APPLICATION

Baltic Sea marine landscape maps

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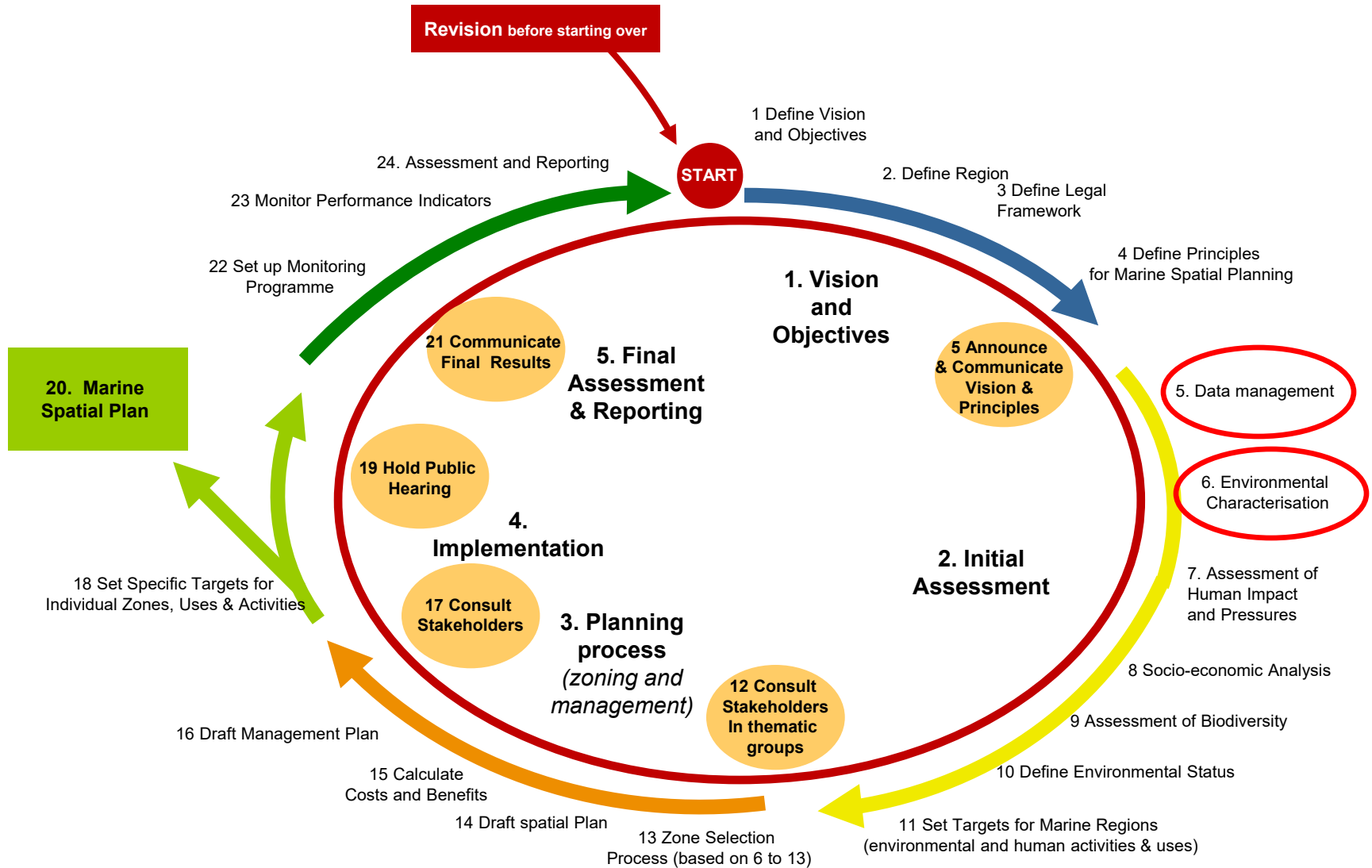
Outline

Why marine landscapes?

Application

- Topographic marine landscapes
- Physiographic marine landscapes
- Benthic marine landscapes

The first step...

BSR INTERREG IIIB region seen from space,
Source: SeaWiFS Project, NASA/Goddard Space Flight Centre and ORBIMAGE

EU legislation – environmental characterisation

EU Water Framework Directive (art. 5.1, Annex II): "- *an analysis of its [river basin district] characteristics"*

EC Habitats Directive (art. 3.2, Annex I): "- *shall contribute to the creation of Natura 2000 in proportion to the representation within its territory of the natural habitat types and the habitats of species…"*

Proposed Marine Strategy Directive (art. 8.a, Annex III): "- *an analysis of the essential characteristics and current environmental status of those waters… and covering the habitat types, the biological components, the physio-chemical characteristics and the hydromorphology"*

All three directives requires a transnational approach covering entire ecoregions (WFD art. 5.1, Annex II, HD art. 1.c, pMSD art. 3.1)

Topographic & physiographic features
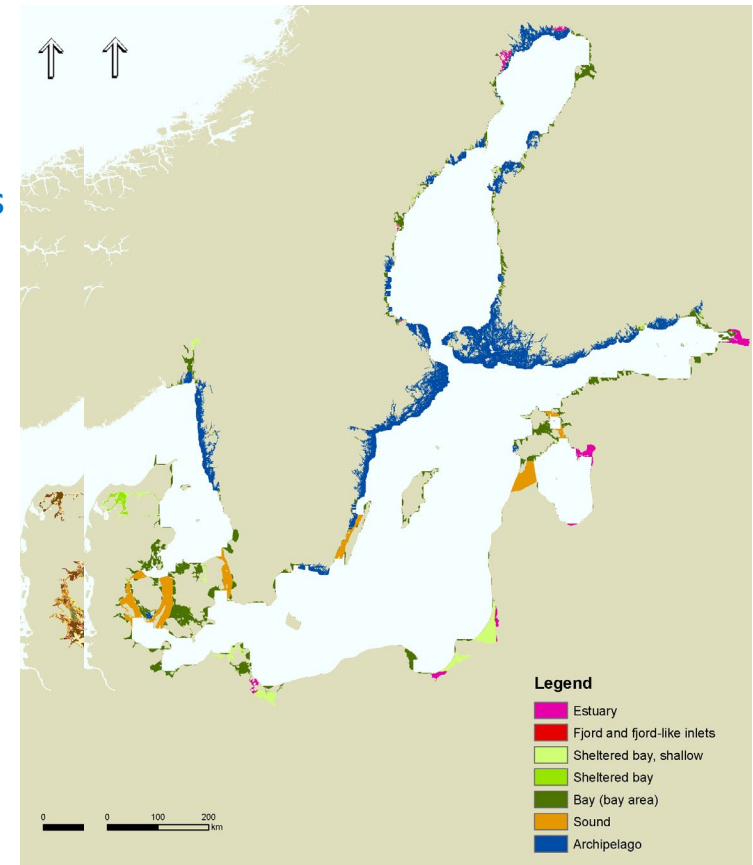
Topographic features

Shows the topographic and sediment complexity of the seafloor (plains & basins cover 70%)

Can be used for informing e.g the planning of large scale constructions

Physiographic features

Shows the geographic "layout" of the coastal zone (e.g. archipelagoes cover 8% of the Baltic Sea Region)

Can be used for e.g. implementation of the Habitats Directive

Legend
- Estuary
- Fjord and fjord-like inlets
- Sheltered bay, shallow
- Sheltered bay
- Bay (bay area)
- Sound
- Archipelago

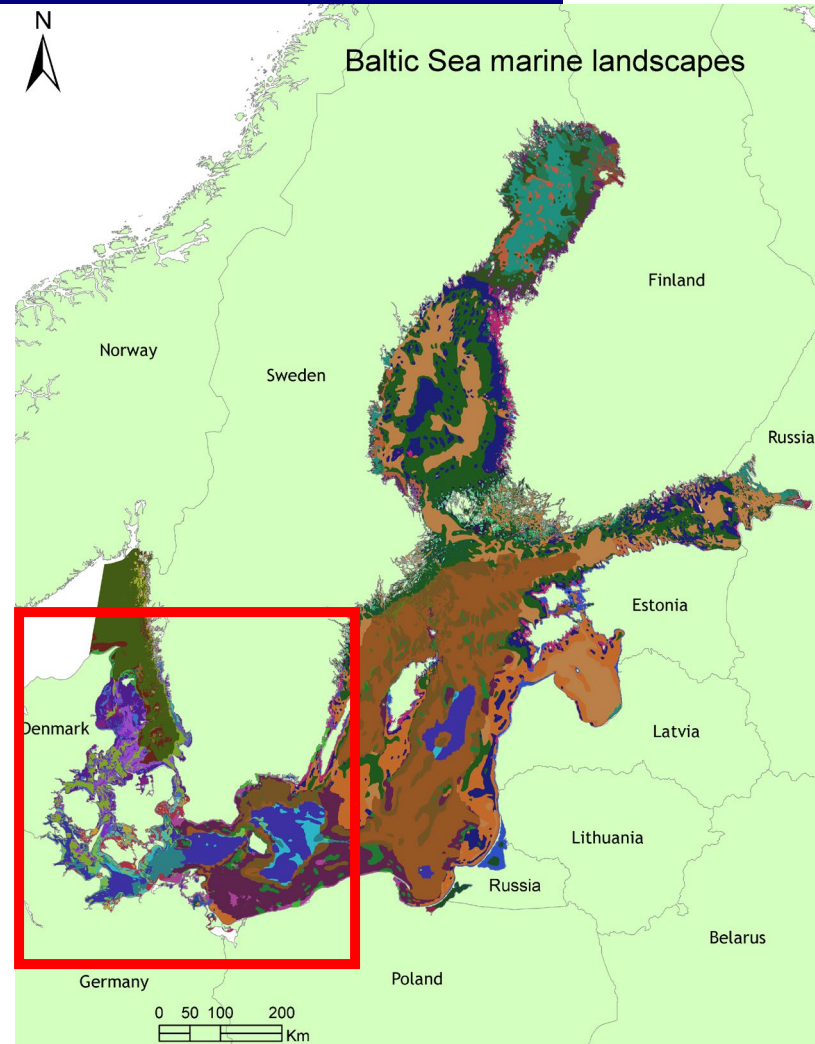# Benthic marine landscapes

Features

60 benthic landscapes identified

Most common is non-photic mud at 7,5 – 11psu covering 14,3% of total seabed (58.640 km^2)

8 landscapes cover 90,7% of the total seabed (371.000 km^2)

40 landscapes cover less than 1% of total seabed area

Baltic Sea marine landscapes

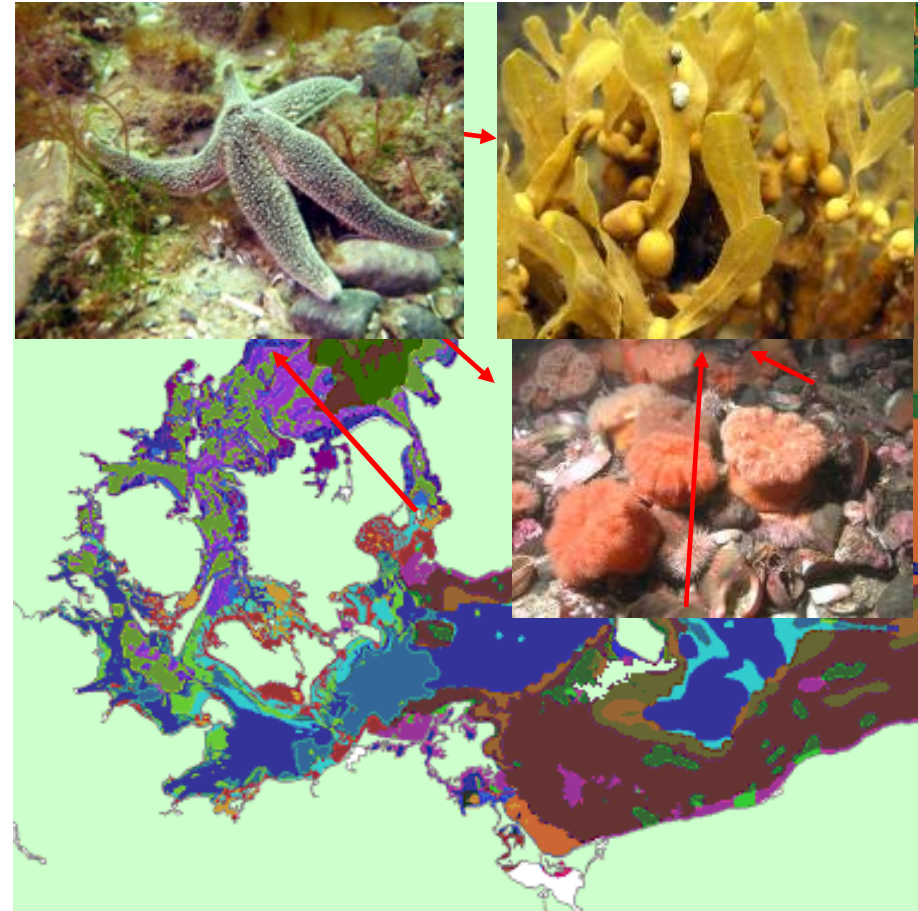# Benthic marine landscapes

Features

Aim to shown broad scale ecological relevant entities

Picks up known reef areas

Basins

Biogeographic boundaries

Application I – complexity index
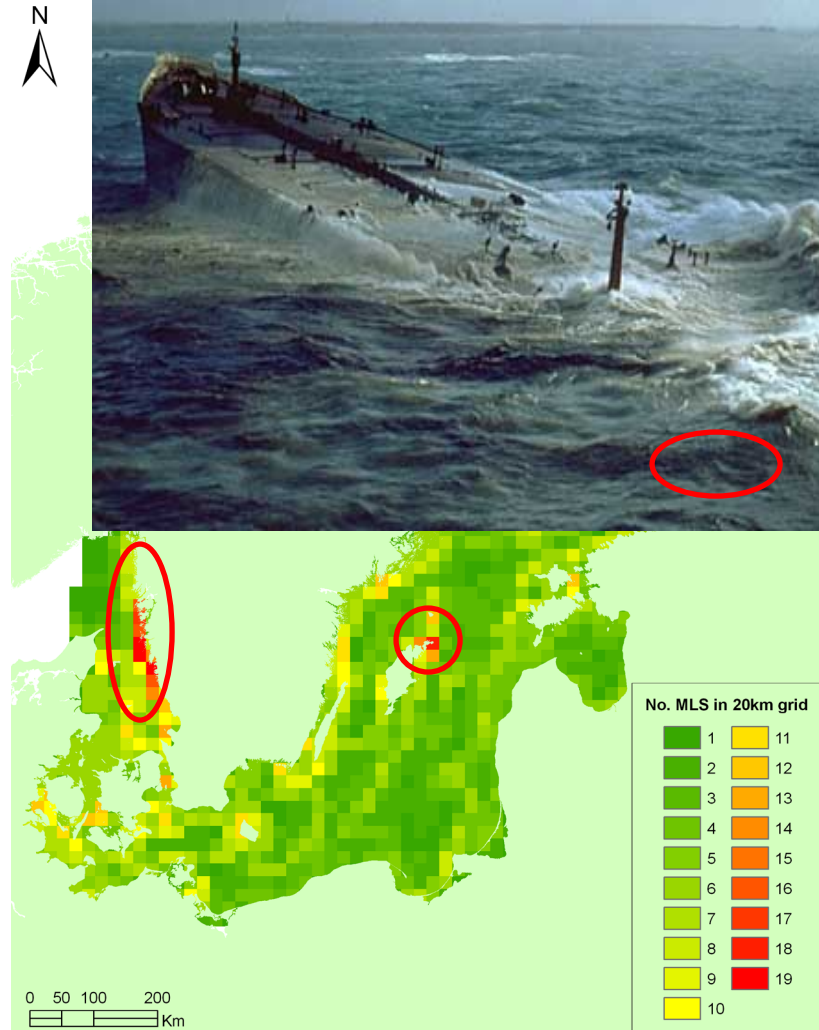
Features

Show the diversity or complexity within a 20 km grid

Indicative of potential biological "hotspots"

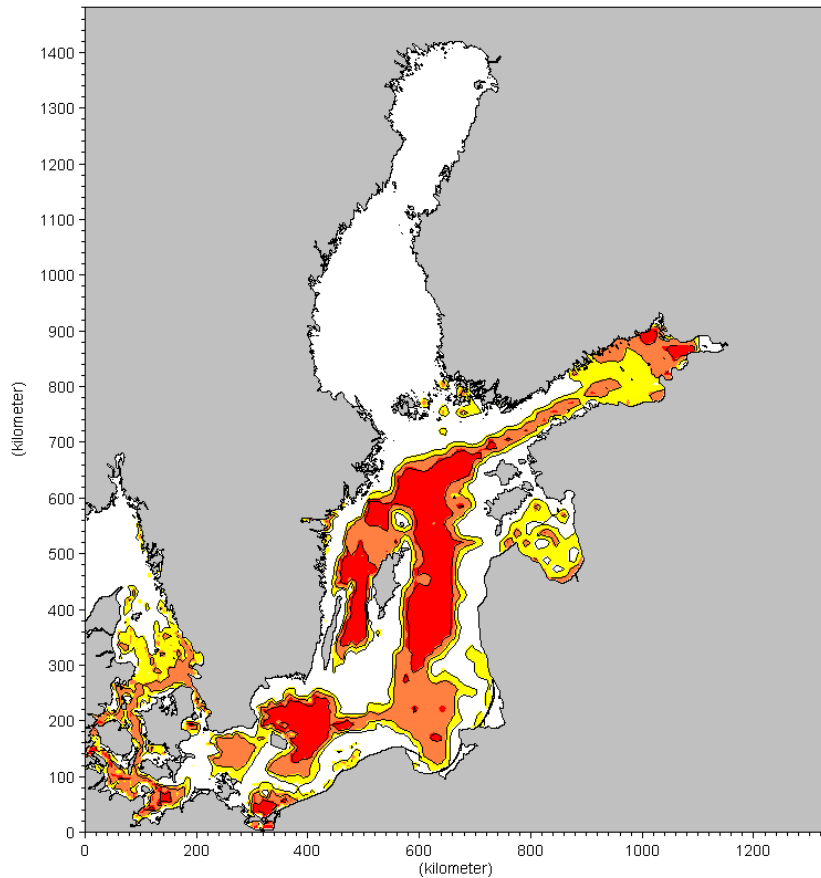Applicable for informed planning of large scale constructions

Applicable for informing preparedness & response to oil spills
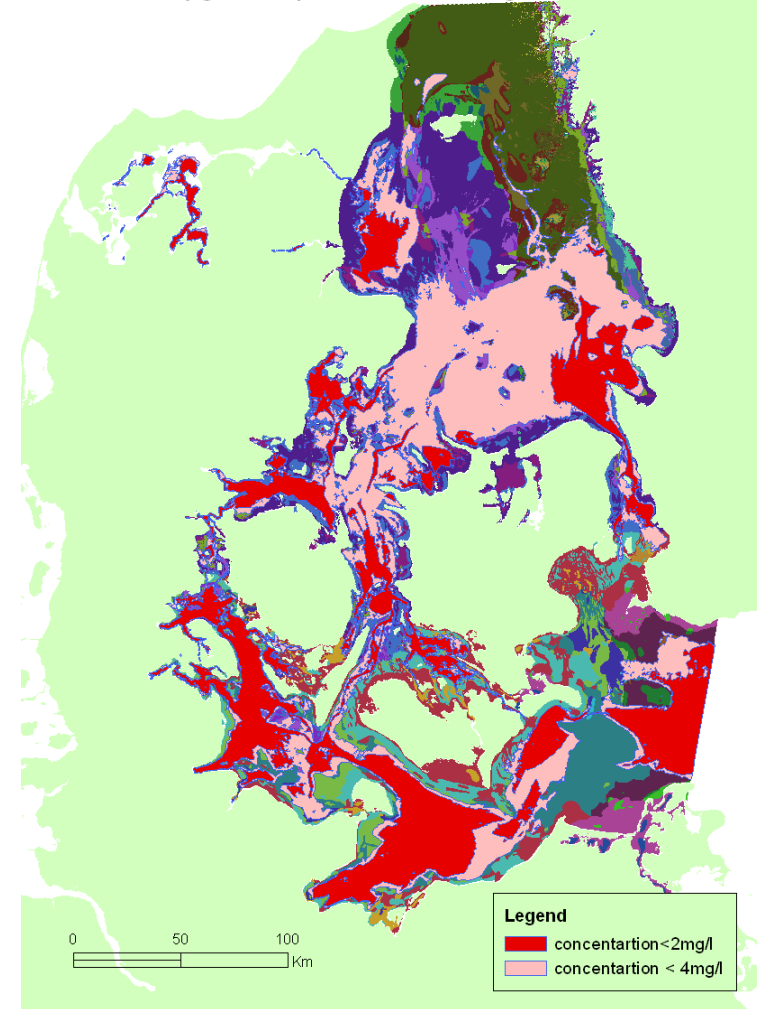
Can be further developed as a strategic tool

No. MLS in 20km grid

1	11
2	12
3	13
4	14
5	15
6	16
7	17
8	18
9	19
10	

0 50 100   200 Km

Oxygen depletion in Kattegat

Oxygen depletion in August 2002

Source: DHI Water – Environment – Health, SNS & SEPA

Oxygen (ml/l)
- Above 3
- 1.5 - 3
- 0.3 - 1.5
- Below 0.3

Legend
- concentartion<2mg/l
- concentartion < 4mg/l

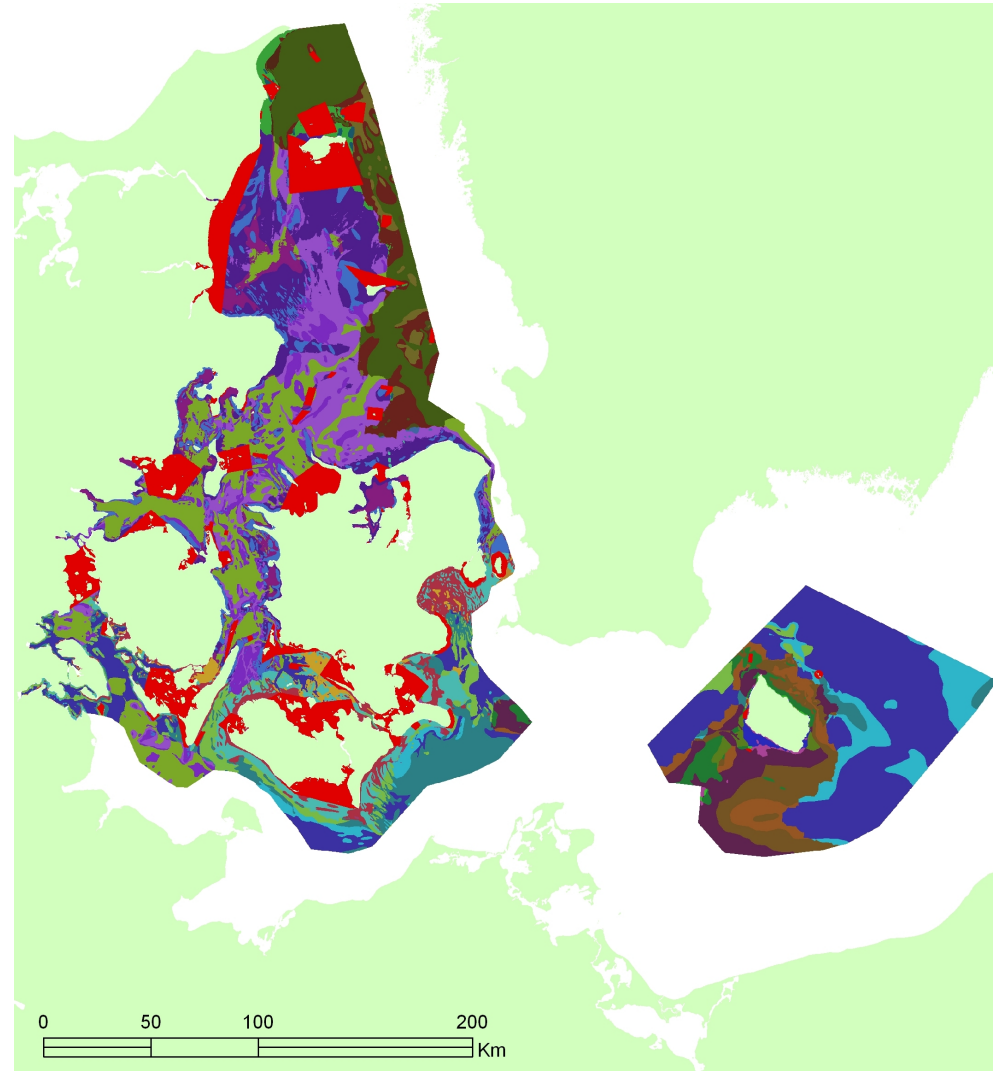# Application III – MPA network assessment

Features

35 benthic landscapes present

11,92% of the area is within a NATURA 2000 site (5.279 km^2)

Only 5 marine landscapes are not represented

30 marine represented from 100% to less than 1%

No direct link between Natura 2000 habitats and marine landscapes

Application III – merging information...

Oxygen depleted (western Baltic)

Marine landscape	Total area km^2	Area with >4 mgO2/l	% of total area covered
Non-photic mud 7.5-11 psu	244.16	230.40	94.36
Non-photic mud 11-18 psu	5107.52	4651.84	91.08
Non-photic mud 18-30 psu	5368.32	4785.44	89.14

Within existing protection schemes (DK EEZ)

Marine landscape	Area (km^2) of the marine land-scapes in the Danish EEZ	Area (km^2) within a Natura 2000 site (HD)	% within a Natura 2000 site
Non-photic mud 7.5-11 psu	788.00	0	0.00
Non-photic mud 11-18 psu	7215.56	56.84	0.79
Non-photic mud 18-30 psu	4328.16	245.84	5.68

Application IV – many potential uses
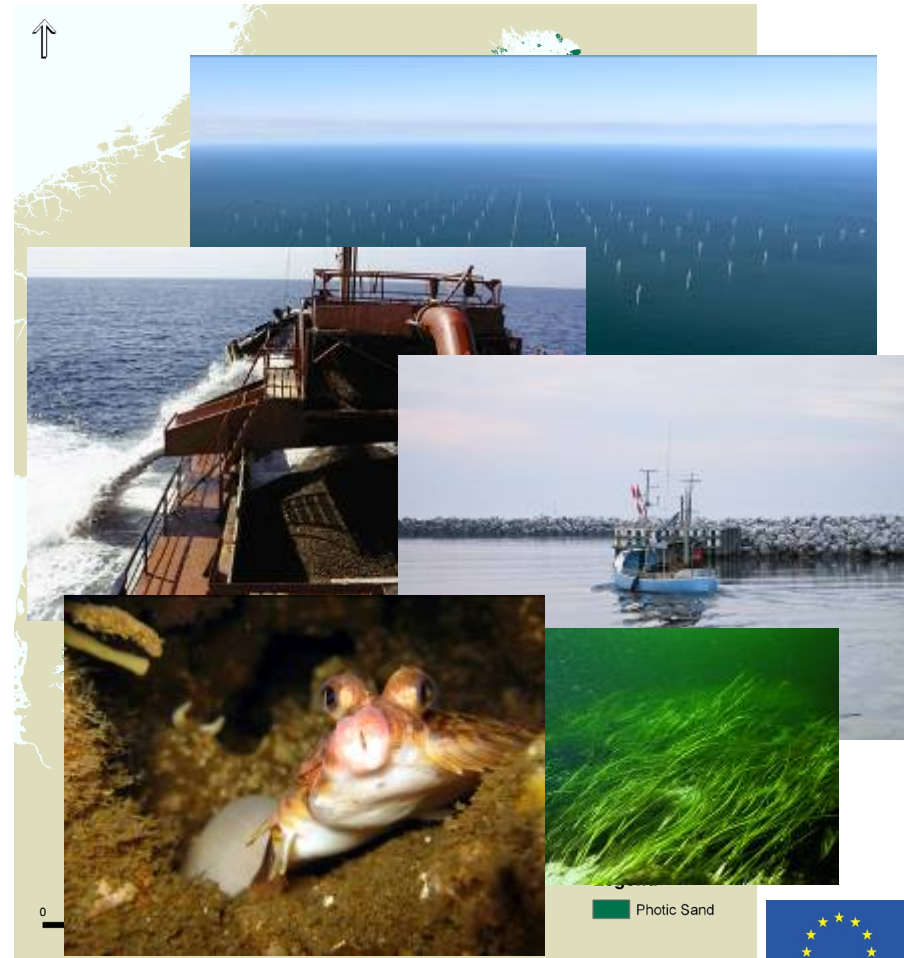
Marine landscape: Photic sand

Locations for offshore windfarms?

Marine aggregates?

Fishing grounds?

Distribution of Habitats Directive Annex 1 (1110) *Sandbanks*?

Essential fish habitats?

Photic Sand

Application V – Marine aggregates & windfarms

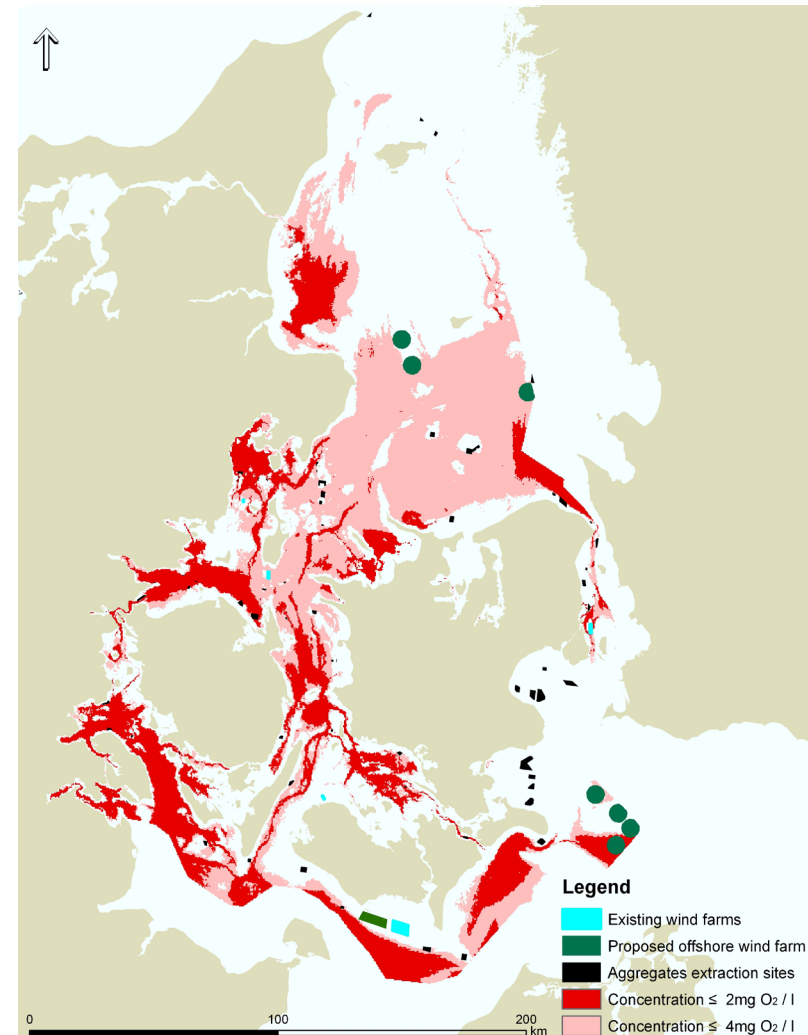**An example from the Danish EEZ:**

68 sites for aggregate extraction (~187km^2)

13 sites for off-shore windfarms (~366km^2)

Environmental pressures e.g. oxygen depletion

68% of these human activities are in areas with no oxygen depletion

Targetting specific landscapes e.g. >50% of *"Non-photic sand at 7,5-11psu"*

Legend

- Existing wind farms
- Proposed offshore wind farm
- Aggregates extraction sites
- Concentration ≤ 2mg O$_2$ / l
- Concentration ≤ 4mg O$_2$ / l

0   100   200 km

The first step...

Marine landscape maps provide:

Broad-scale ecologically relevant maps covering an entire Marine Region

A tool which supports implementation of an ecosystem-based approach to management of human activities in the marine environment

Relevant for assessing mutiple pressures and illustrating the sum of impacts on the marine environment at a Marine Regional level

Can be adopted by many sectors

Build upon international cooperation in the Baltic Sea Region

Future application success depends on actual adoption as a basic layer in integrated marine spatial planning

Thank you!

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