

BALANCE

Ecological coherence of the Baltic Sea MPA networks

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S Y K E



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Aims of our work

1. Develop practical criteria and tools to assess ecological coherence of the Baltic Sea MPA networks
2. Make the first preliminary assessment of ecological coherence of the Baltic Sea MPA networks



Photo: WWF/Mauri Rautkari

Introduction – Obligations for the assessment

- ✓The Habitats Directive (1992): *A coherent European ecological network of special areas of conservation.*
- ✓IUCN (2001): *A coherent network maintaining and restoring...*
- ✓World Summit on Sustainable Development (Johannesburg 2002): *Ecological networks are key instruments.*
- ✓"Environment for Europe" (Kiev 2003): *Representative networks by 2012.*
- ✓OSPAR & HELCOM (2003): *Well-managed ecologically coherent networks of MPAs by 2010.*
- ✓CBD COP7 (Malaysia 2004): *A global network of comprehensive, effectively managed and ecologically representative MPAs by 2012.*

What is an ecologically coherent network? 1/2

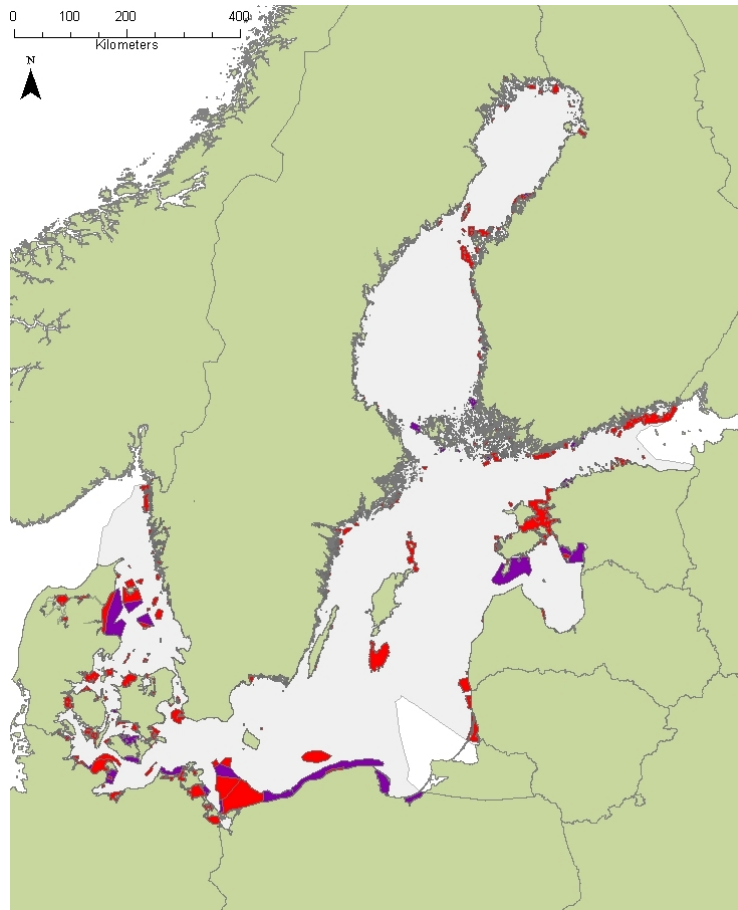
- ✓ Four “universal” criteria: Adequacy, representativity, replication and connectivity.
- ✓ Adequacy focuses on MPA design and fulfillment of its conservation purposes: size, shape, water quality, habitat quality, etc.
 - ✓ E.g. large MPAs for short-distance dispersers such as some algae.
- ✓ Representativity:
 - ✓ How good is the geographical coverage of our MPA network?
 - ✓ How much underwater features are we protecting within the network? E.g. reefs, estuaries, etc.

What is an ecologically coherent network? 2/2

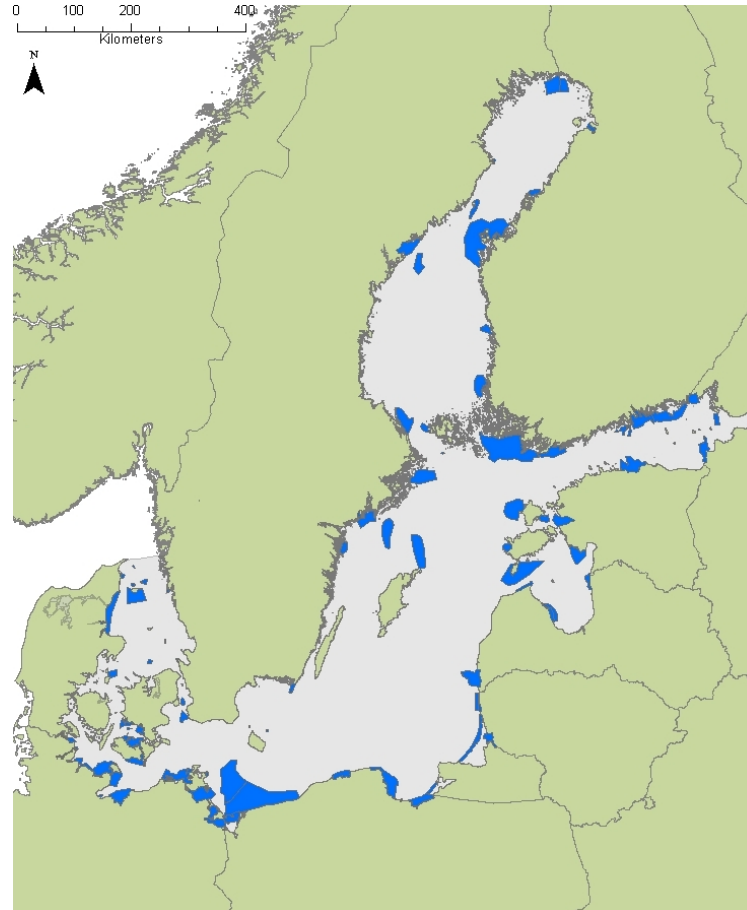
- ✓ Replication: It makes a difference to protect one large habitat patch or several smaller (MPAs placed adequately and covering right features).
- ✓ Connectivity ties the network together. How close or far should the MPAs be to/from each other?
 - ✓ Long-distance dispersal, short-distance dispersal → species-specific needs
 - ✓ Not the MPAs but the habitats patches!
- ✓ Interlinked or separate?

The networks assessed

Natura 2000

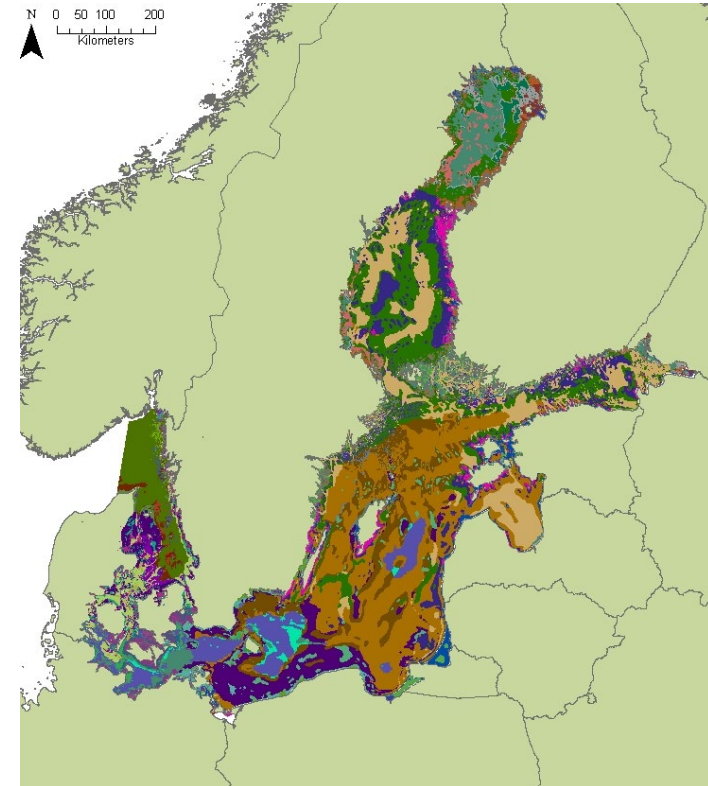


Baltic Sea Protected Areas



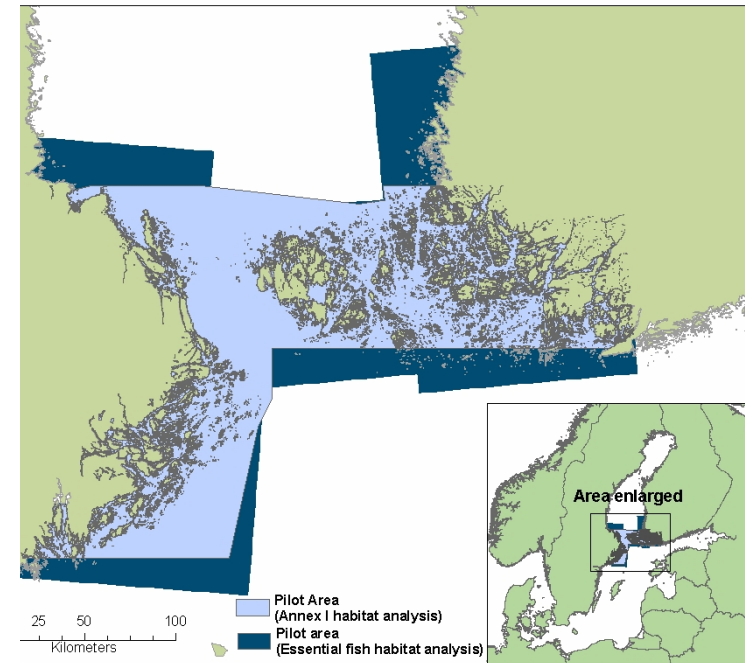
BALANCE assessment - Baltic Sea scale

- ✓ Why do we use marine landscapes in this assessment?
- ✓ Representativity of benthic marine landscapes (60), topographic bed-form features (9), and coastal physiographic features (5).
Minimum target: 20%.
- ✓ Replication for 60 benthic marine landscapes.
- ✓ Of the 60 landscape types – connectivity was assessed for 5 landscapes. Connectivity was assessed also for five species.



BALANCE assessment – Pilot area scale

- ✓Habitat maps produced for Stockholm archipelago – Åland – Archipelago Sea.
- ✓Higher resolution than at the Baltic Sea scale.
- ✓Closer to biological features.
- ✓Habitat scale assessment goal for assessing the whole basin.
- ✓Annex I habitats are the features that the Natura 2000 network is actually aiming to protect.



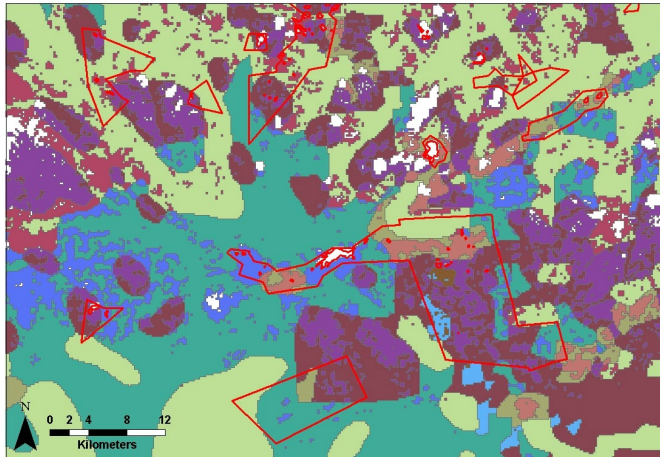
Reefs | Esker islands | Estuaries | Lagoons

Large shallow inlets and bays | Boreal Baltic islets

Nursery areas for perch | pike | pikeperch | roach

Spawning areas for perch

Methods



SACs

Adequacy:

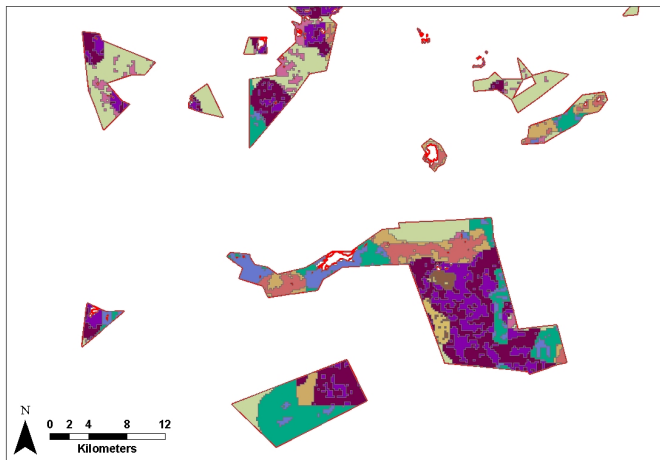
Size distribution of the sites (only marine)

Representativity:

- Geographical representativity
- Representativity of different landscapes

Replication:

Number of landscape patches within Natura 2000 area (all small patches dissolved into their surroundings)



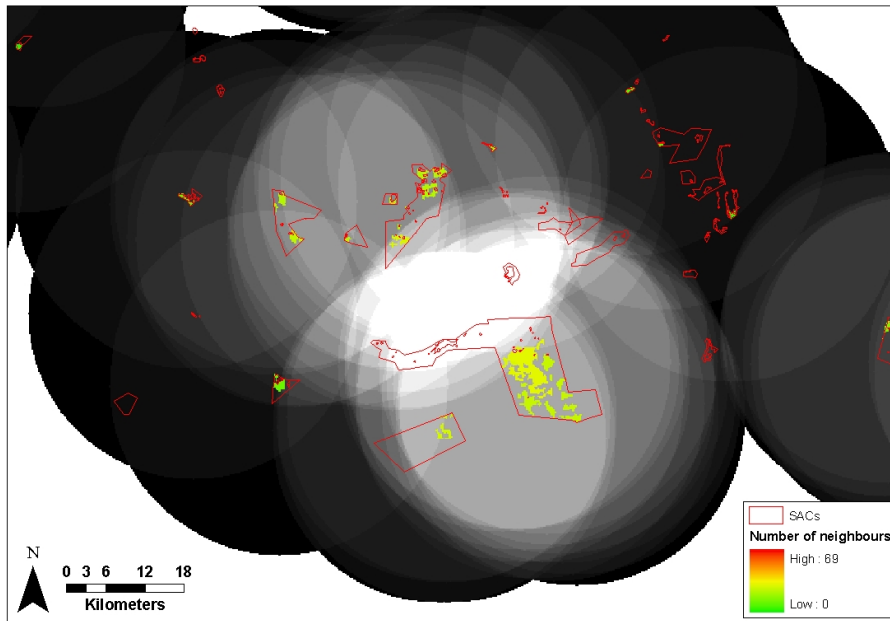
SACs+SPAs

Connectivity:

- Connectivity between replicates
- Both within site and between site connectivity included
- 5 landscapes (25km)
- 5 species (species specific dispersal distances, 1-100km)

Methods - connectivity

Species-specific approach – *Furcellaria lumbricalis* as an example



1. Landscapes suitable for *Furcellaria* chosen

2. 25km search radius for neighbours (other patches suitable for *Furcellaria*) applied

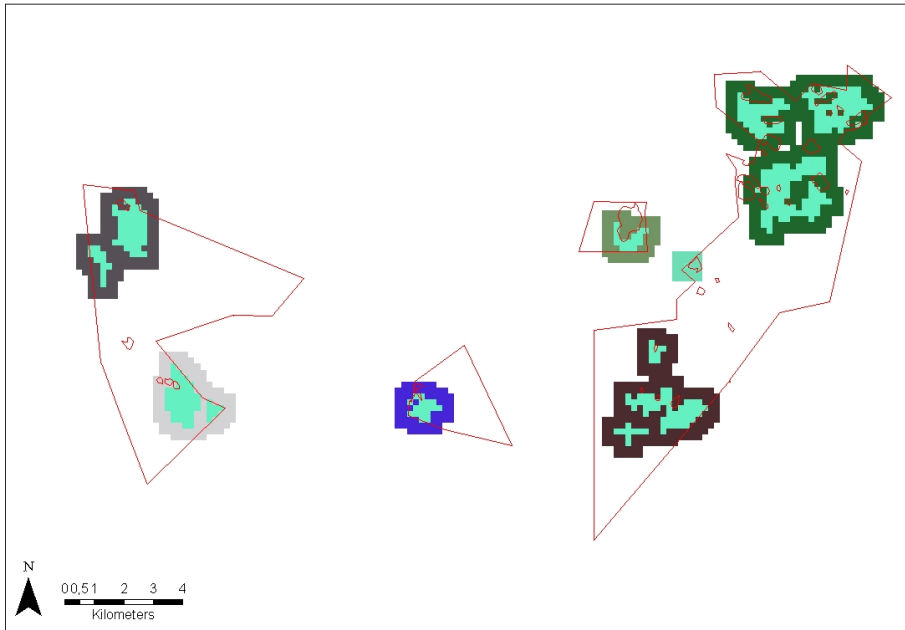
3. Result: Number of neighbours for each patch

4. Classification into 5 classes:

- 0 connections
- 1-3 connections
- 4-6 connections
- 7-10 connections
- >10 connections

Methods - connectivity

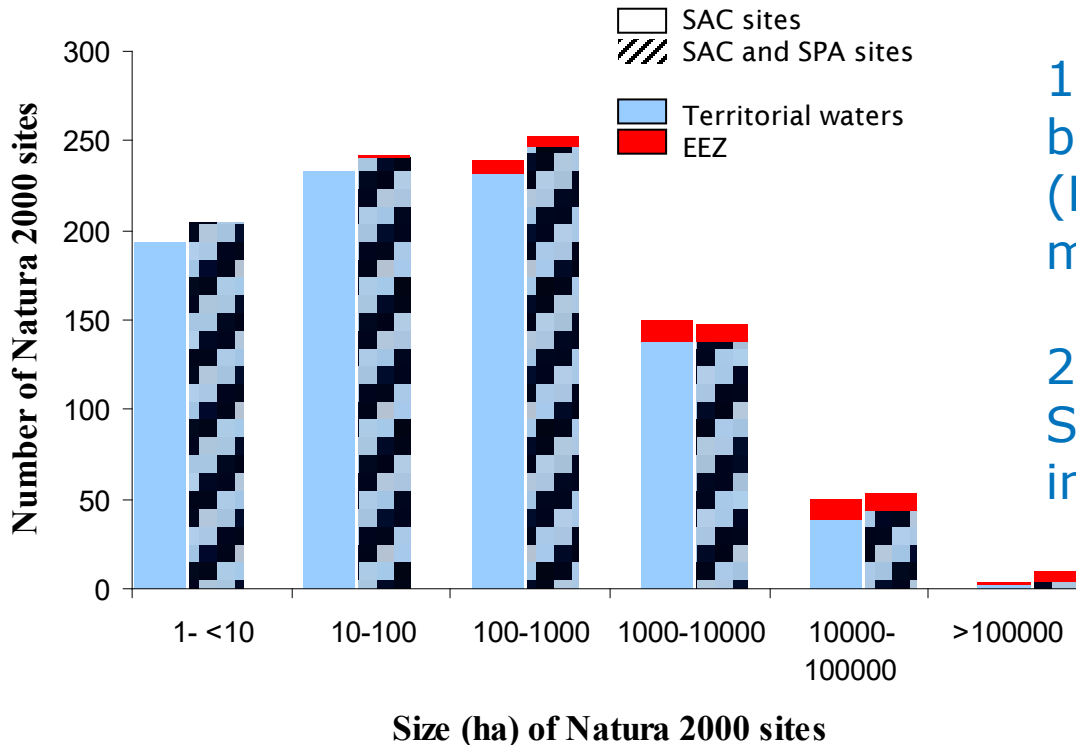
2nd method, *Fucus vesiculosus* as an example



1. Expansion of patches by half the dispersal distance of the species

2. Formation of "connected clusters"

Results – Adequacy

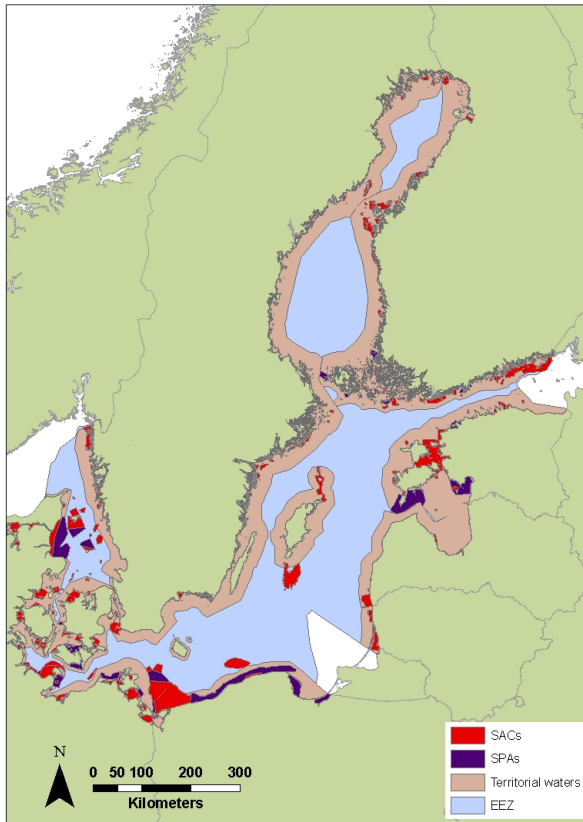


1. Size distribution strongly biased towards small sites (HELCOM recommendation: minimum 3000ha)

2. Inclusion of SPAs to the SAC network would not improve the situation

Results – Representativity

Geographical representation of the Natura 2000 network



SACs

EEZ 3%

Territorial Waters 11%

Total 7%

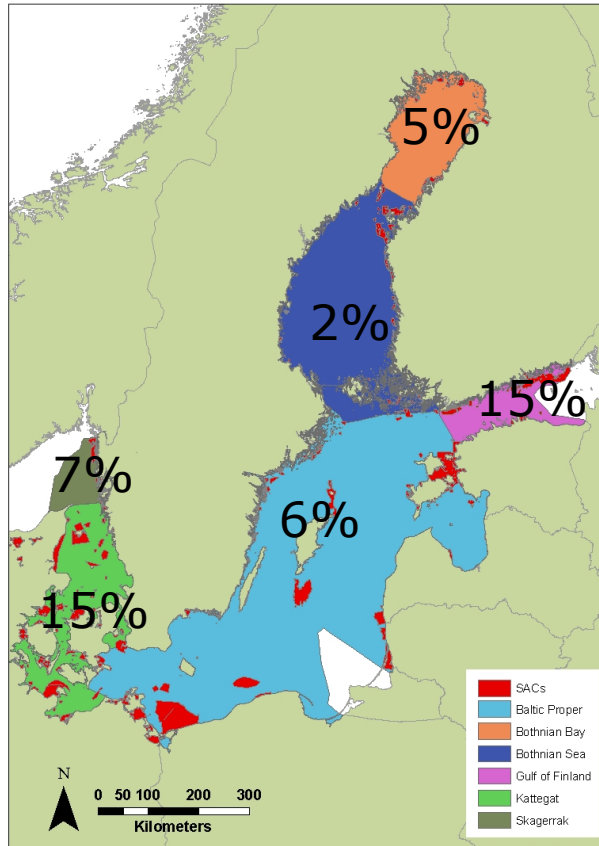
SACs+SPAs

EEZ 4%

Territorial Waters 16%

Results – Representativity

Geographical representation of the Natura 2000 network



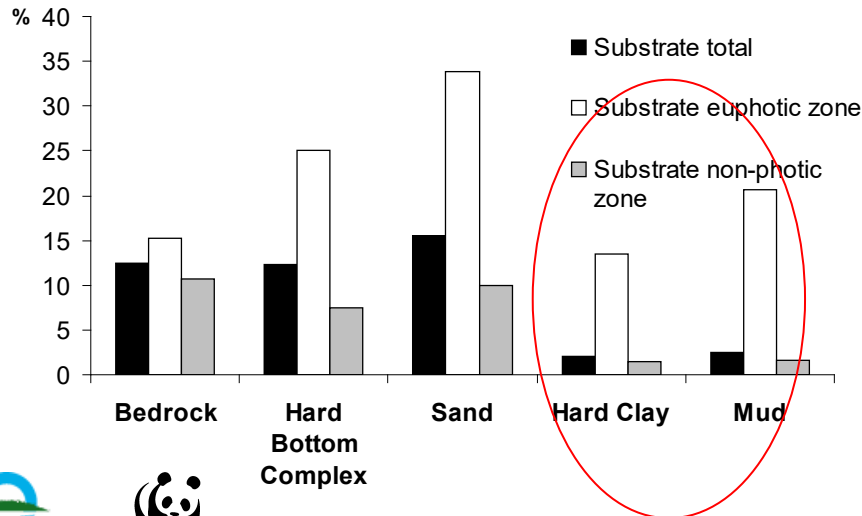
SACs

1. Gaps in representation in the low salinity areas of Bothnian Bay and Bothnian Sea
2. Gulf of Finland and Kattegat are closer to the minimum target of 20%

Results - Representativity

Representativity of the Benthic Marine Landscapes

Representation	SACs	SACs+SPAs
Bad (<10%):	28 / 60	24 / 60
Poor (10-20%)	13 / 60	13 / 60
Moderate (20-30%)	10 / 60	6 / 60
Good (30-60%)	6 / 60	13 / 60
High (60-100%)	3 / 60	4 / 60



1. Landscapes with mud and hard clay poorly represented

2. Non-photic landscapes poorly represented

3. Landscapes with low salinity poorly represented

Results - Replication

-Most of the benthic marine landscapes were found to have many replicates within the SAC network – especially coastal areas naturally patchy

-Low number of replicates often coincided with low representativity

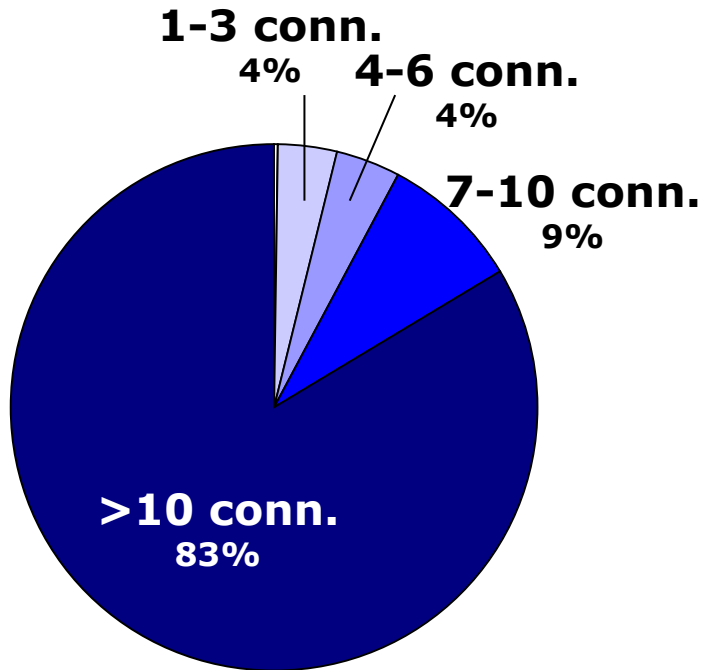
-Gaps found especially in non-photic hard clay

Definition for a replicate?

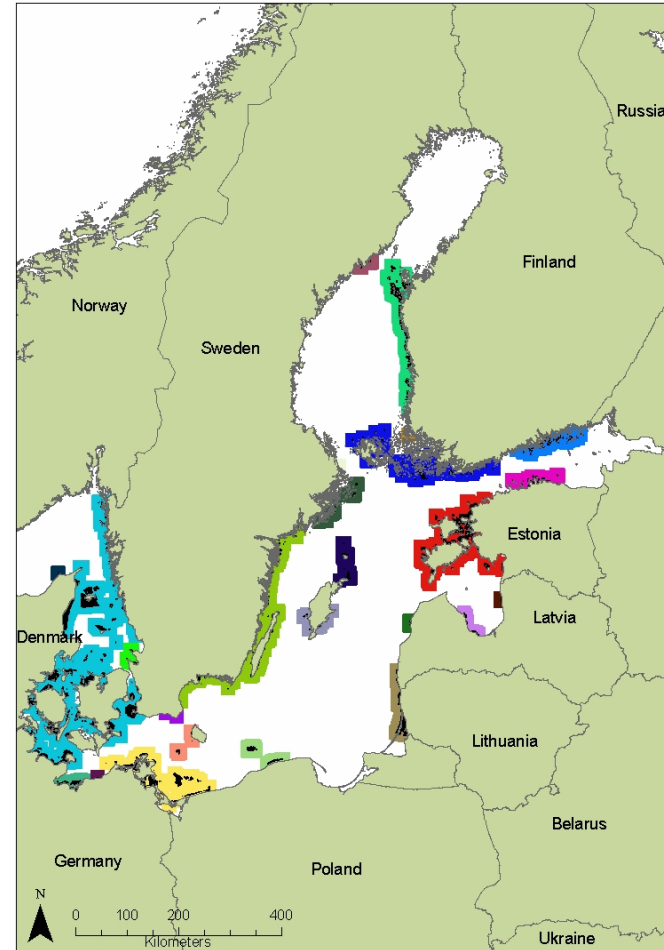
→Needs further development and should be done based on biology

Results -Connectivity

Psetta maxima, 25km

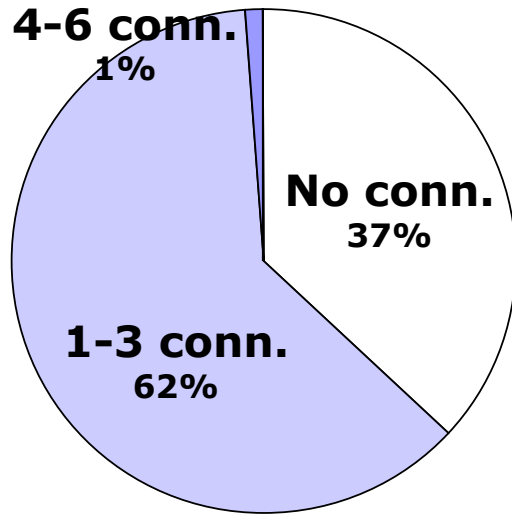


Within SACs only

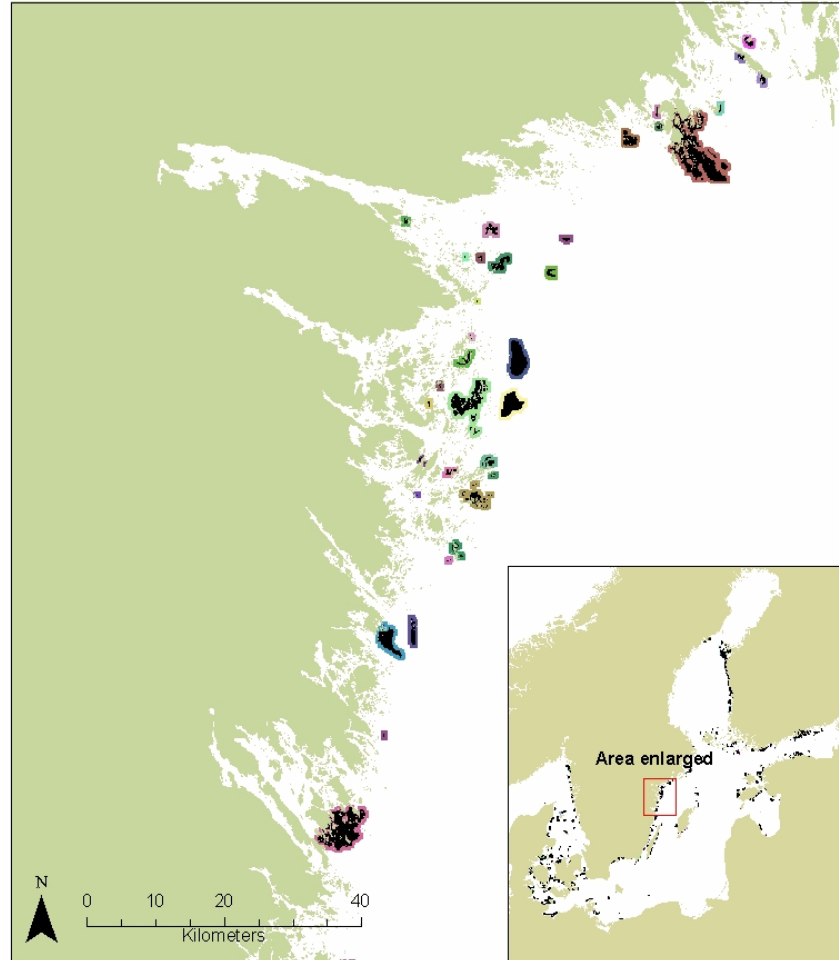


Results -Connectivity

Fucus vesiculosus, 1km



Within SACs only



Results – The pilot area assessment

Representativity

Natura 2000 Habitat	Minimum target level	Rep. in SACs (%)	Rep. in SACs+SPAs (%)
Estuaries (1130)	20	2.8	11.0
Coastal lagoons (1150*)	60	15.4	16.4
Large shallow inlets and bays (1160)	20	7.9	9.3
Reefs (1170)	20	4.6	7.1
Esker islands (1610)	20	16.1	16.2
Boreal Baltic islets and small islands (1620)	20	7.4	10.0

Conclusions & Recommendations 1/2

The current Natura 2000 network is NOT ecologically coherent.

To improve the network:

- More off-shore sites,
- More large sites,
- Sites placed carefully to support connectivity,
- More sites on deep-water bottoms of mud and hard clay, and
- More sites in low-salinity areas.

Conclusions & Recommendations 2/2

Recommendations for future assessments

- Assessing ecological coherence should be done repeatedly as the networks develop
- As species don't know political boundaries, a regional approach in assessing the Baltic Sea networks is important
- Marine landscape approach is a good starting point, but as ecological coherence is tightly linked to biology, more ecological knowledge and data are needed!!
- Important factors to be included in the assessment; water quality, oxygen depleted areas, areas of strong human impact, currents and other water movements at the whole Baltic sea scale

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Thank you for your attention



Photo: WWF/Samuli Korpinen