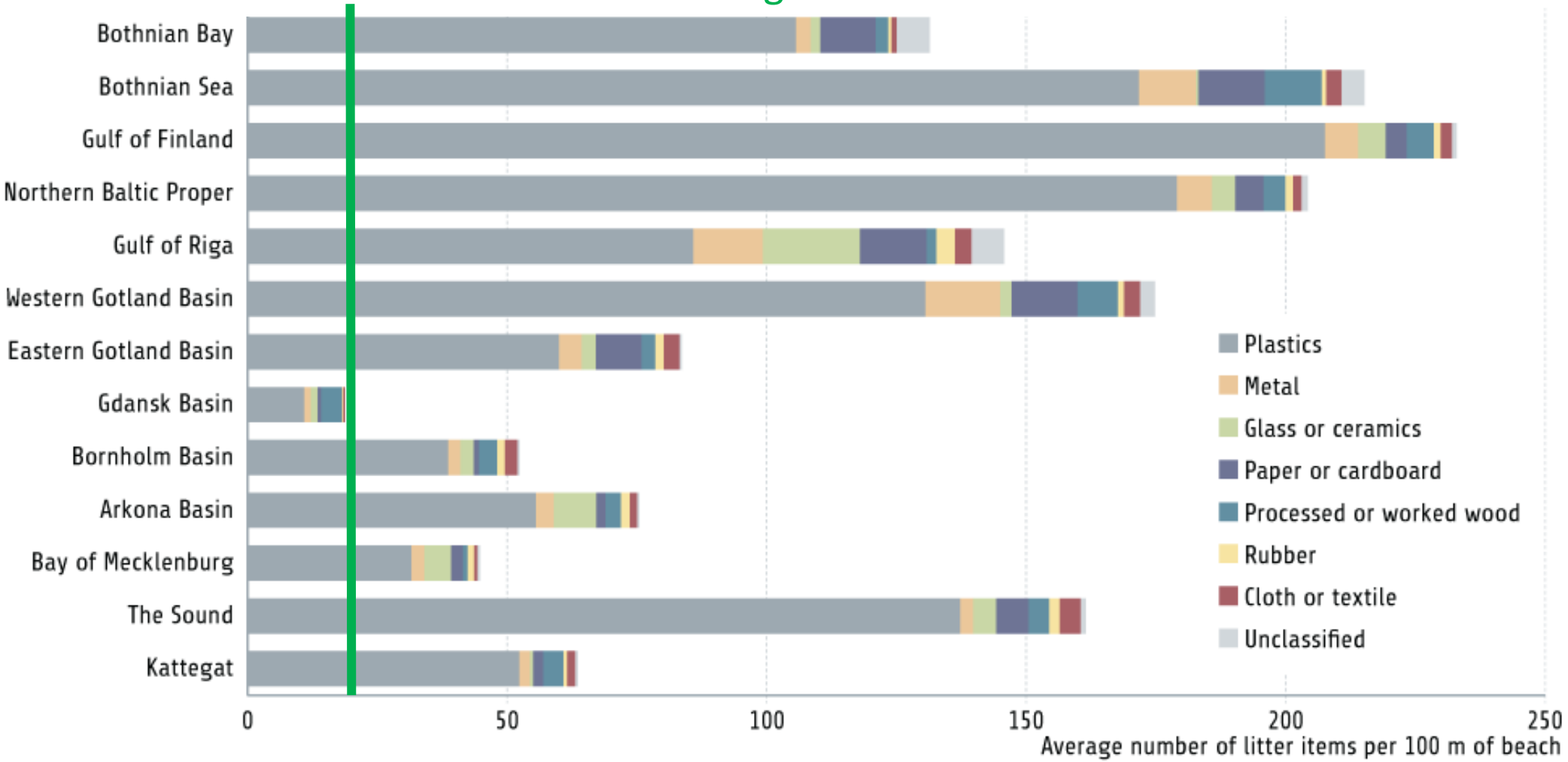




3. Baltic Sea pressures & state: Marine litter

Macrolitter (>25 mm) at beaches

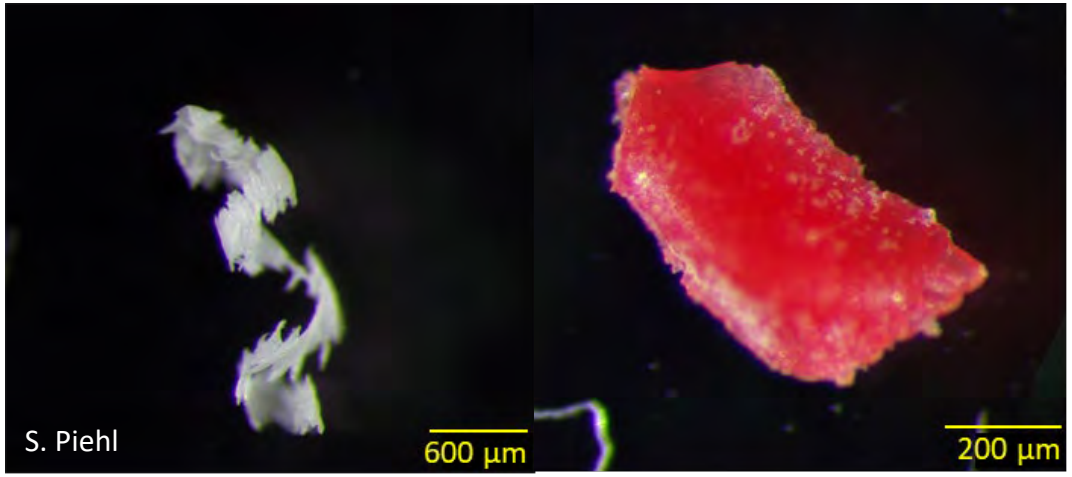
20 is the threshold for a good status



HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

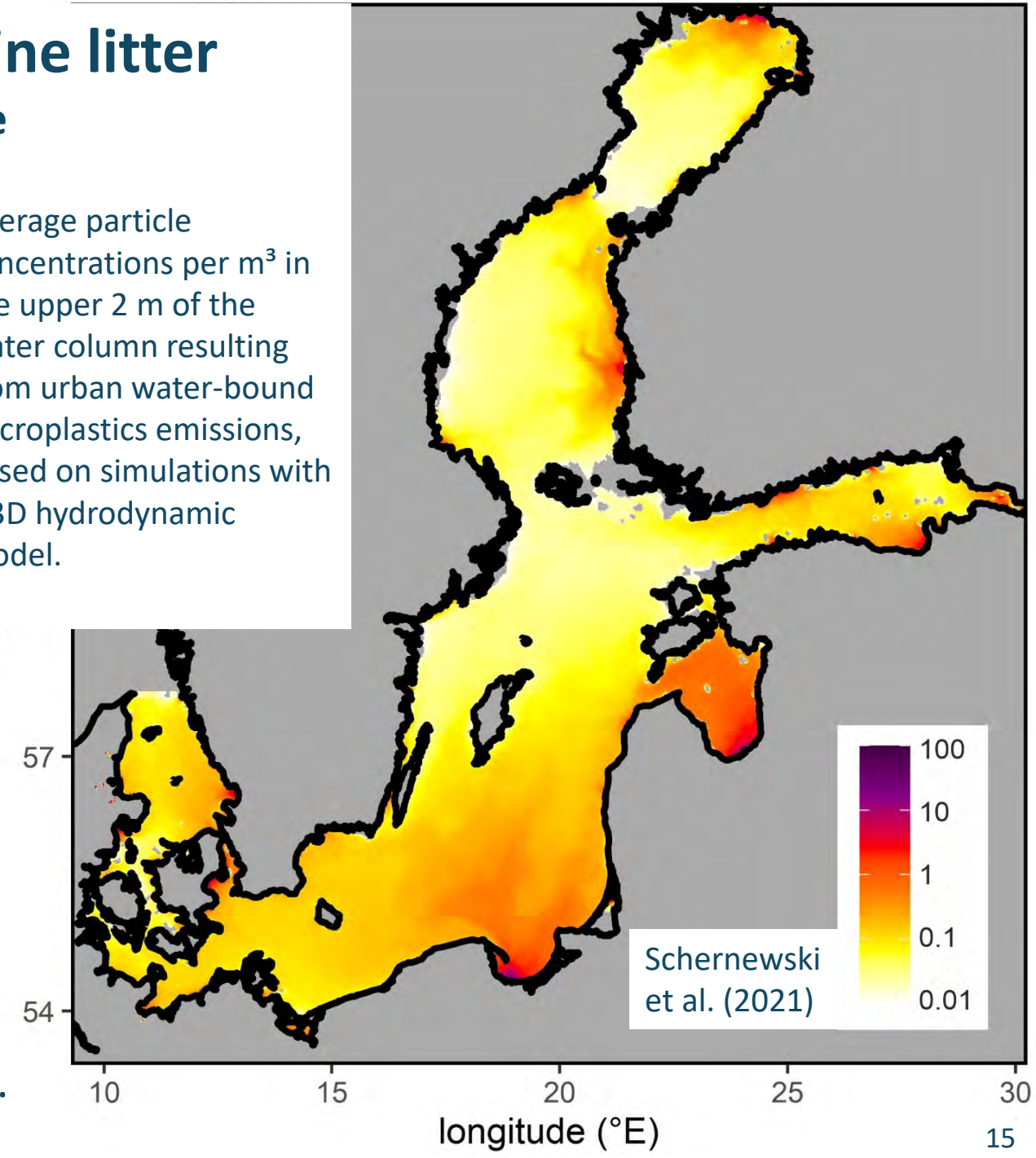
3. Baltic Sea pressures & state: Marine litter

Microplastic (20-500 µm) near the sea surface



Average particle concentrations per m^3 in the upper 2 m of the water column resulting from urban water-bound microplastics emissions, based on simulations with a 3D hydrodynamic model.

- Data on microplastic in the sea are rare.
- Model approaches focused on urban microplastic pathways suggest relatively low concentrations in the sea.
- Concentrations are high near major river mouths.
- 67 trillion microplastic particles are annually emitted from urban sources in the Baltic region.



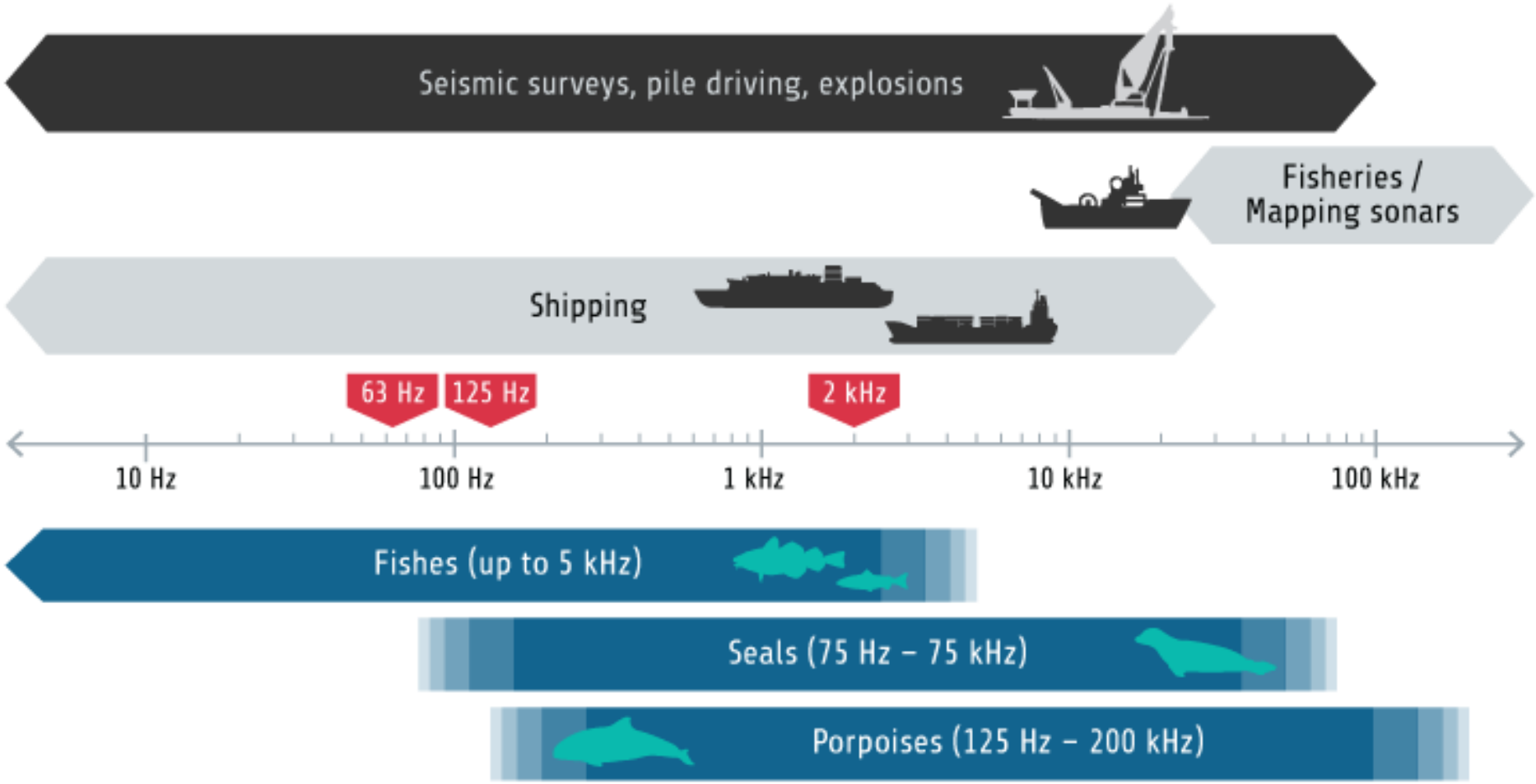
3. Baltic Sea pressures & state: Underwater noise

- Around 400 sea ports are located in the Baltic Sea region. 90 are of international importance.
- In average 2000 ships are on the Baltic Sea at any time.
- 11% are passenger ships, which transport about 50 Mio. passengers annually.
- About 7,000 larger ships (>1,000 t) are located around the Baltic Sea.
- The Baltic Sea fleet represents 13% of the world fleet and 35% of the EU fleet (Boteler et al. 2015).

Matczak et al. (2018): 20180730_FutureShippingQuoVadis.pdf

3. Baltic Sea pressures & state: Underwater noise

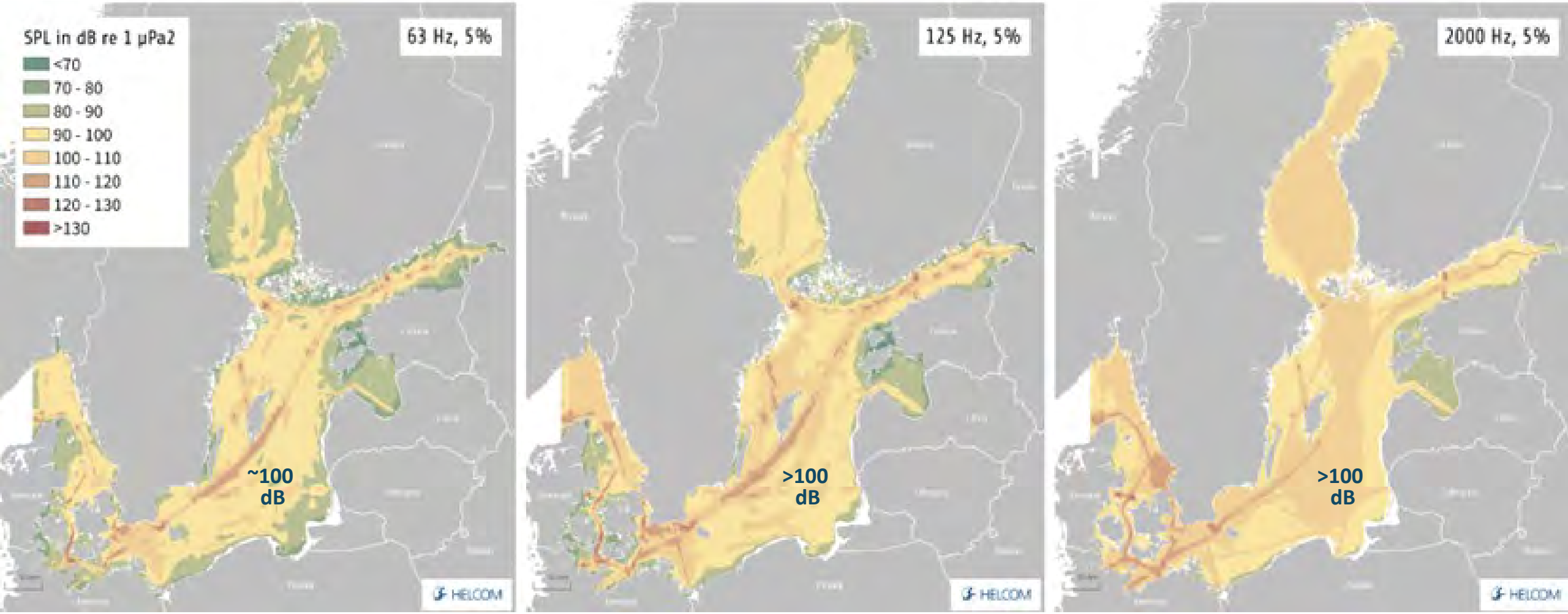
Sound frequencies generated by human activities and auditory range of some marine species present in the Baltic Sea.



HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Underwater noise

The sound pressure level (SPL) of underwater continuous sound at different frequency exceeding 5% of the time in dezibel (dB).

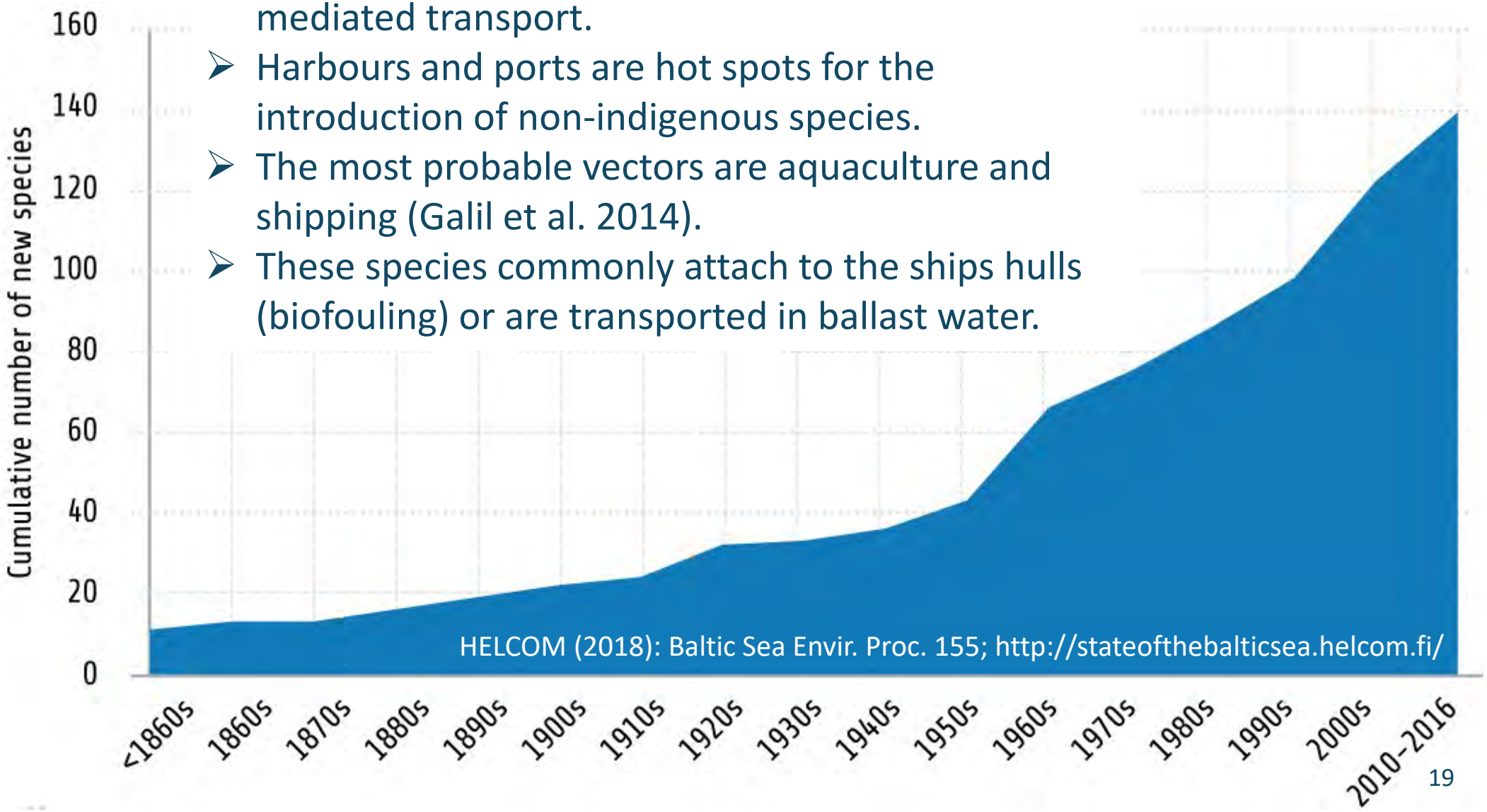


100 dB ~ circular saw/waterfall

HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Non-indigenous species

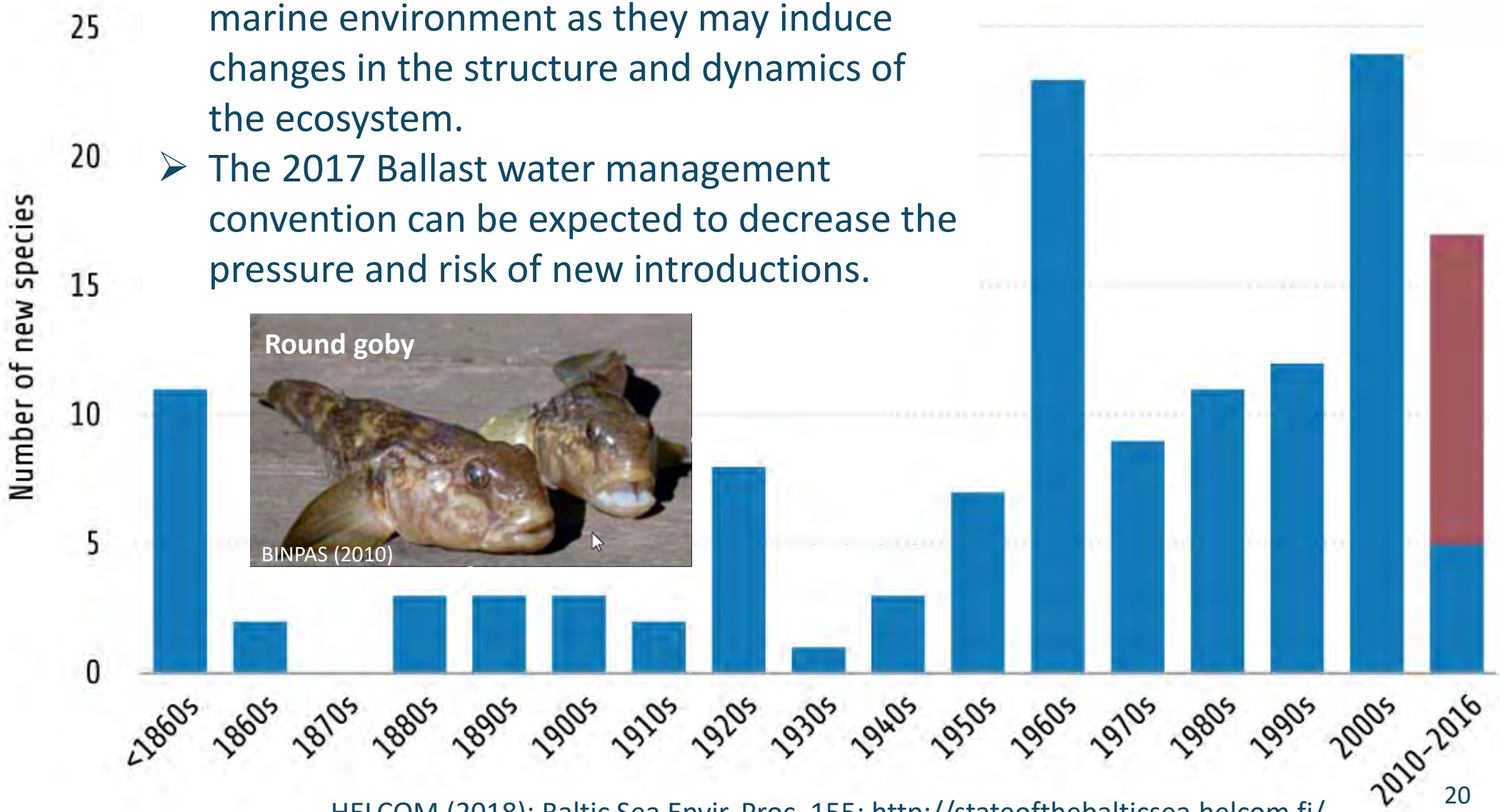
- Non-indigenous species usually arrive via human-mediated transport.
- Harbours and ports are hot spots for the introduction of non-indigenous species.
- The most probable vectors are aquaculture and shipping (Galil et al. 2014).
- These species commonly attach to the ships hulls (biofouling) or are transported in ballast water.



HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Non-indigenous species

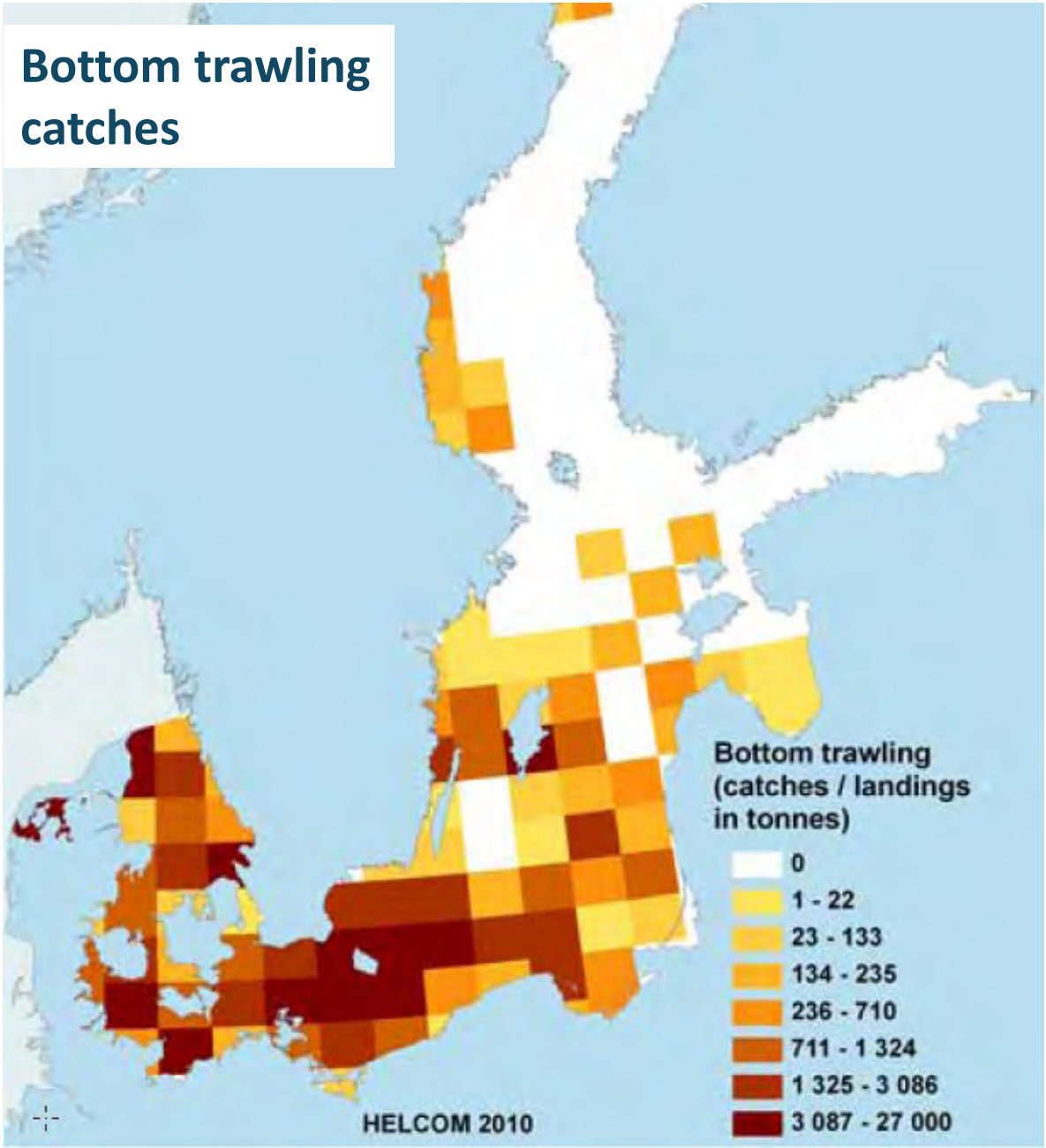
- Non-indigenous species pose a threat to the marine environment as they may induce changes in the structure and dynamics of the ecosystem.
- The 2017 Ballast water management convention can be expected to decrease the pressure and risk of new introductions.



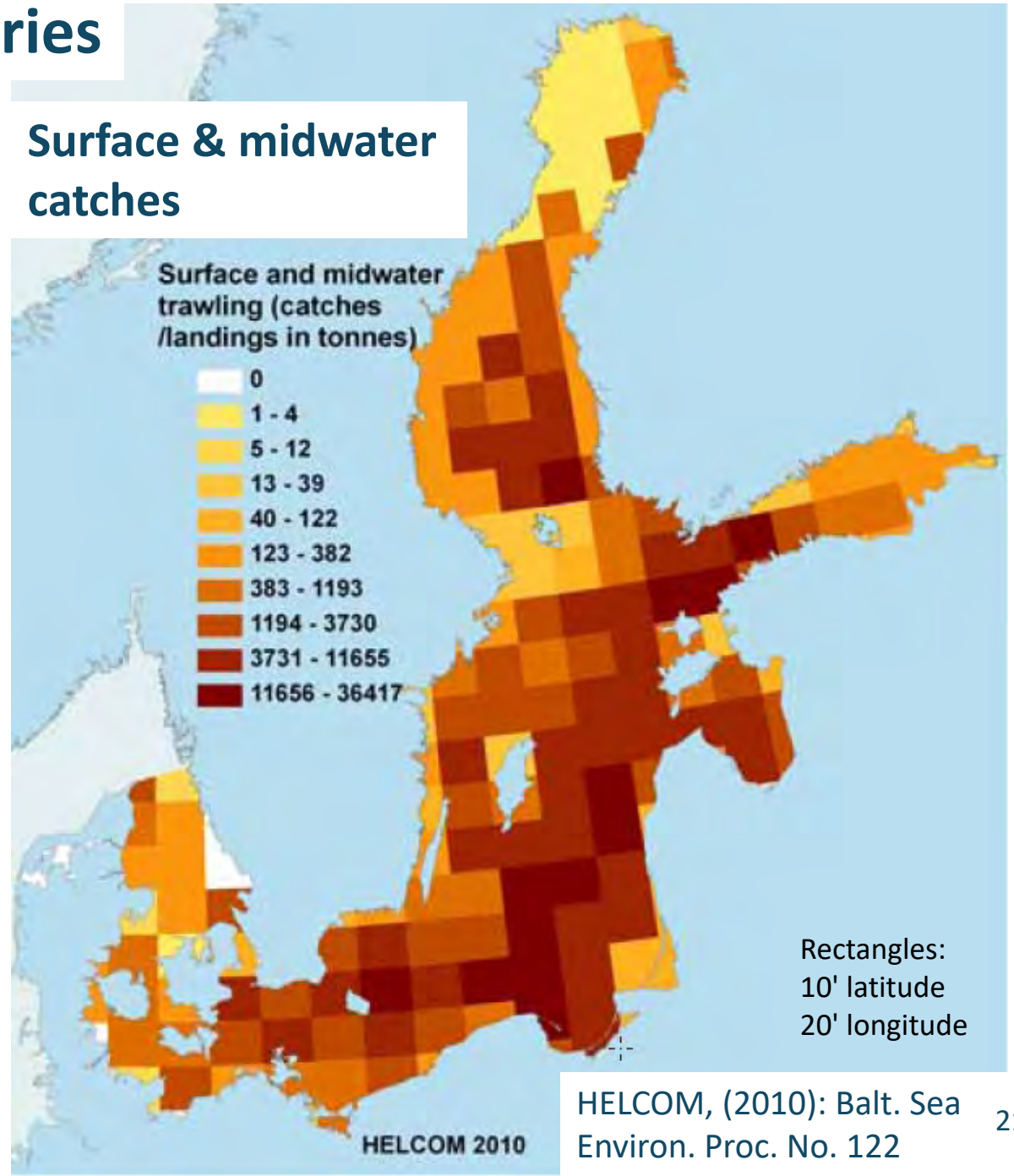
HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Fisheries

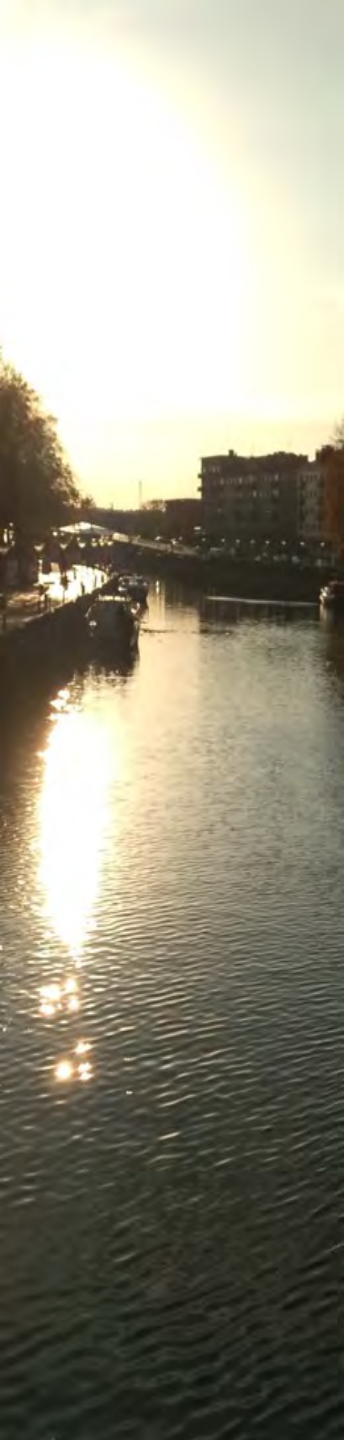
Bottom trawling catches



Surface & midwater catches

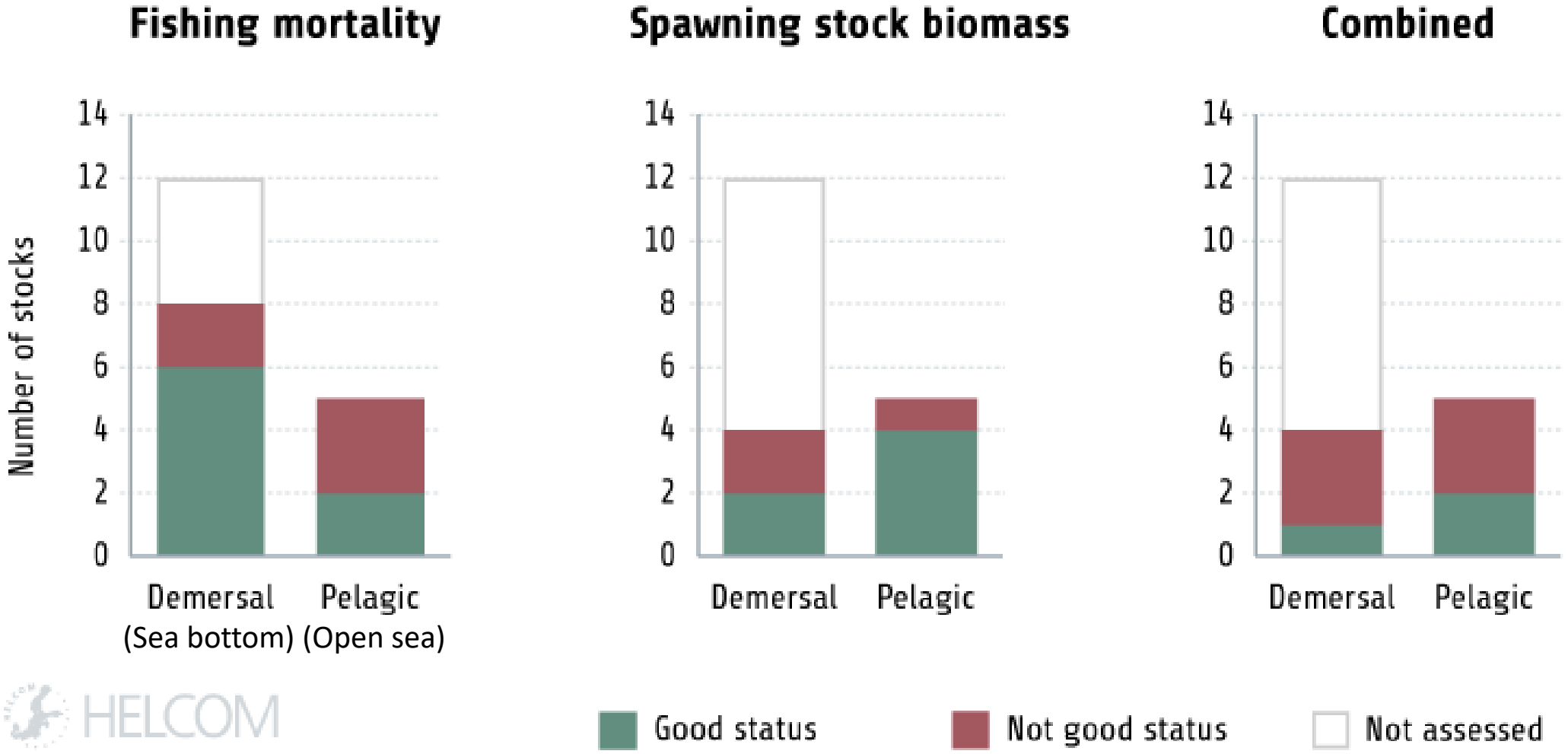


HELCOM, (2010): Balt. Sea Environ. Proc. No. 122



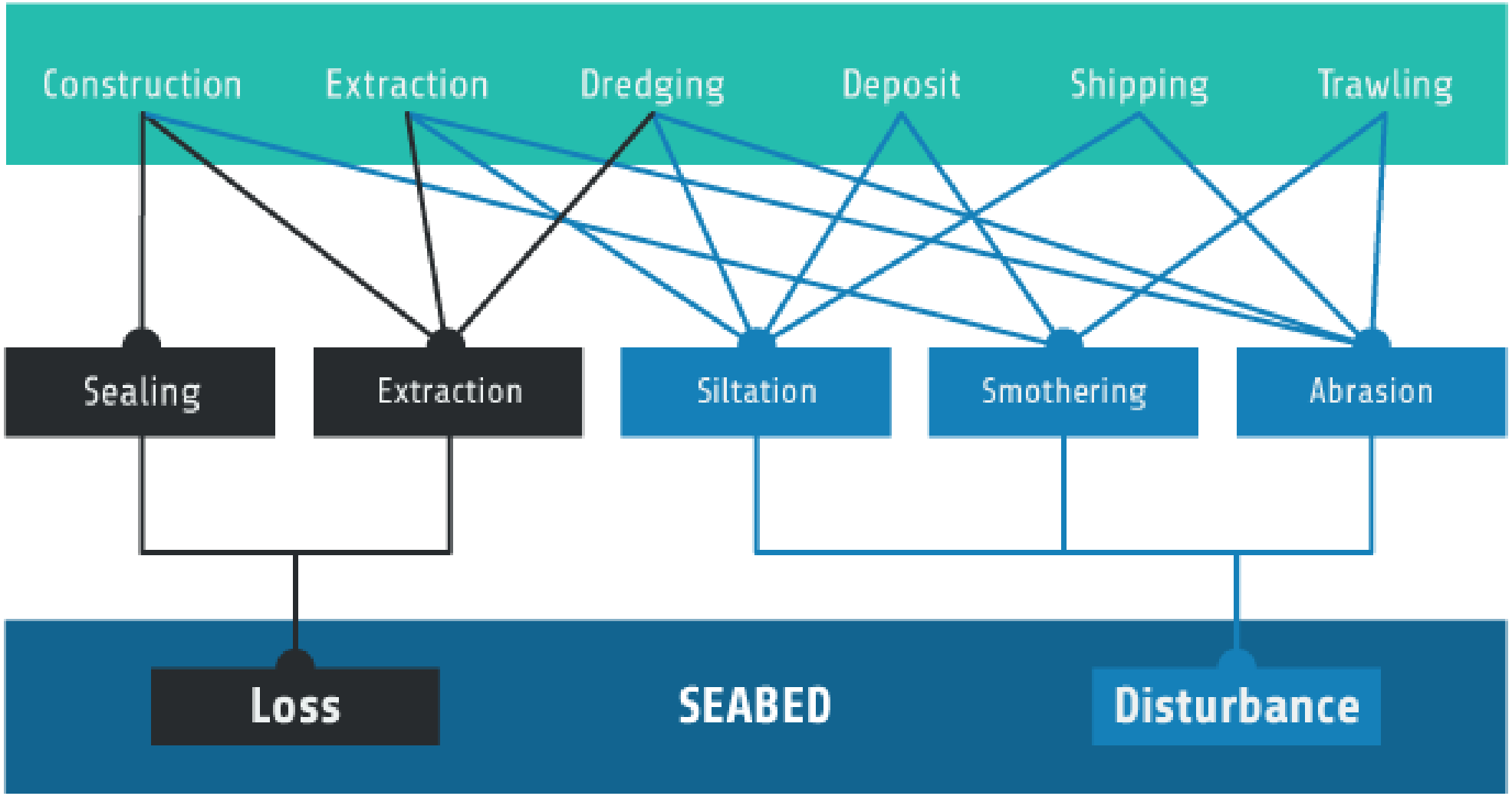
3. Baltic Sea pressures & state: Fisheries

In 2011-2016, ~50% of the assessed commercial coastal and ~40% of the pelagic fish indicators showed a good status.



HELCOM (2018): Baltic Sea Envir. Proc. 155

3. Baltic Sea pressures & state: Seabed loss and disturbance

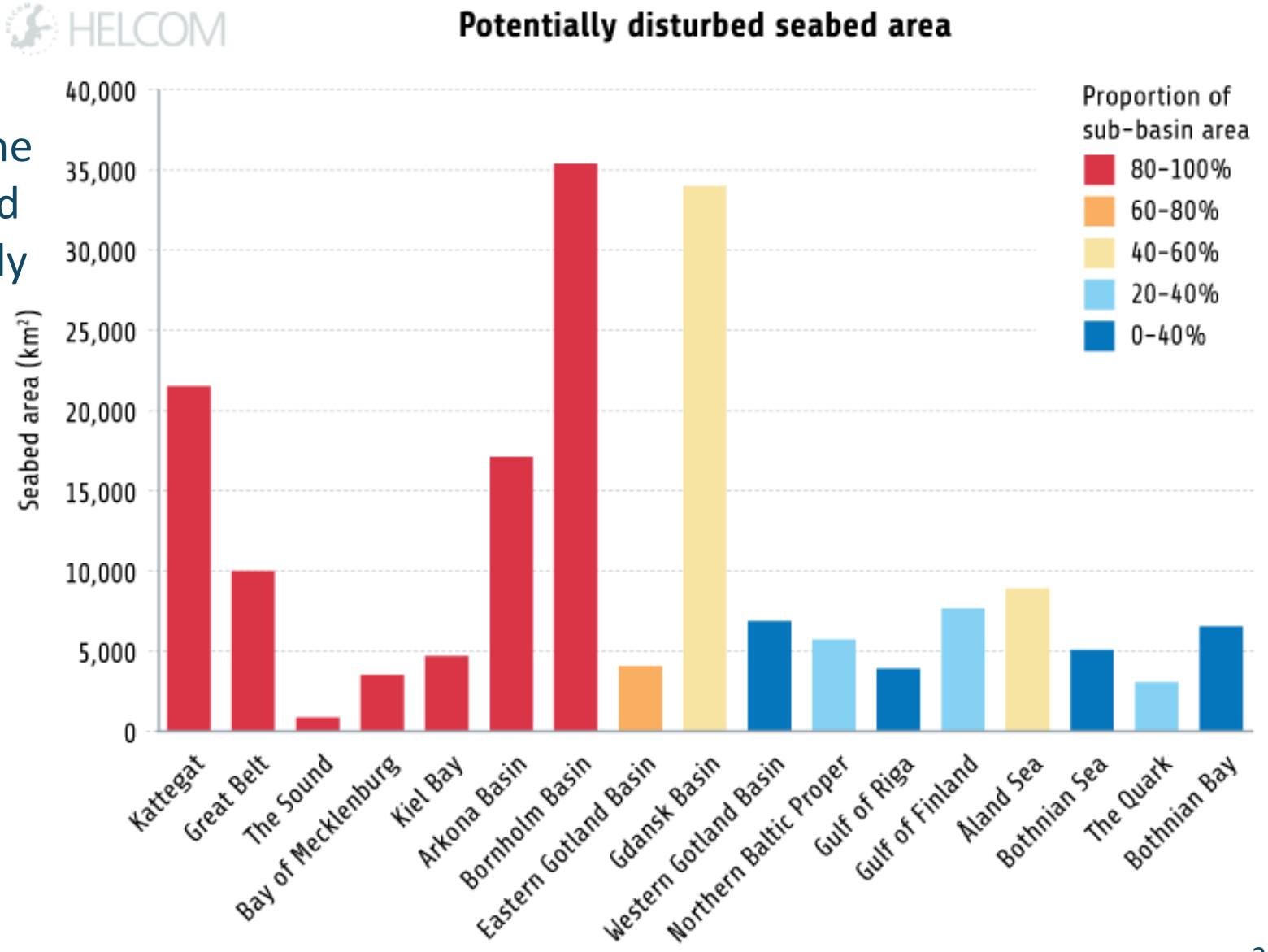


HELCOM

HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

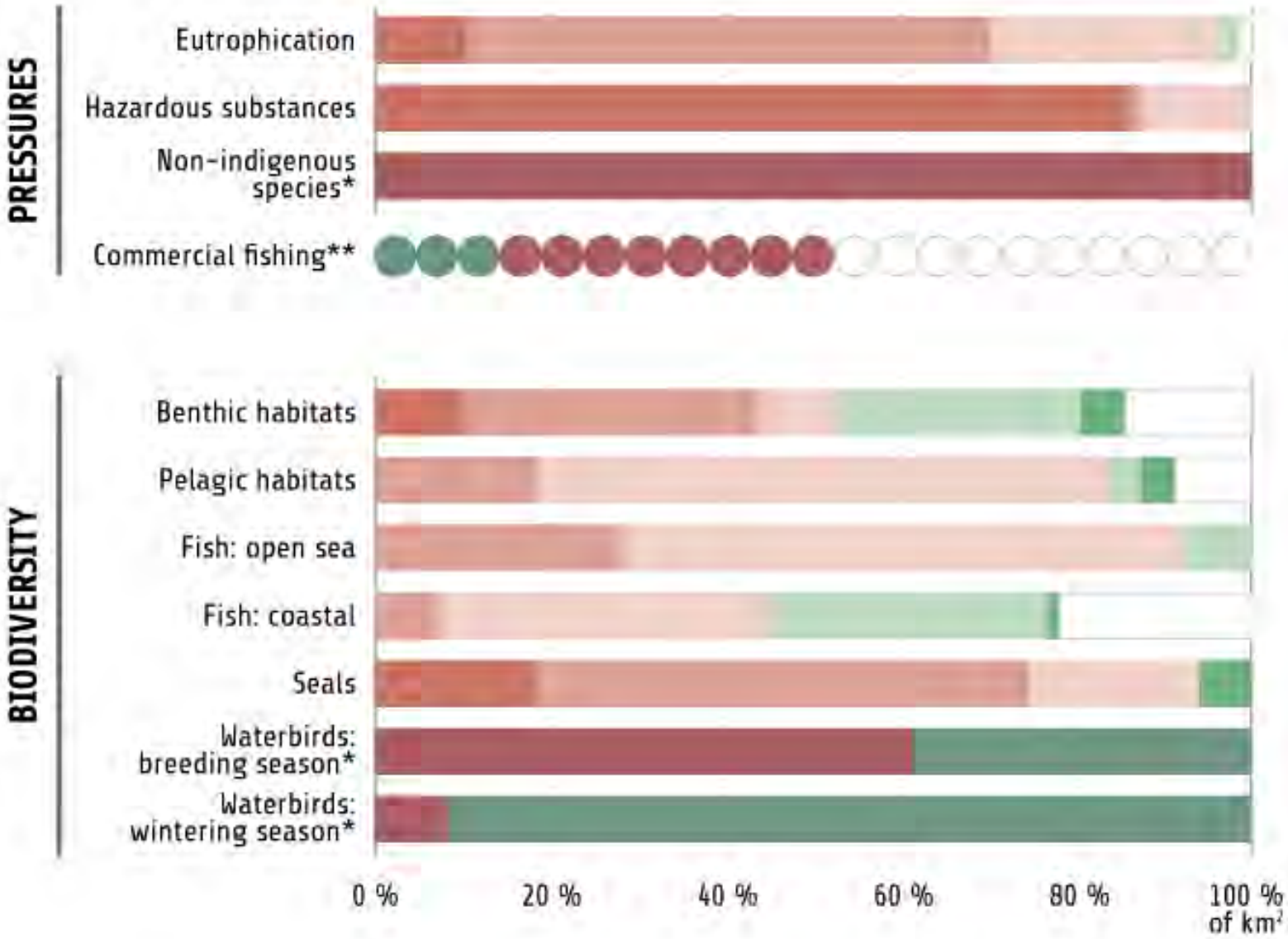
3. Baltic Sea pressures & state: Seabed loss and disturbance

About 40 % of the Baltic Sea seabed area is potentially disturbed.



HELCOM (2018): Baltic Sea Envir. Proc. 155; http://stateofthebalticsea.helcom.fi/

3. Baltic Sea pressures & state: Biodiversity



INTEGRATED ASSESSMENTS

Not good | Good | Not assessed

***INDICATORS**

Good
Not good
Not assessed

****FISH STOCKS**

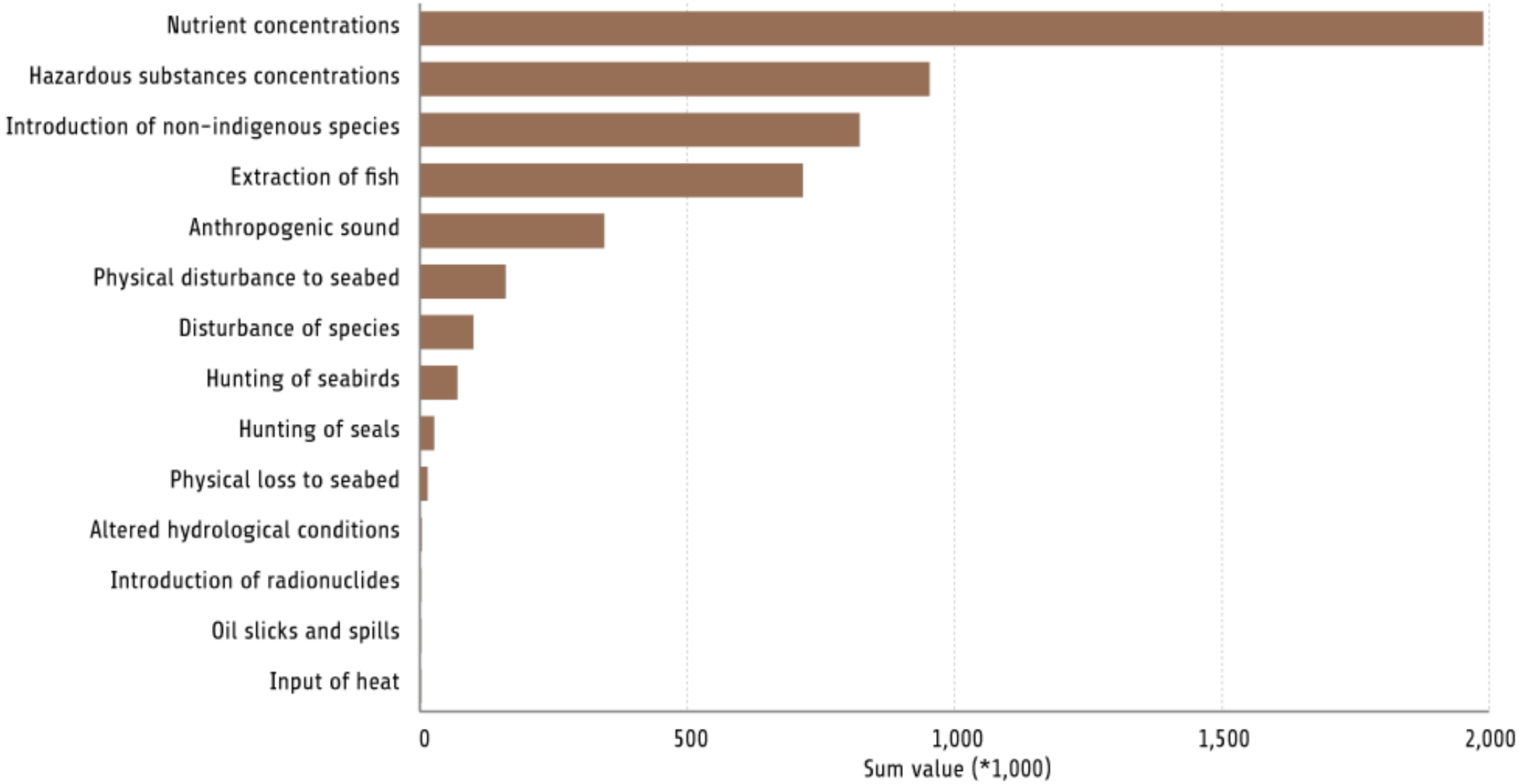
Good
Not good
Not assessed

The following pressures were assessed descriptively:

Marine litter
Underwater noise
Seabed loss and disturbance
Hunting of seals and waterbirds
Pharmaceuticals
Incidental bycatch in fishing gear

http://stateofthebalticsea.helcom.fi/

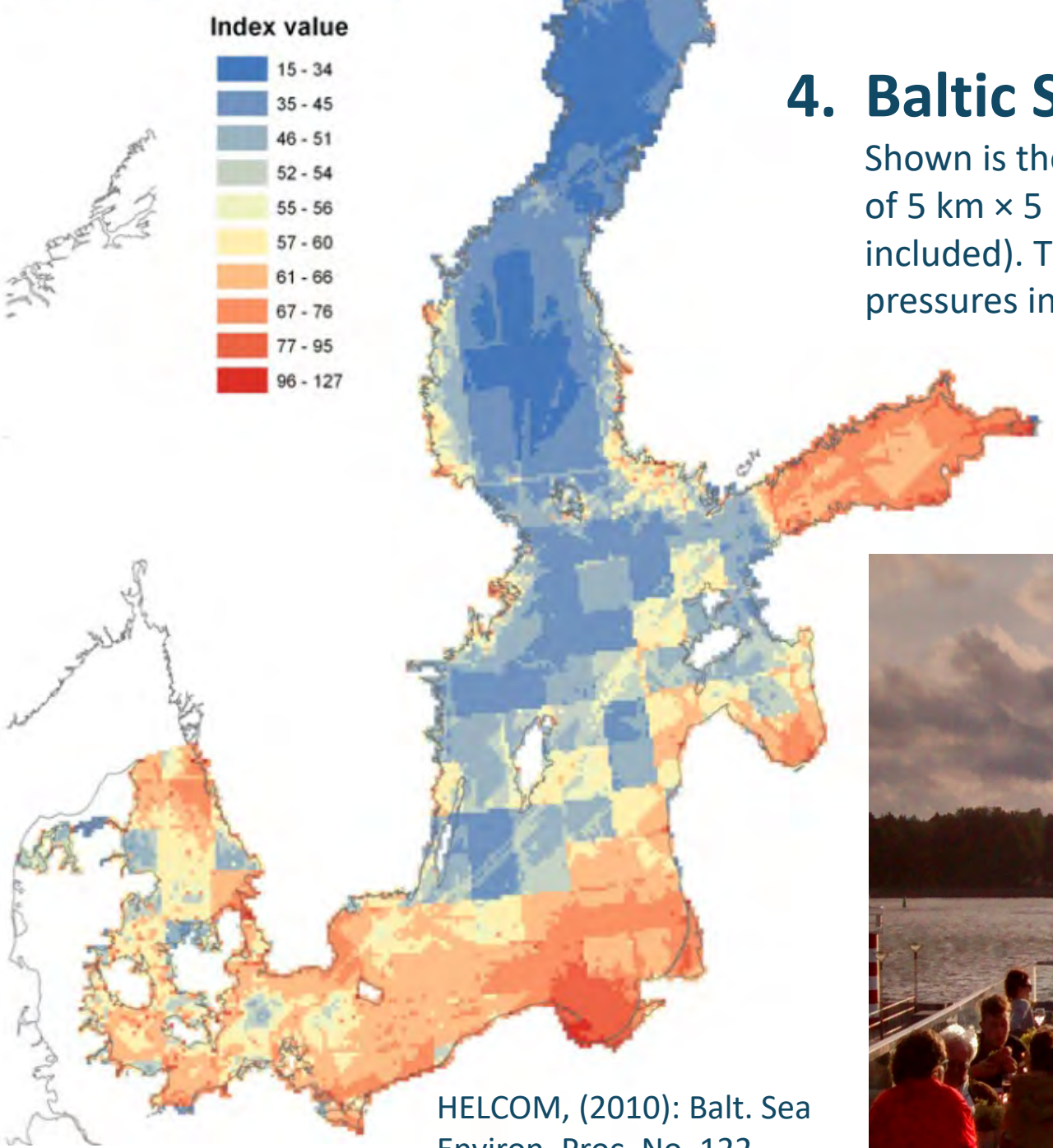
4. Baltic Sea pressures ranked by cumulative impact



http://stateofthebalticsea.helcom.fi/

4. Baltic Sea Pressure Index

Shown is the sum of pressures present in areas of 5 km × 5 km (52 pressure data layers included). The index sums up all anthropogenic pressures in an area of 5 km × 5 km.



HELCOM, (2010): Balt. Sea Environ. Proc. No. 122

5. Conclusions

- Major pressures on the Baltic Sea – eutrophication, hazardous substances, introduction of non-indigenous species, and effects of commercial fishing – are above sustainable levels.
- Therefore, the environmental health of the Baltic Sea is not sufficient, and does not meet the policy objectives.
- Measures taken so far show first improvements, but additional actions are needed.
- Climate change affects the Baltic Sea in multiple ways and needs to be taken into account in future.

Thank you for your attention!

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