Offshore wind and MSP - Denmark

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Danish Energy Agency

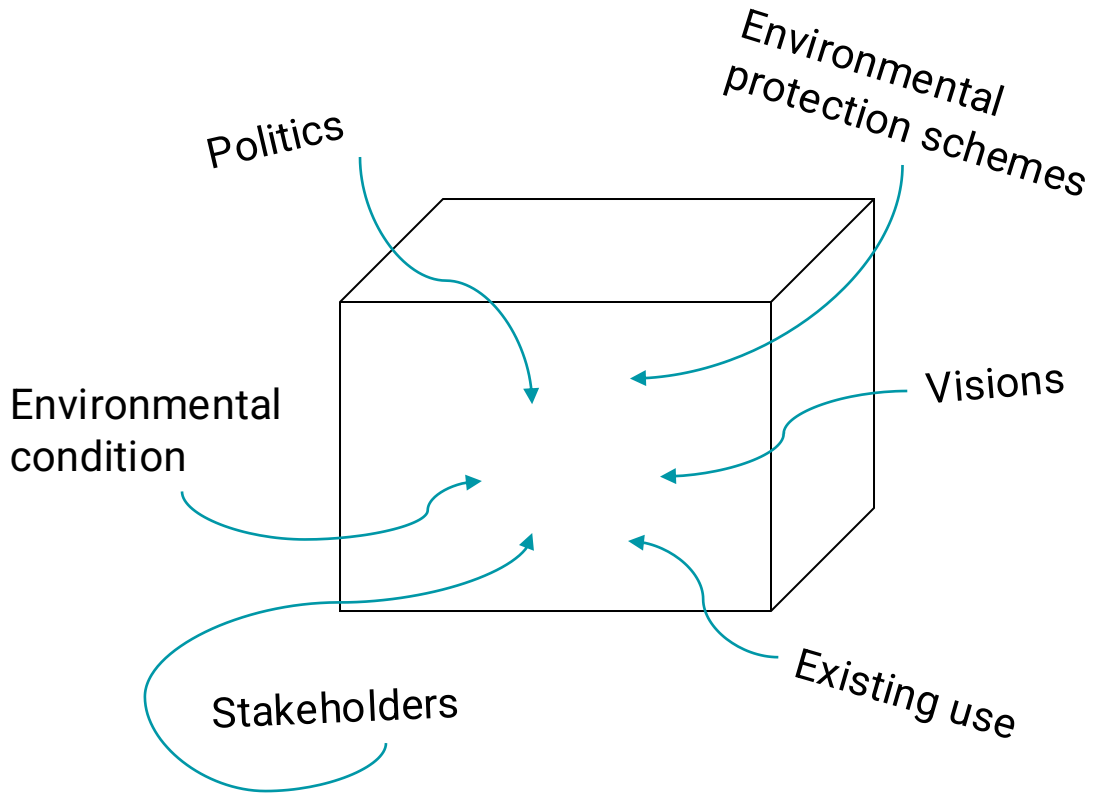
A galaxy perspective on spatial planning

Land

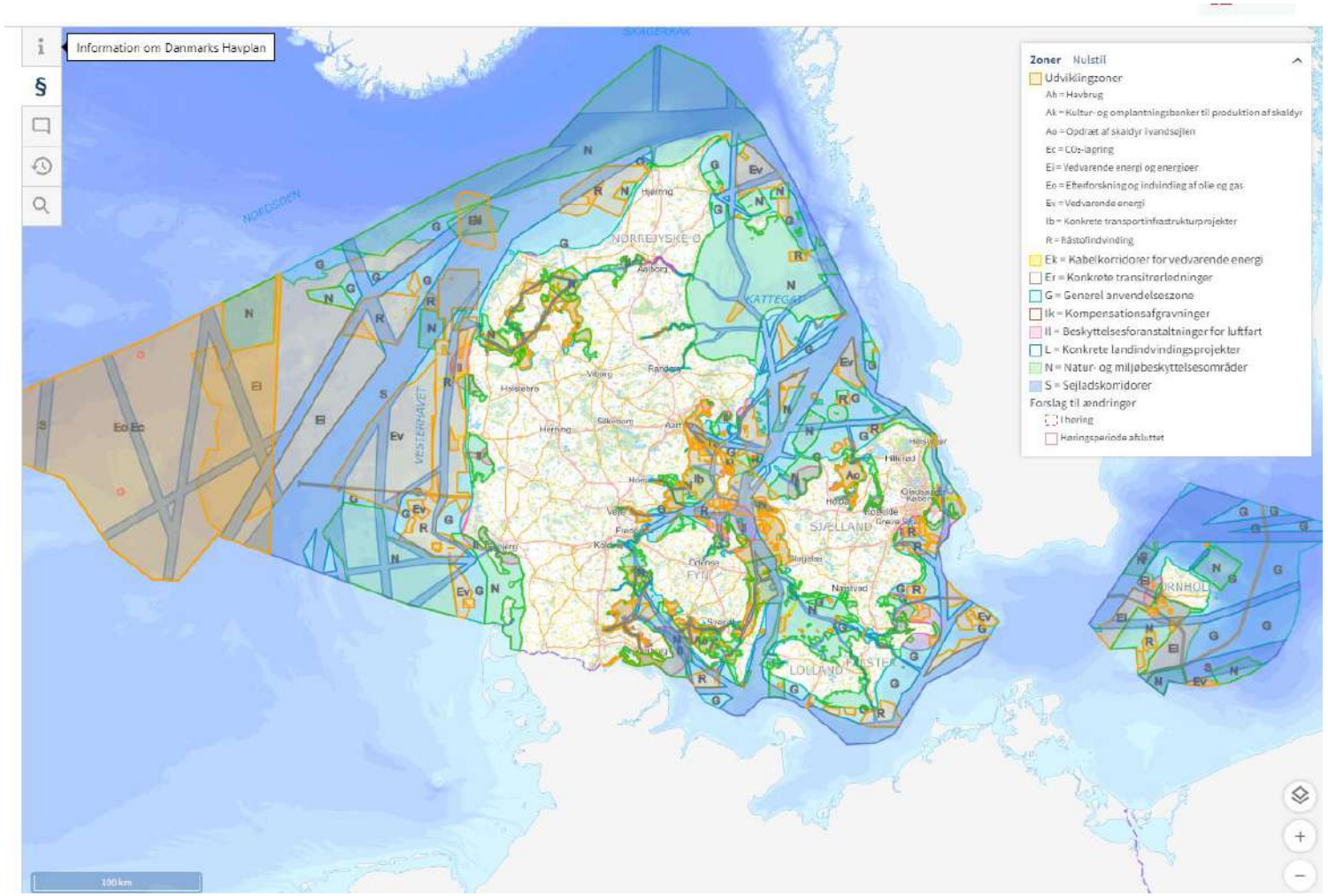
- Long tradition of spatial planning on land
- Spatial planning and environmental protection ”grew up” together
- Long-time experience of coordination between spatial interests – human activities and protection

Sea

- MSP-directive from 2014
- Broader marine environmental protection has ”lagged behind” protection on land
- Brief experience in systematic, centralised coordination between actitivites at sea



The Danish maritime spatial plan (MSP)



- Follows EU directive 2014/89/EU
- Holistic approach to MSP
- Purpose of ensuring economic growth and use of sea territory in sustainable way
- Covers activities:
  - 1) Energy at sea
  - 2) Maritime transport
  - 3) Transport infrastructure
  - 4) Fisheries and aquaculture
  - 5) Extraction of raw materials
  - 6) Protection and improvement of the environment

MSP – Havplan.dk

MSP and offshore wind farms

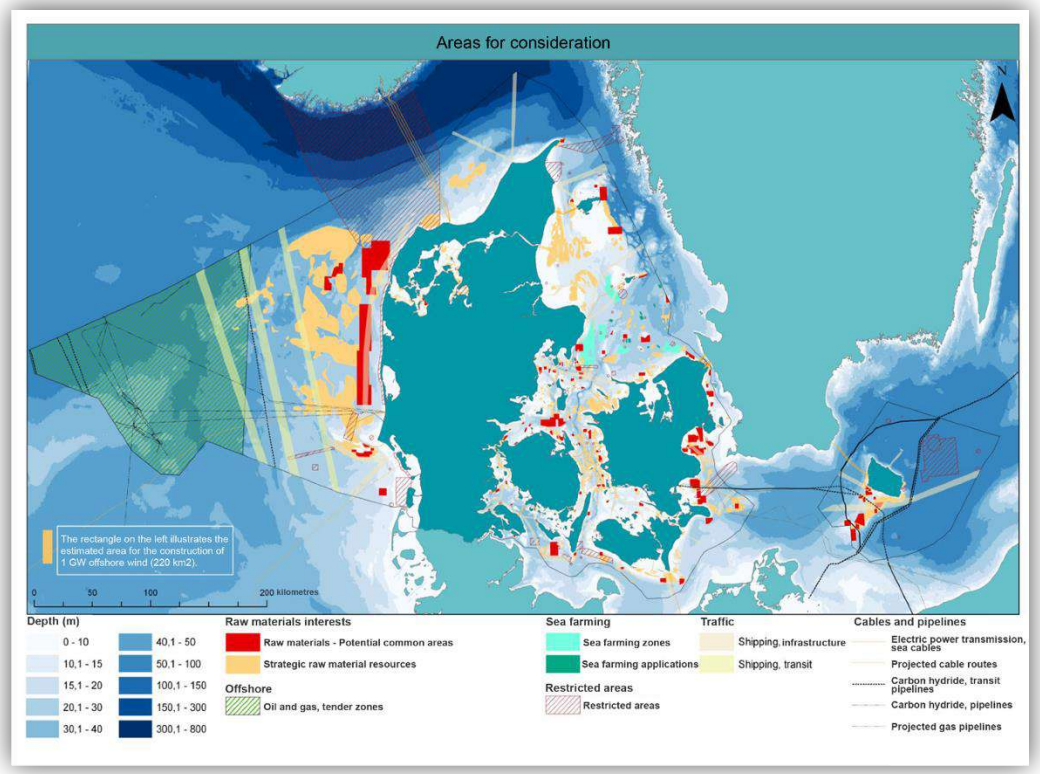
- DEA has been ”MSP’ing” long before the official MSP – first planning for offshore wind sites began in late 80’s and first action plan for offshore wind from 1997 (with expected 4 GW by 2030)

- Followed up by further plans and area screenings for offshore wind farms in 2011, near coast offshore wind in 2012, a rough screening for suitable areas for offshore wind in 2017 (became input to the MSP) and a screening for 12,4 GW in 2019.

- Increased complexity in spatial planning for offshore wind:
  - Marine environmental protection as well as other pressure factors have increased, while environmental status/condition has decreased (for some factors)
  - More and larger wind farms

Rough screening 2017 – input to MSP

Type of interests	Restriction	Consideration	Comment
Shipping lanes		X	Ferry routes and routes with less traffic
Shipping lanes	X		International shipping routes and heavy traffic
Raw materials (sand, gravel etc.)		X	Potential extraction and strategic resources
Extraction and deposit of raw materials	X		Areas with active permits and reserved areas
Defense	X		Military, restricted
Defense limited use		X	Military, less restricted
Oil- and gas installations	X		Operators of oil and gas platforms
Oil and gas tender zone		X	Concessions with use rights to be awarded
Existing offshore wind farms	X		Existing wind farms have 6 km perimeter clearance
Cables and pipes		X	Can be combined with offshore wind, but 200 m safety distance
Environment	X		Natura 2000, maritime strategy and nature conservation.



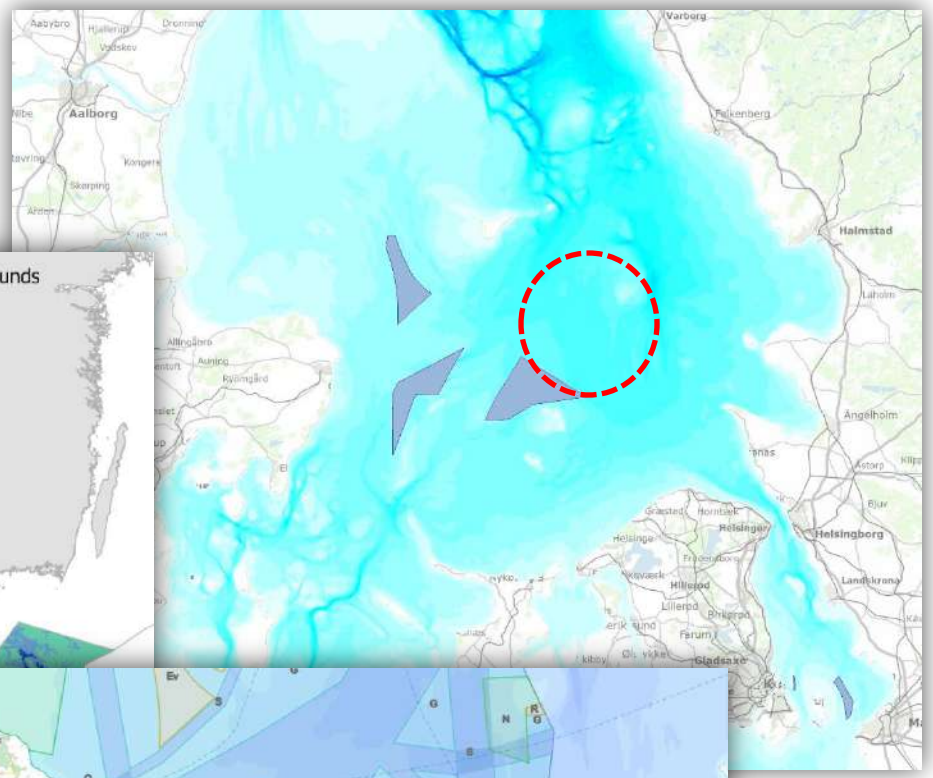
Communication is key

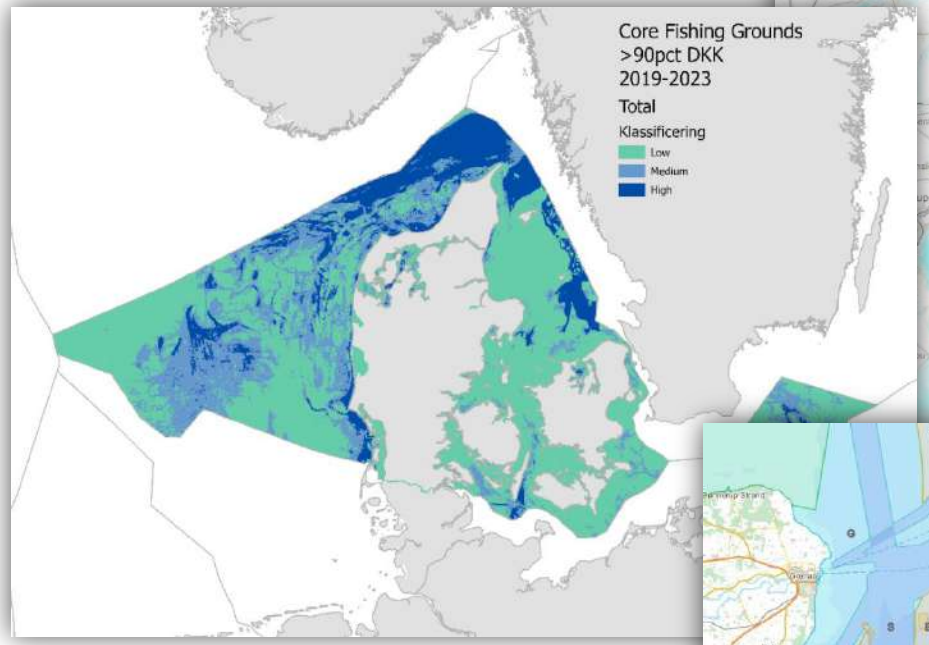
- Involvement of other relevant authorities from start to finish (often easier said than done)
- Remember other marine/maritime stakeholders and remember that maritime spatial planning is not only happening at sea
- Consequences of offshore wind planning for other parties are not always discernible to energy authorities
- Strong political mandate is important for planning authority in dialogue with other authorities and stakeholders

A spatial planning case: Hesselø OWF

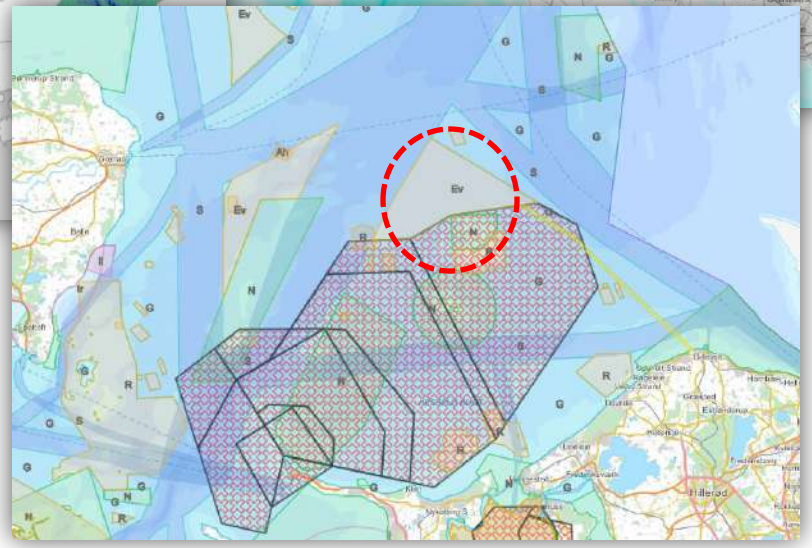
- Tender of ”Old” Hesselø site paused in 2021 because of large area with soft sediment
- Tender area moved south to area used by Danish Defence
- Also Norway lobster fishing grounds and new ferry route at old Hesselø site

Source: Danmarks Miljøportal





Source: DTU, Egekvist (2025)



Source: havplan.dk

Screening and environmental mapping of the offshore wind potential in Denmark

A new initiative making offshore wind planning easier

Danish Energy Agency

Knowledge is also key: The new screening and environmental mapping – smarter planning of offshore wind

Funds allocated for 2022-2025

› A project aimed at establishing the essential data foundation to support offshore wind development

Objective:

› Support long-term planning and decision-making for the expansion of new large-scale offshore wind in Denmark.

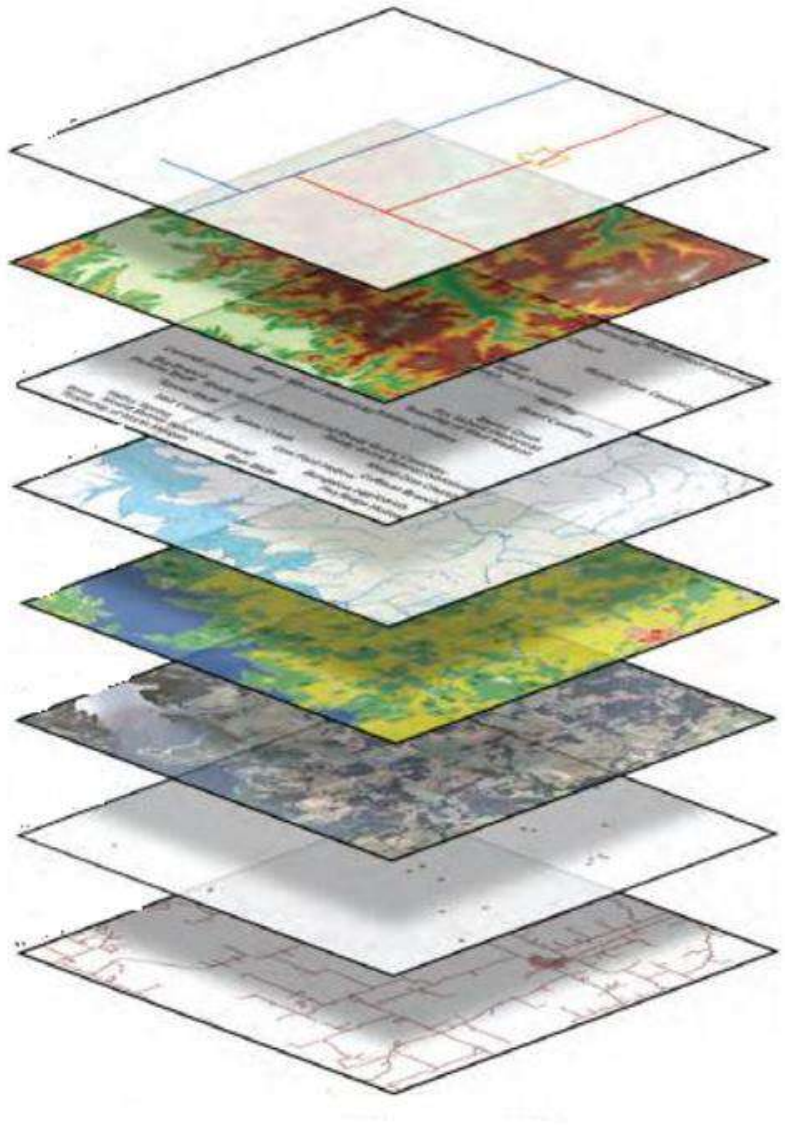
Purpose:

- Smart planning of offshore wind.
- Identify areas where the fewest environmental and interest conflicts are expected.
- Find the most suitable areas for offshore wind.
- Identify areas of concern where special investigations, mitigation measures, and/or project adjustments may be needed.
- Due diligence/"early warning" to avoid significant and undesirable surprises (soft seabed, important migration routes, etc.) that could increase costs or complicate the installation of offshore wind.

Screening and sensitivity mapping

- A technical screening based on the results from sensitivity mapping by NIRAS and Aarhus University, geological mapping by GEUS and other relevant spatial interests (shipping lanes, defence areas etc.)

- Digital report and interactive maps in Q3 2025



Examples of sensitivities addressed: seabed habitats

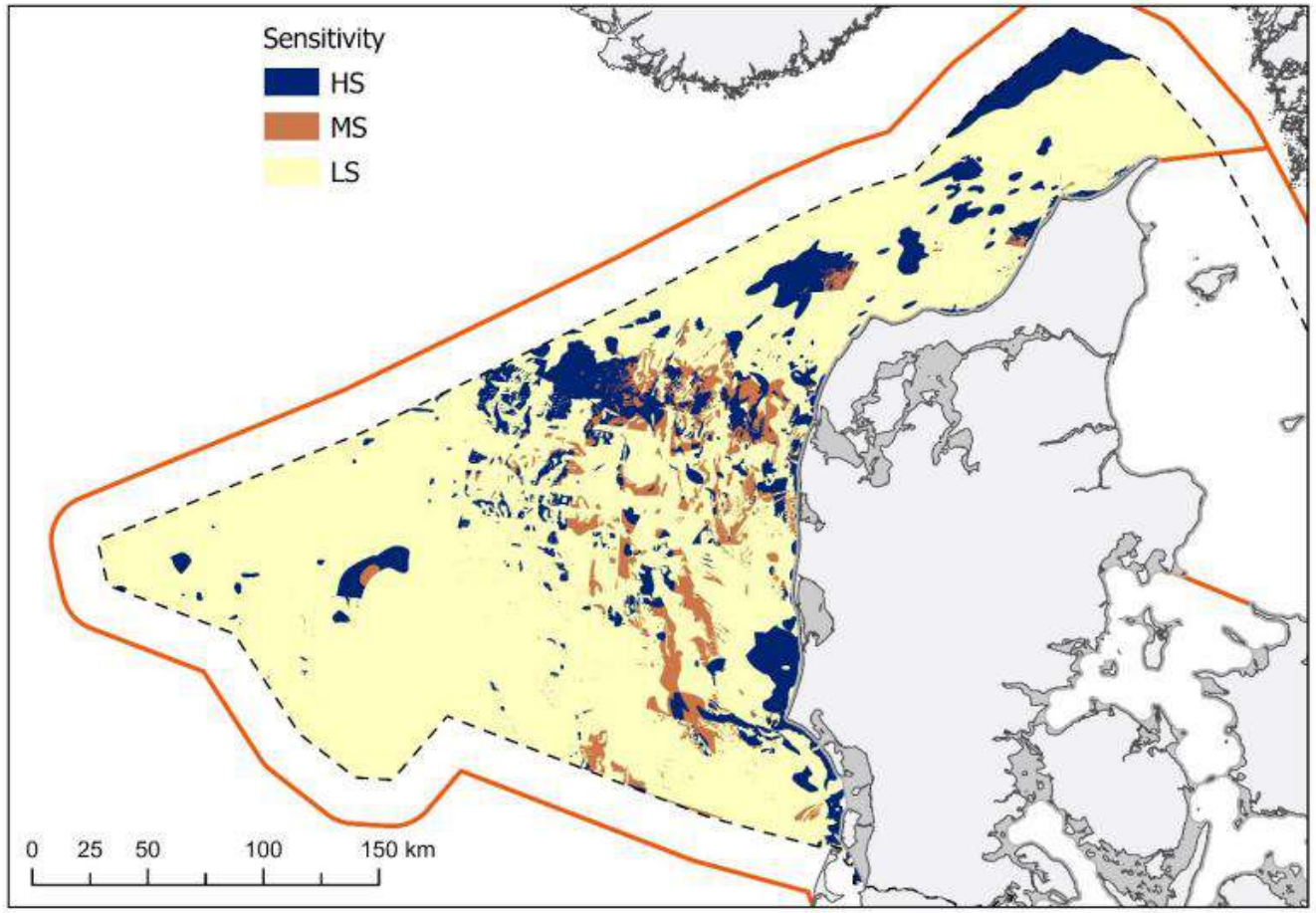
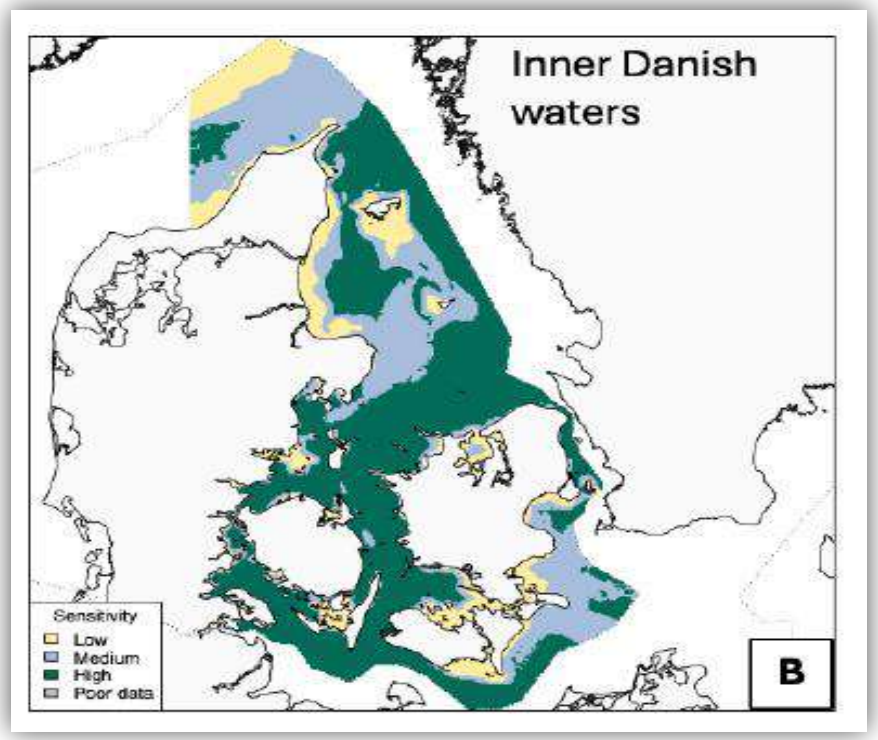


Figure 4.5. Sensitivity of the broad habitats in the North Sea/Skagerrak. Blue: Higher sensitivity (HS), Red-brown: Medium sensitivity (MS), Yellow: Lower sensitivity (LS)

Source: Cordula Göke, Ben Jamie Owen Robinson and Karsten Dahl. 2025. Environmental mapping and screening of the offshore wind potential in Denmark. Sensitivity mapping: Benthic habitats and associated biological communities. Aarhus University, DCE – Danish Centre for Environment and Energy, 75pp. Scientific Report No. 642

Examples of sensitivities addressed: harbour porpoise + fish



Source: Iben Stokholm, Floris M. van Beest, Jonas Teilmann, Signe Sveegaard, Anders Galatius, Rune Dietz, Jakob Tougaard & Jacob Nabe-Nielsen. 2024. Sensitivity mapping of harbour seals, grey seals and harbour porpoises to the construction and operation of offshore windfarms in Danish waters. Aarhus University, DCE – Danish Centre for Environment and Energy 63 pp. Scientific Report No. 644

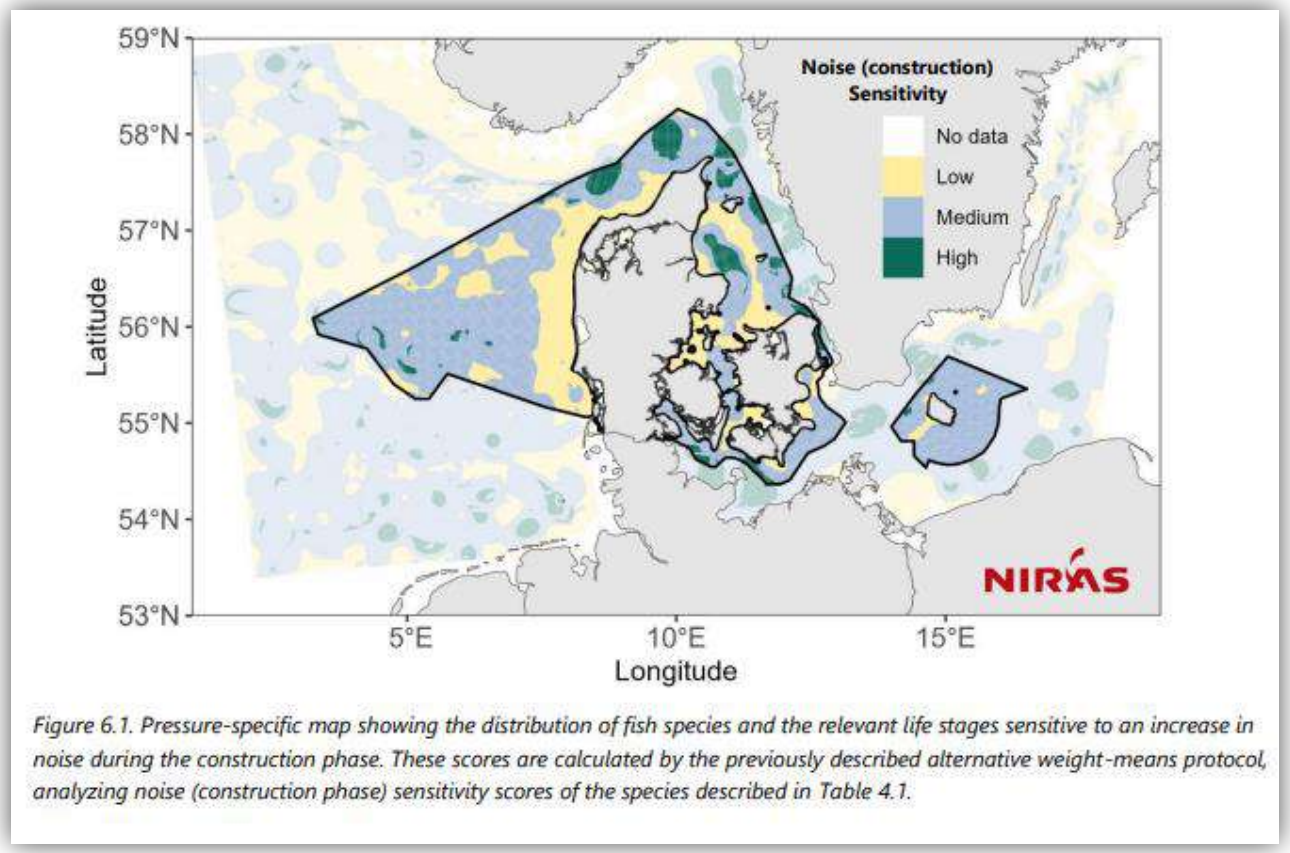


Figure 6.1. Pressure-specific map showing the distribution of fish species and the relevant life stages sensitive to an increase in noise during the construction phase. These scores are calculated by the previously described alternative weight-means protocol, analyzing noise (construction phase) sensitivity scores of the species described in Table 4.1.

Source: NIRAS 2025