

# Mapping of the marine environment for spatial management in Sweden

MSFD seminar  
Tallinn Nov 2012

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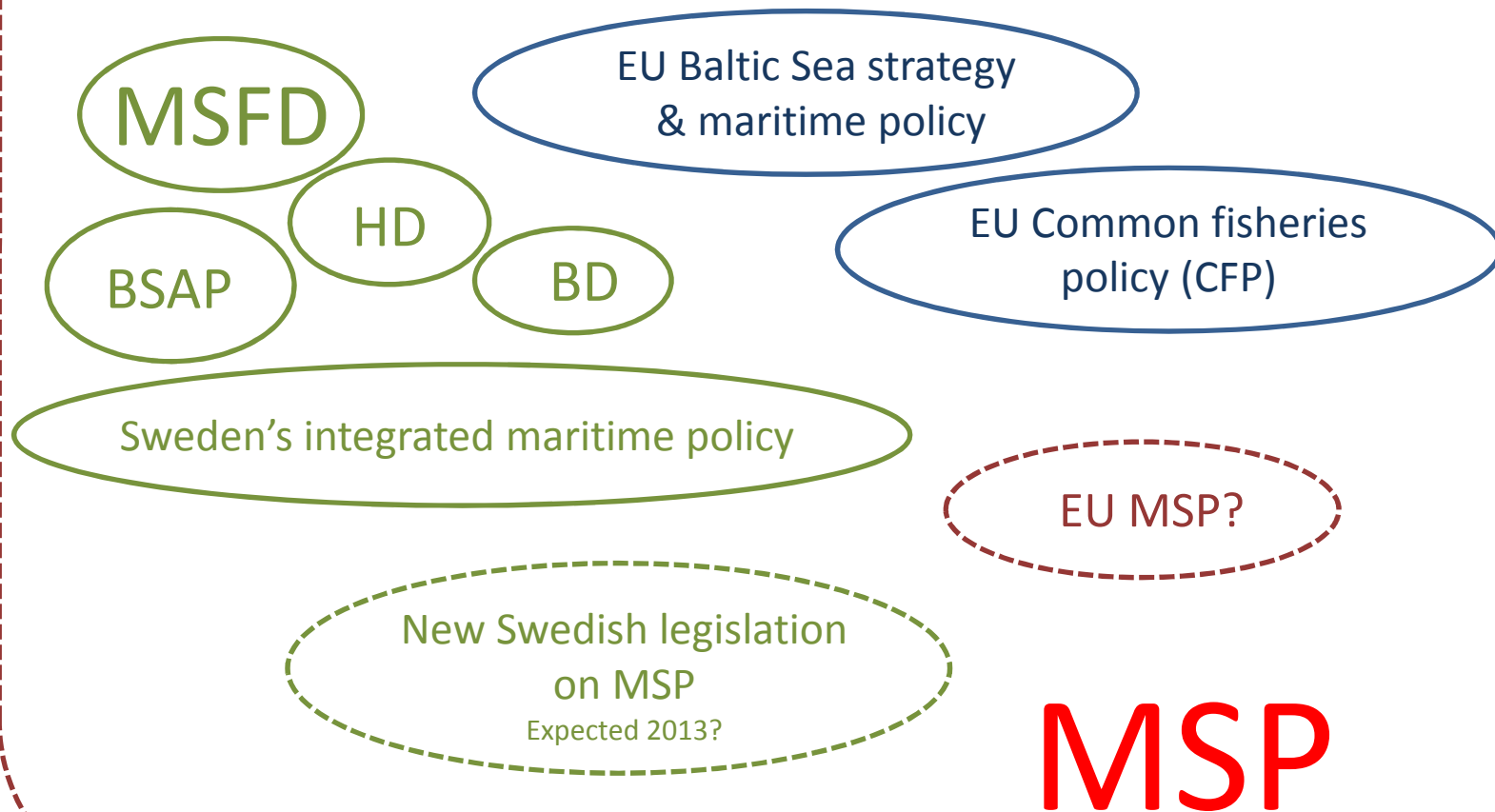


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Innovative approaches for marine biodiversity monitoring and assessment of conservation status of nature values in the Baltic Sea

# Integrated Marine Policy



# Marine spatial planning

Complexity map, Östergötland , Sweden (MESMA)

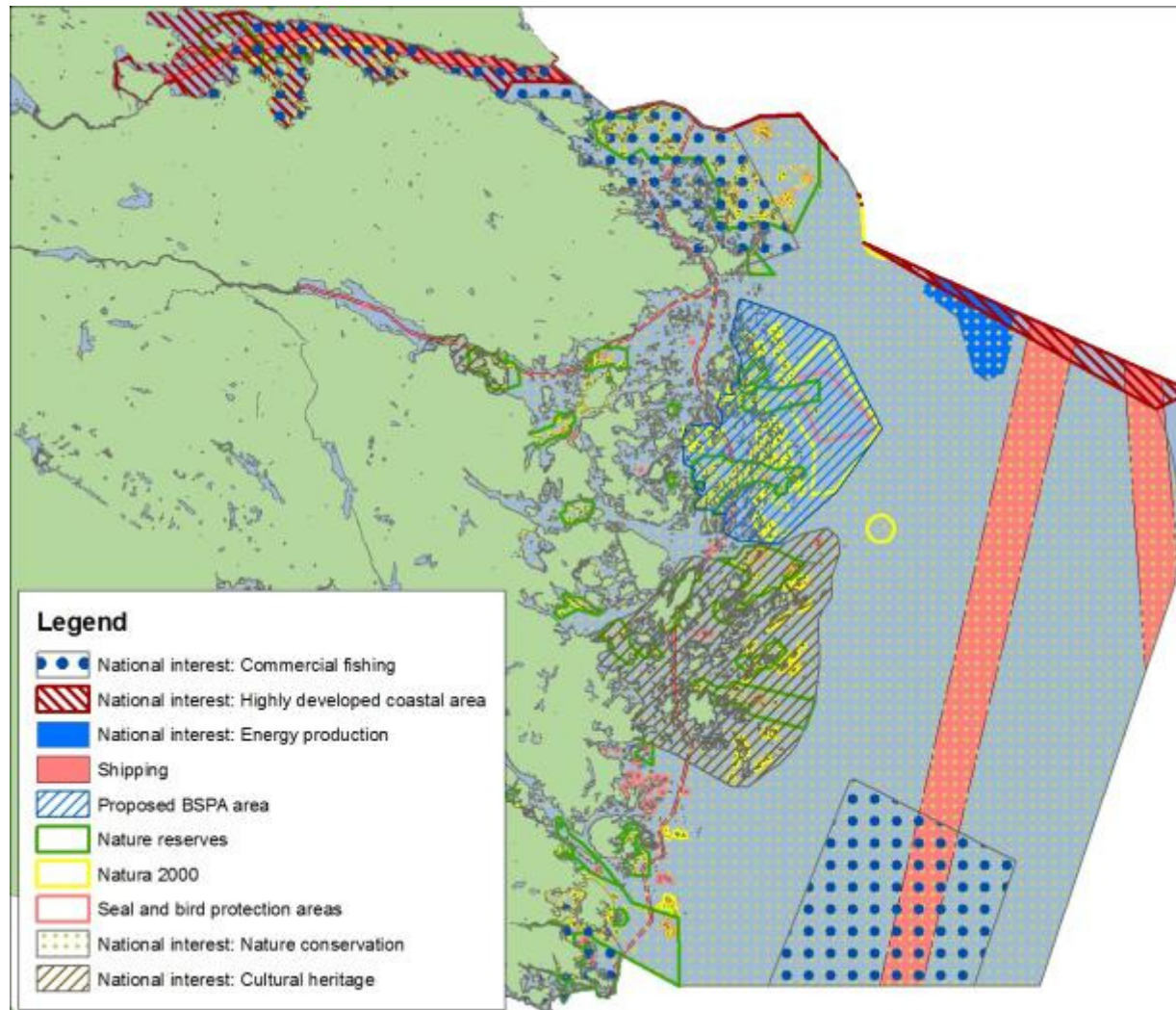




FOTO: KNUT STRØM

## Marine spatial planning

- To avoid conflicts between sectors and nature conservation
- To avoid conflicts between different sectors
- Ecosystem based approach to management



# Management at relevant scales

## Antropogenic

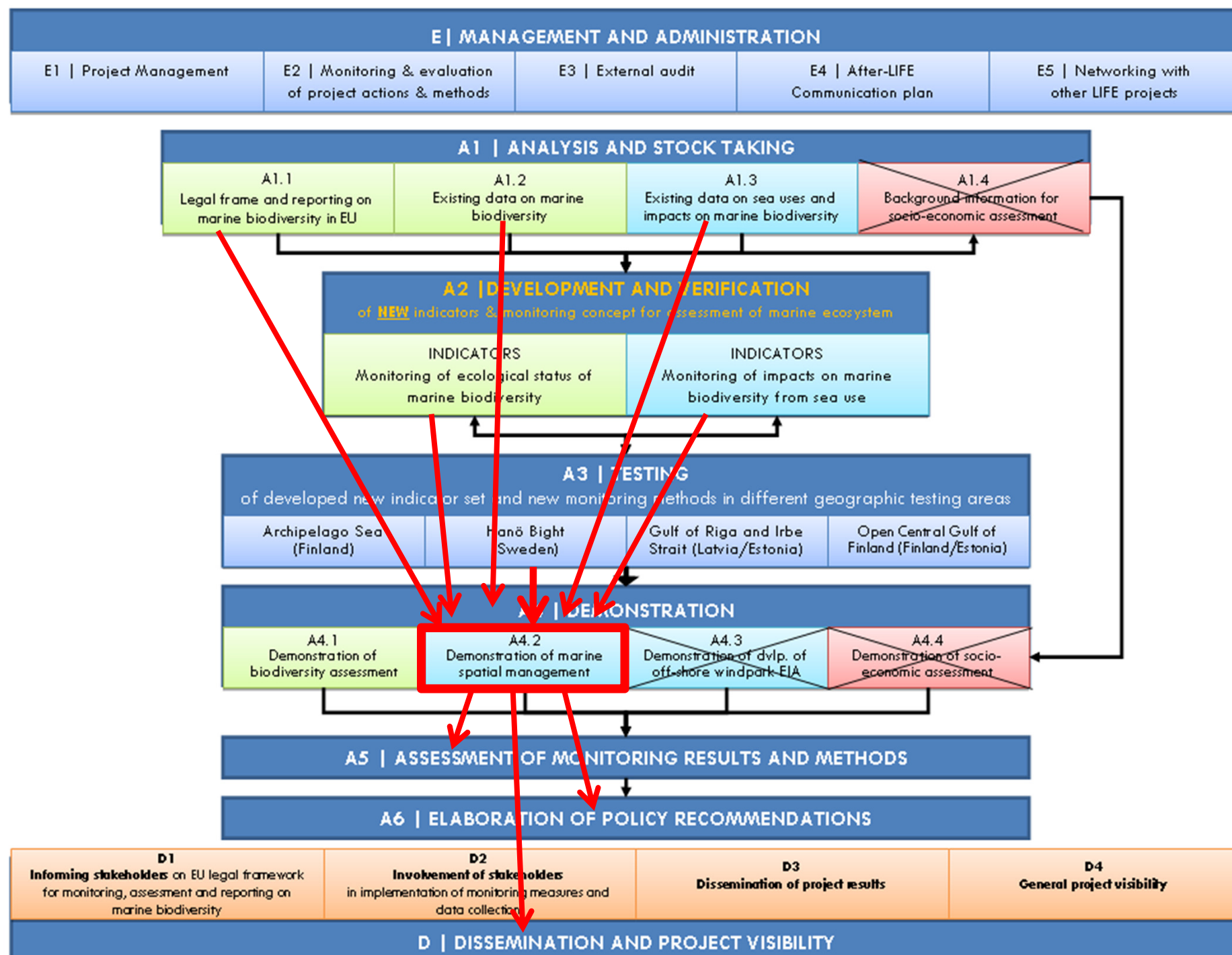
- Planning wind parks in Norway – national scale
- Harbours and jetties – municipality scale

## Biology

- Longtailed duck population - Baltic scale
- Fish population scale – Baltic/regional/local

MSFD points out conventions strongly to be an agent for cooperation on regional waters scale, i.e. HELCOM for The Baltic Sea

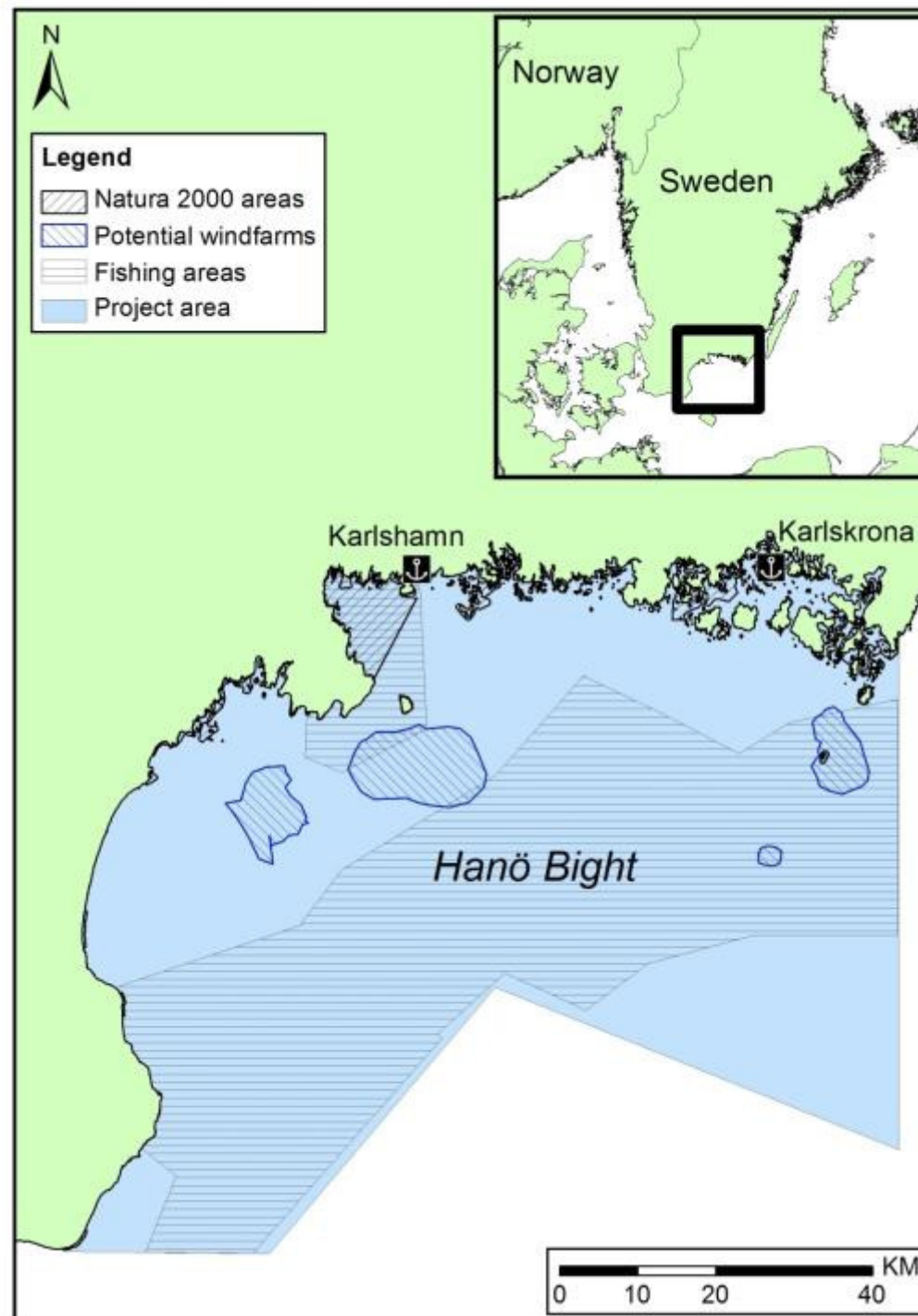




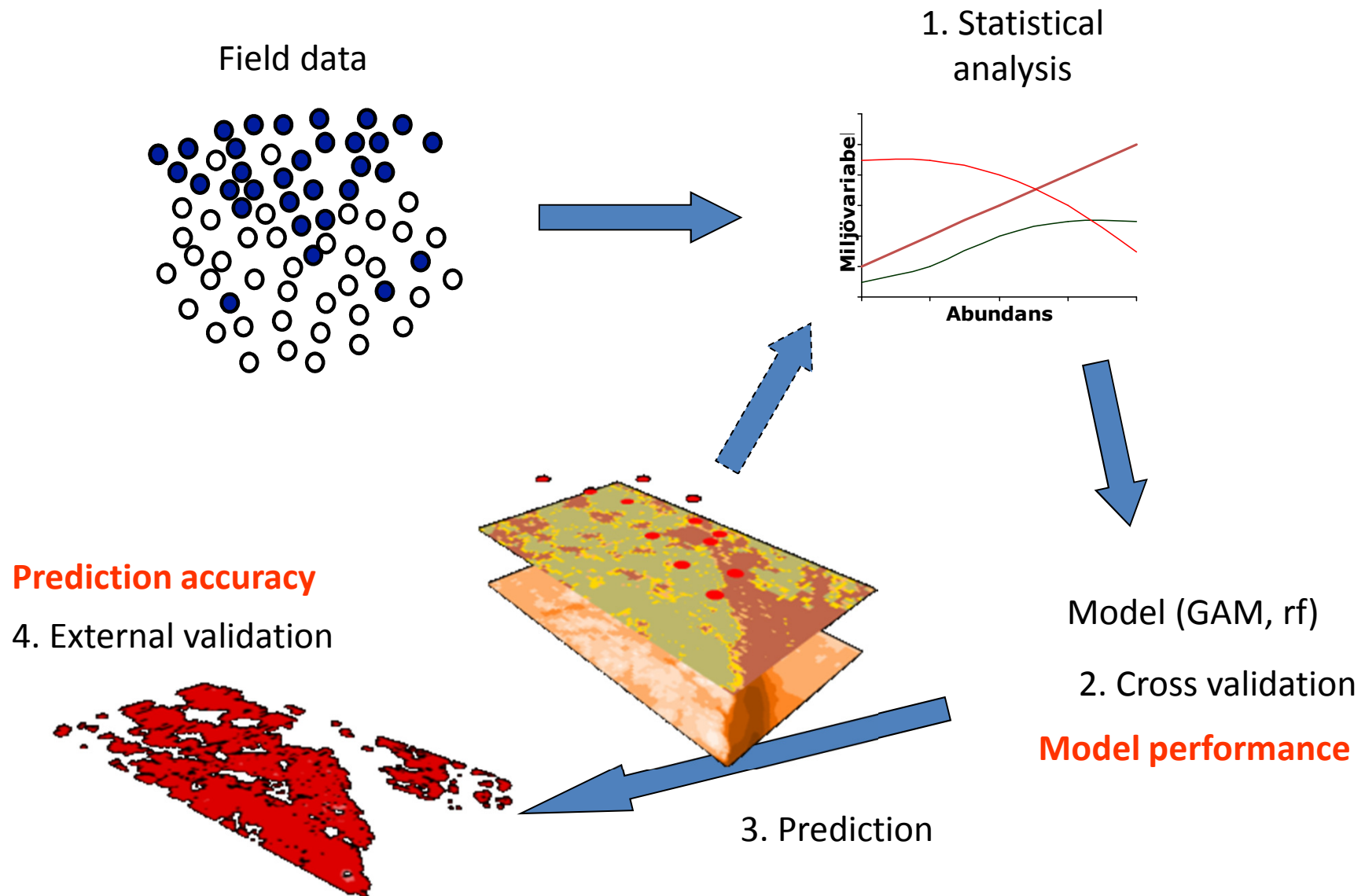
# Project area Hanö Bight, Sweden

Fully cover management layers

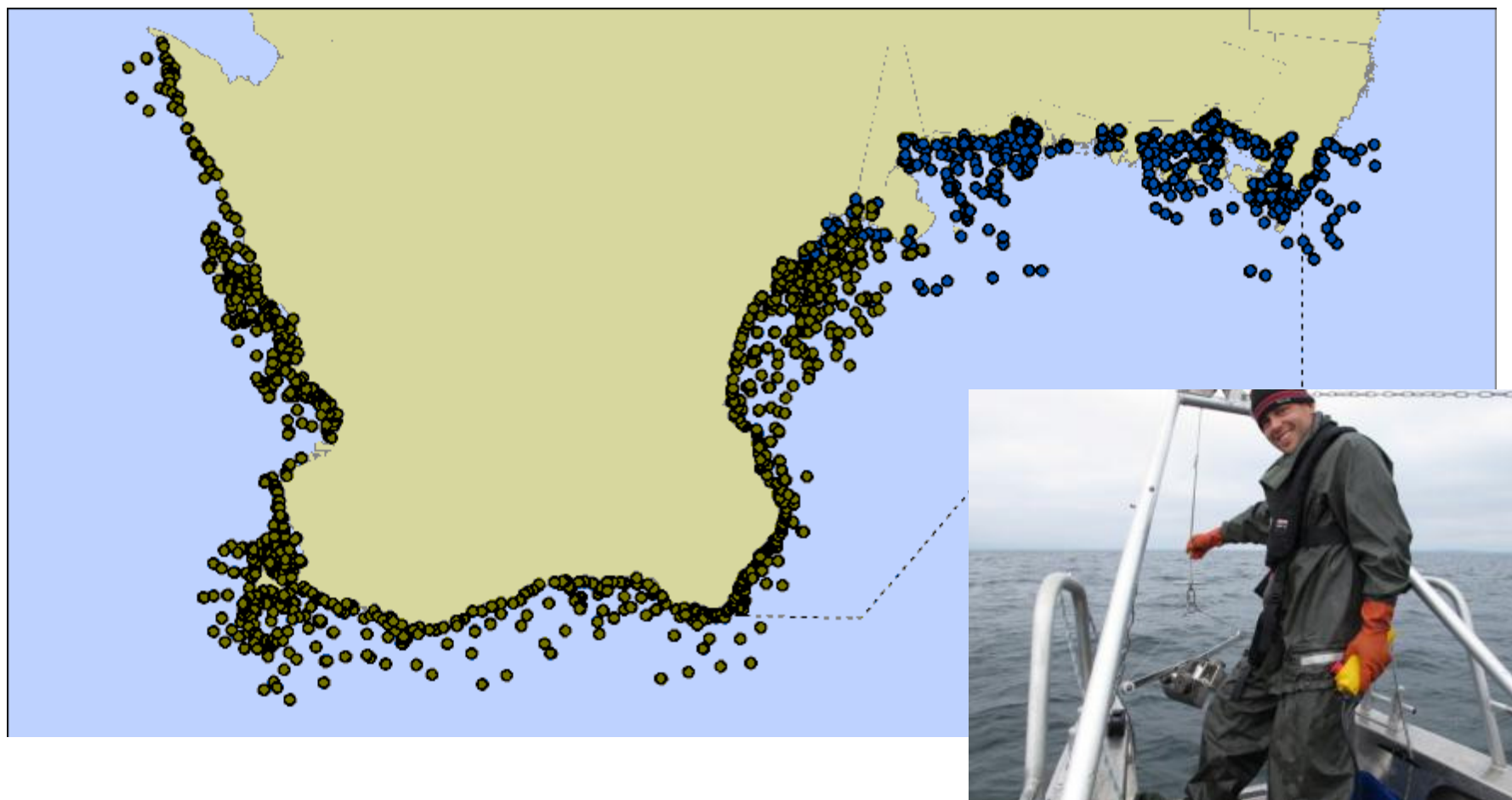
- Biology layers
- Environmental layers
- Antropogenic layers



# Species distribution modeling

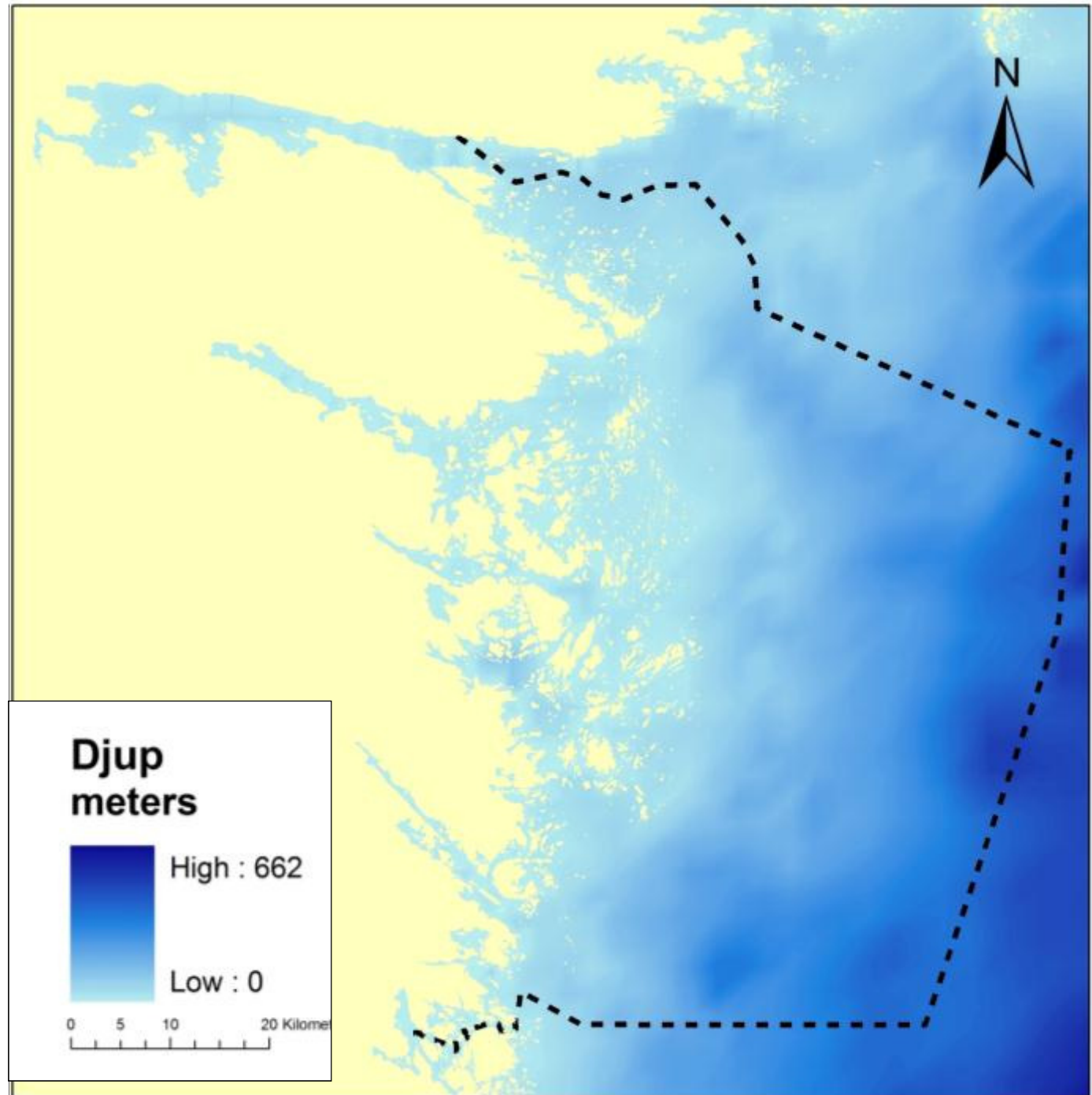


New survey method:  
drop-video + benthic grab at  
almost every station



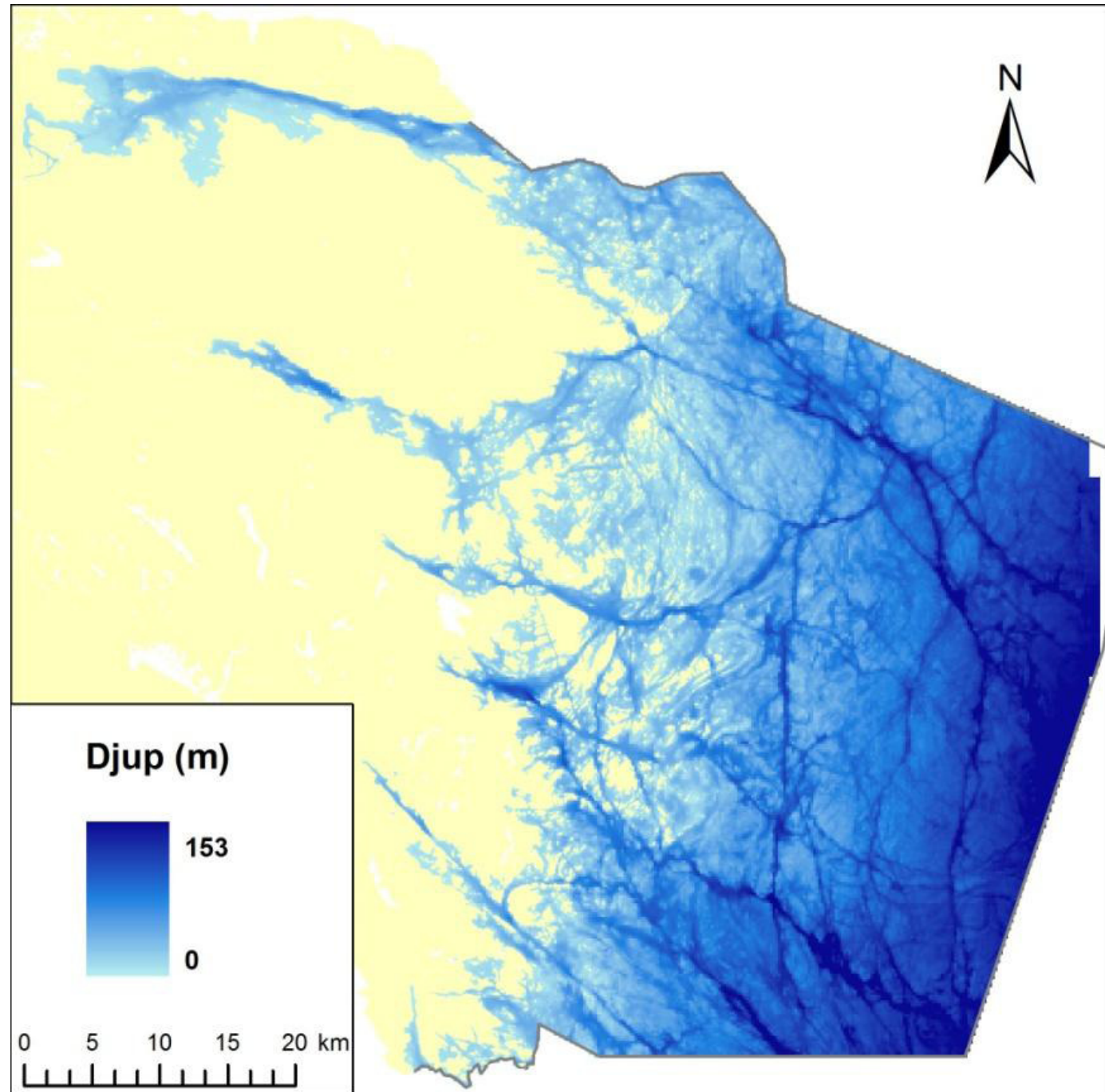
## Batymetry (m)

- Grid based on nautical charts
- 100 m



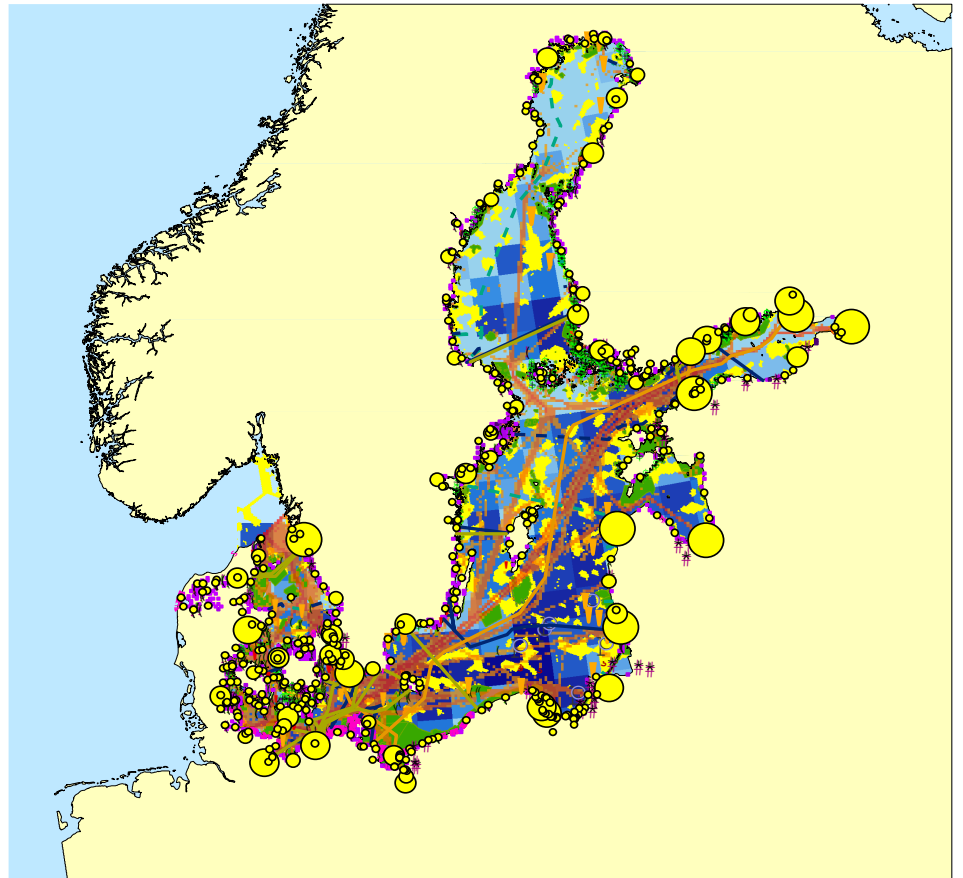
## Batymetry (m)

- Grid based on digitalized measurements 200 m



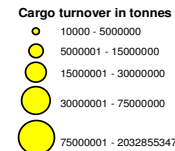
# Pressures

1. Helcom HOLAS
2. Poluted areas
3. Fishing intencity
4. AIS boat traffic
5. Harbours and jetties
6. Secchi-depth (satellite)



## All Sectors 2030

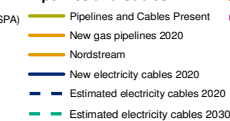
### Ports 2030



### Planned wind farms 2030



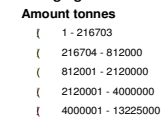
### Pipelines and Cables



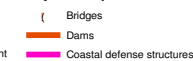
### Oil extraction



### Dredging Present



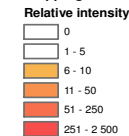
### Physical exploitation



### Industries Present



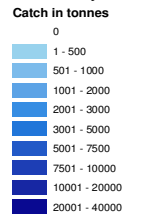
### Shipping 2030



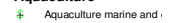
### Recreational boating 2030



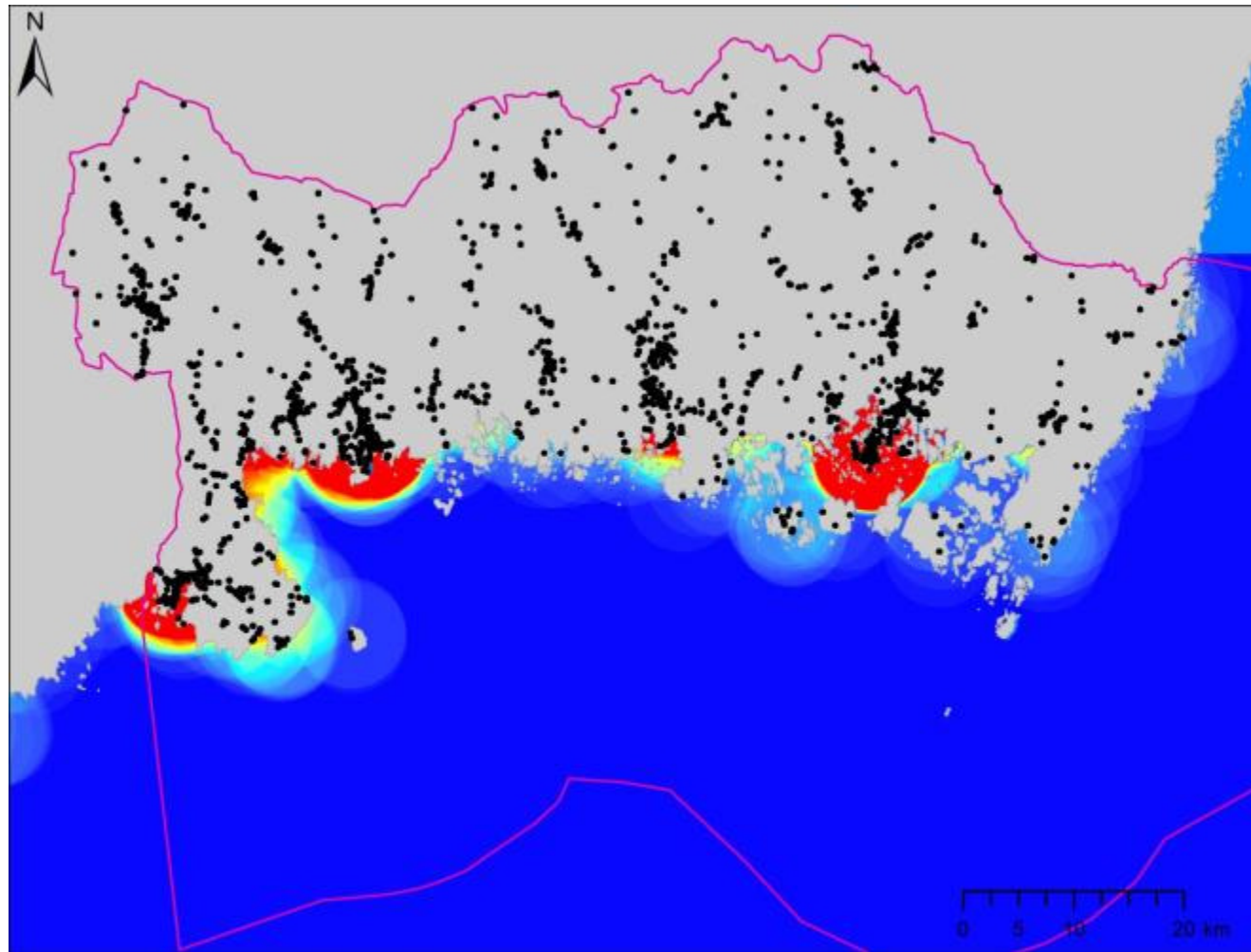
### Total Fishery Prese



### Aquaculture

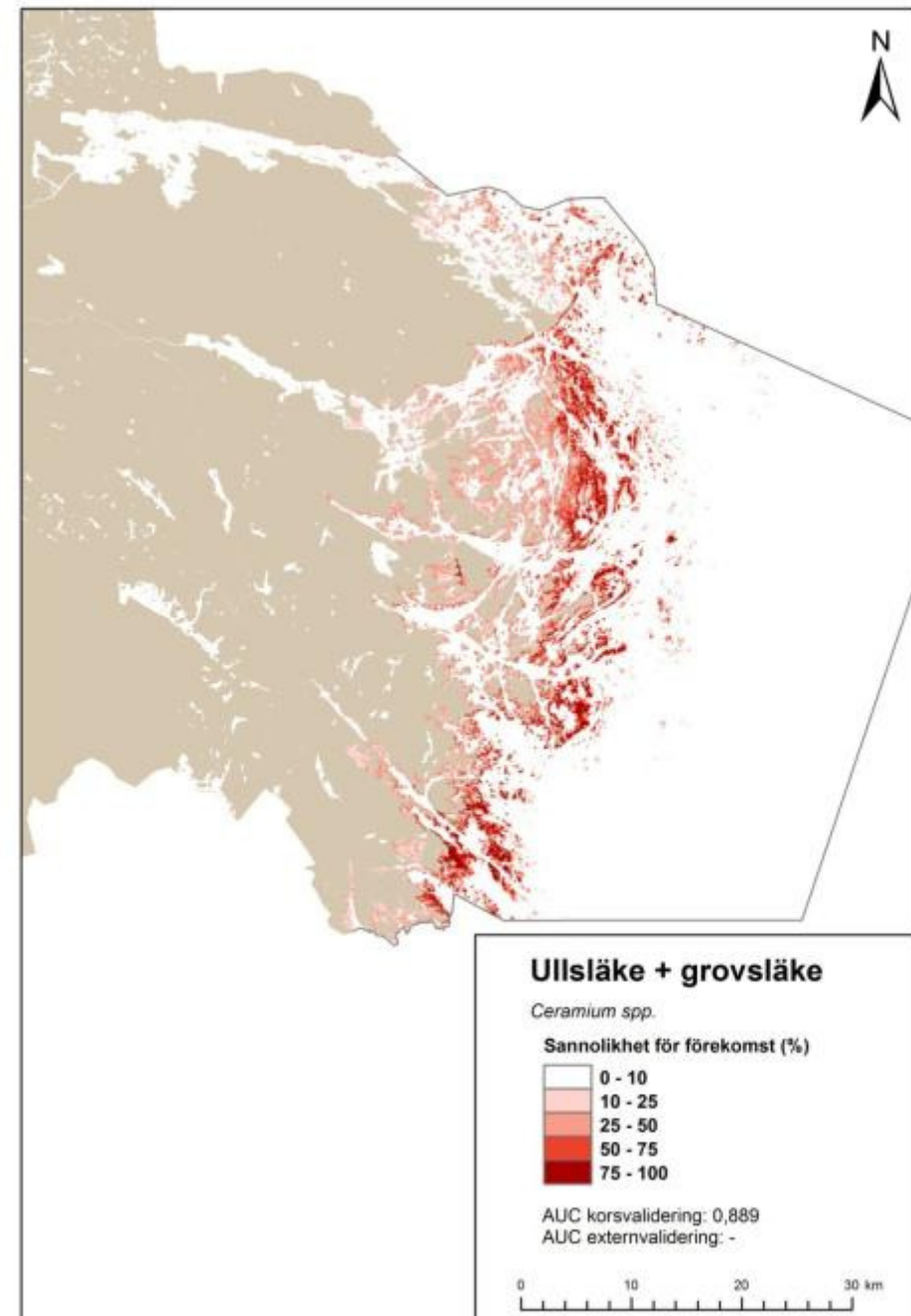


## Density of potentially polluted areas (MIFO)



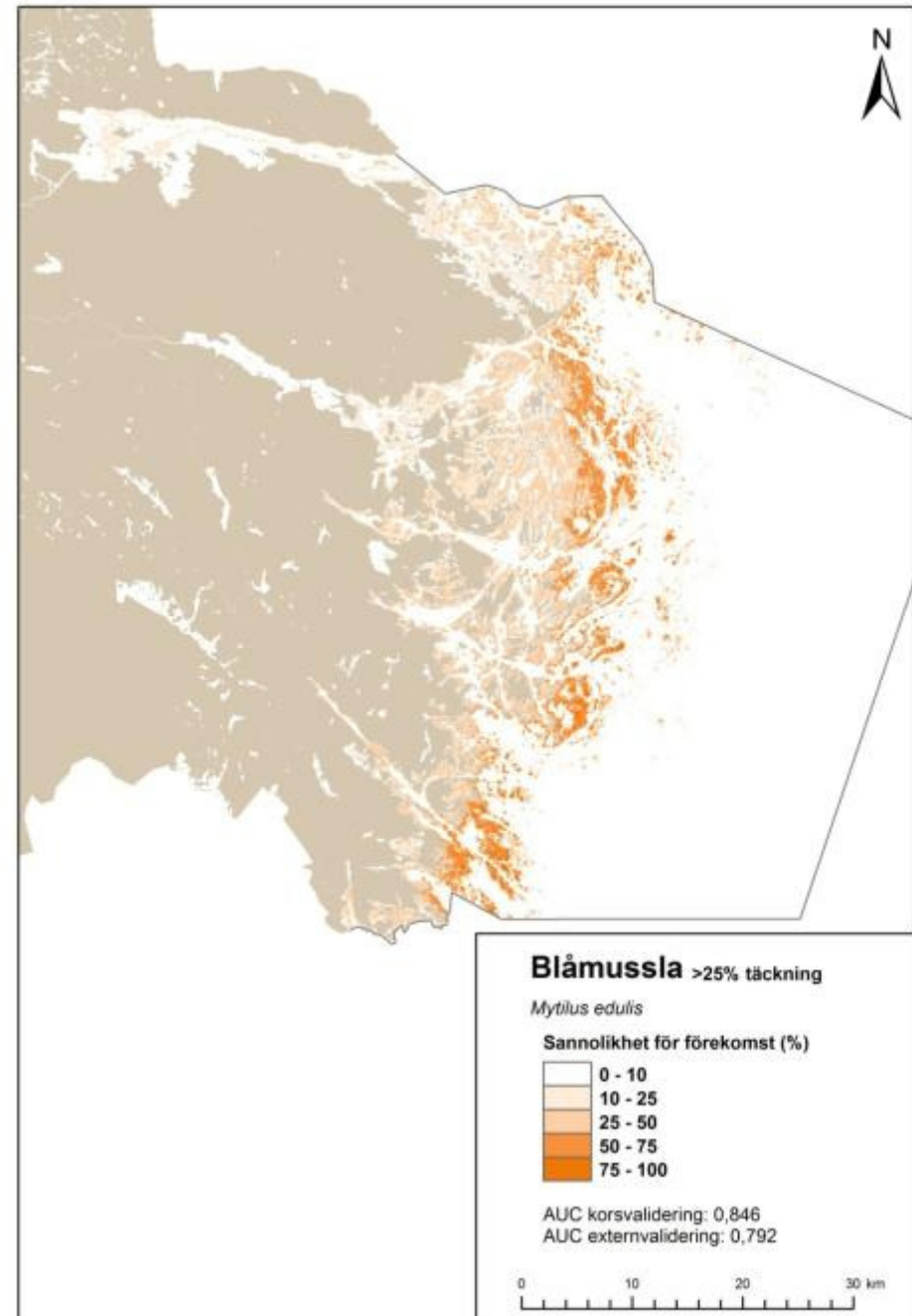
# Ceramium spp.

- Probability of *presence*



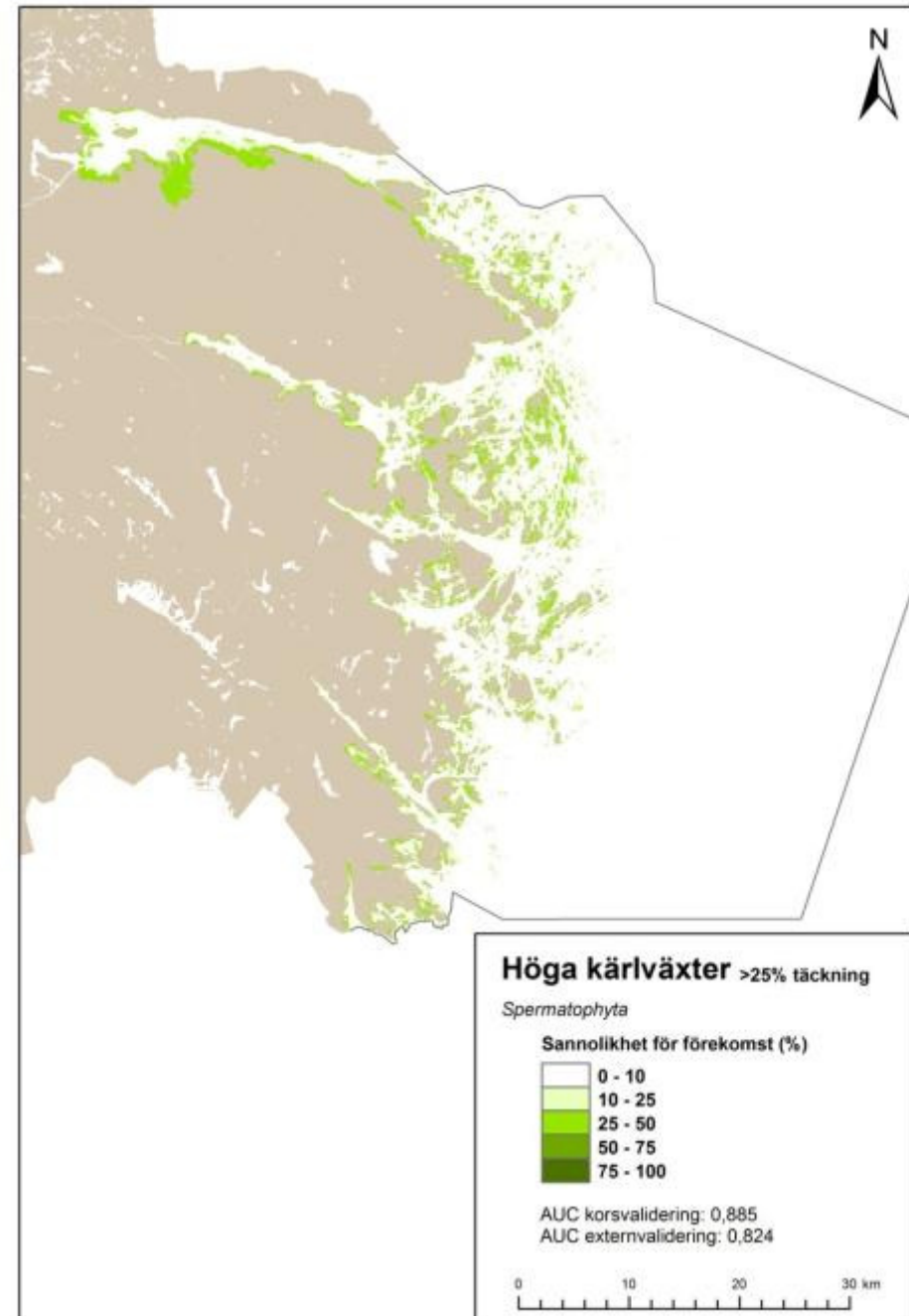
# Mytilus edulis

- *Probability of at least 50% cover*



# High vascular plants

- *Probability of at least 25% cover*



## More than 50 biological maps in MARMONI

- Birds (off-shore and near shore)
  - Benthic vegetation (makroalgae and phanerogams)
  - Benthic macro zoofauna
  - Fish (from hydroacoustic surveys, and recruitment areas)
  - (Harbour porpoises from Sambah)
- Key question: How to use all this information for marine management?



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# Four ways of using marine biology maps for marine management

- Biological synthesis maps, i.e. conservation values or diversity clusters
- Criteria analyses to map Natura 2000 habitats, Baltic-EUNIS
- Impact analyses /EIA, i.e. worst case scenarios
- Ocean zoning tools



# Conservation value mapping

Based on

- CBD criteria
- biological maps and field data
- analyses on trophic relations
- biodiversity patterns



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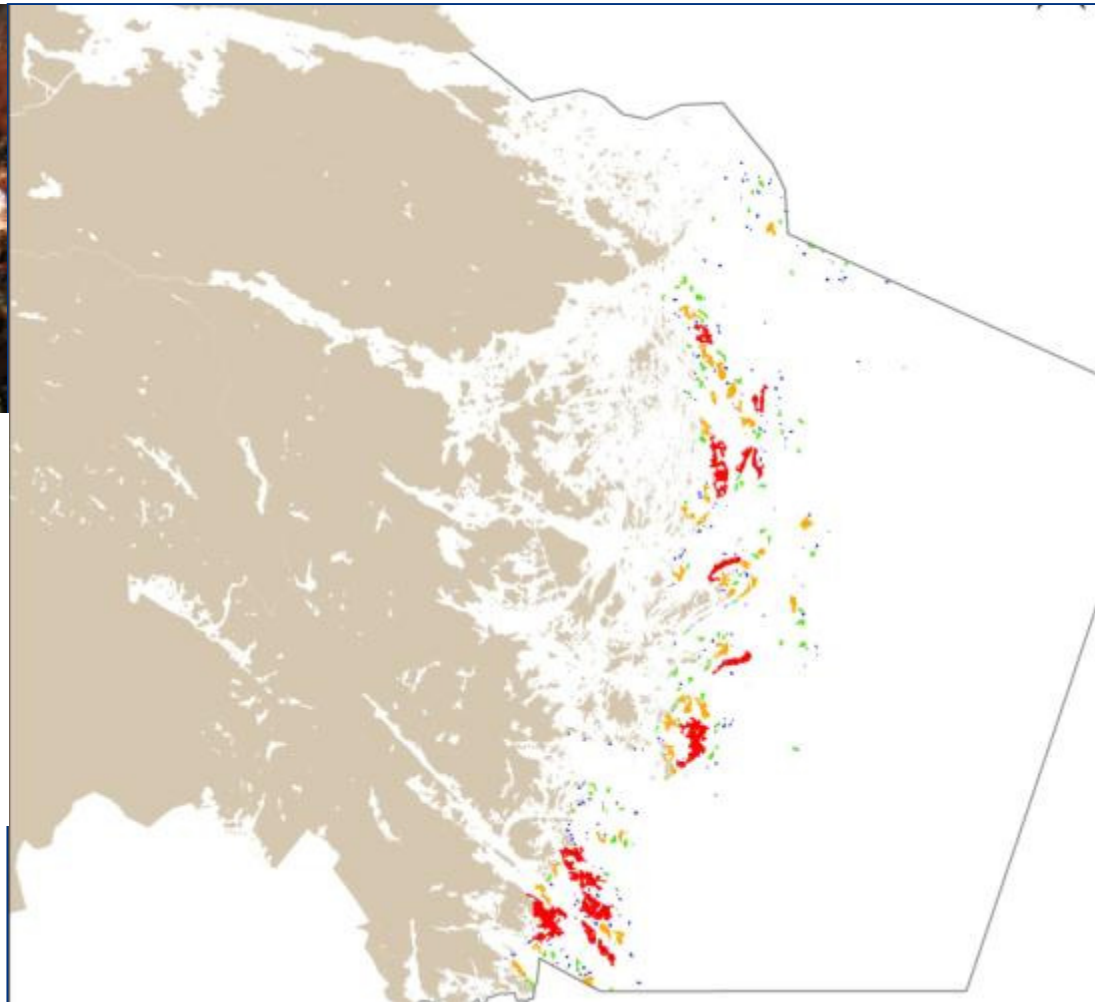
# Conservation values, example from Östergötland



**Marina naturvärdesområden  
för icke fintrådiga rödlager  
(rödblåd + kräkel + klyving)**

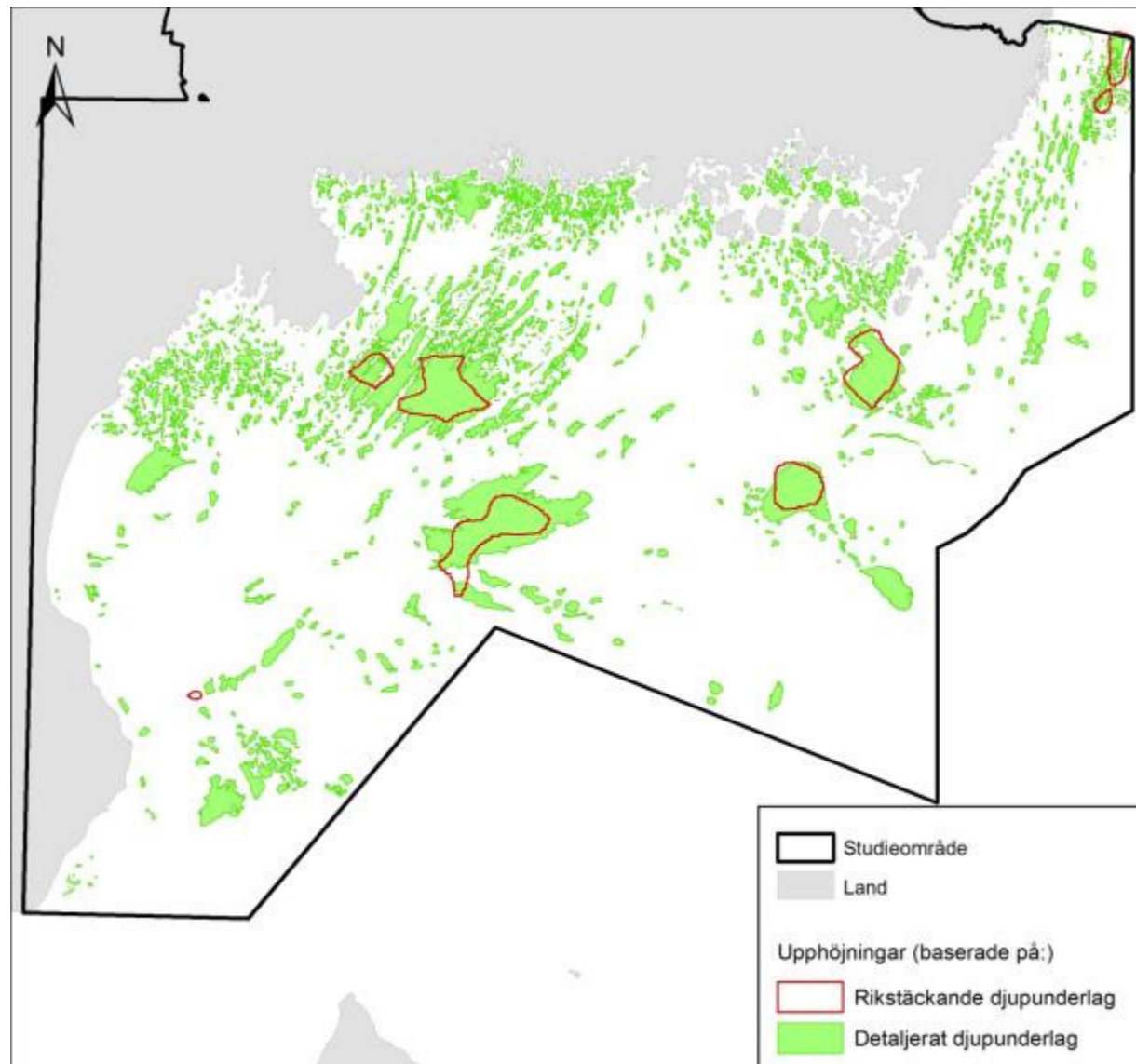
**Klasser**

- |                                                                                     |                |
|-------------------------------------------------------------------------------------|----------------|
|   | 1 (>75 ha)     |
|  | 2 (20 - 75 ha) |
|  | 3 (5 - 20 ha)  |
|  | 4 (1 - 5 ha)   |



# Natura 2000 reefs and sandbanks in Hanö Bight, Sweden

2785 vs. 8 st

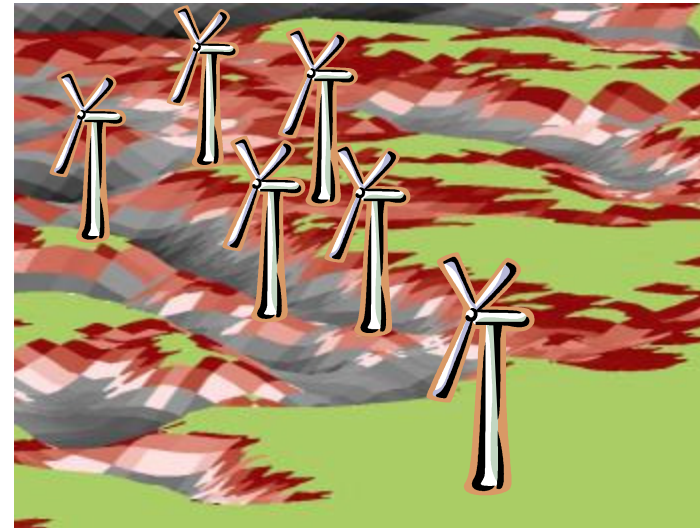


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# Management demonstrations

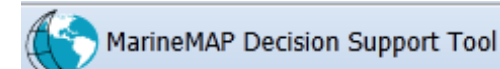
- Scenarios on wind park establishment and changes in fishing intensity
- Recommendations



# Management demonstrations (2014)

## – tools for MSP, Ocean Zoning

- NatureServe Vista
- Marxan & Marxan with zones
- Cumulative Impact Assessment Tool
- Zonation
- InVest
- Atlantis
- MarineMap



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## Key messages

- MSP is a powerful tool for managers, but it is dependent on reliable map data
- Modeling is a possible way to produce useful input for MSP
- Once biological maps are available, there is a variety of relevant methods and tools to aid MSP based on those maps



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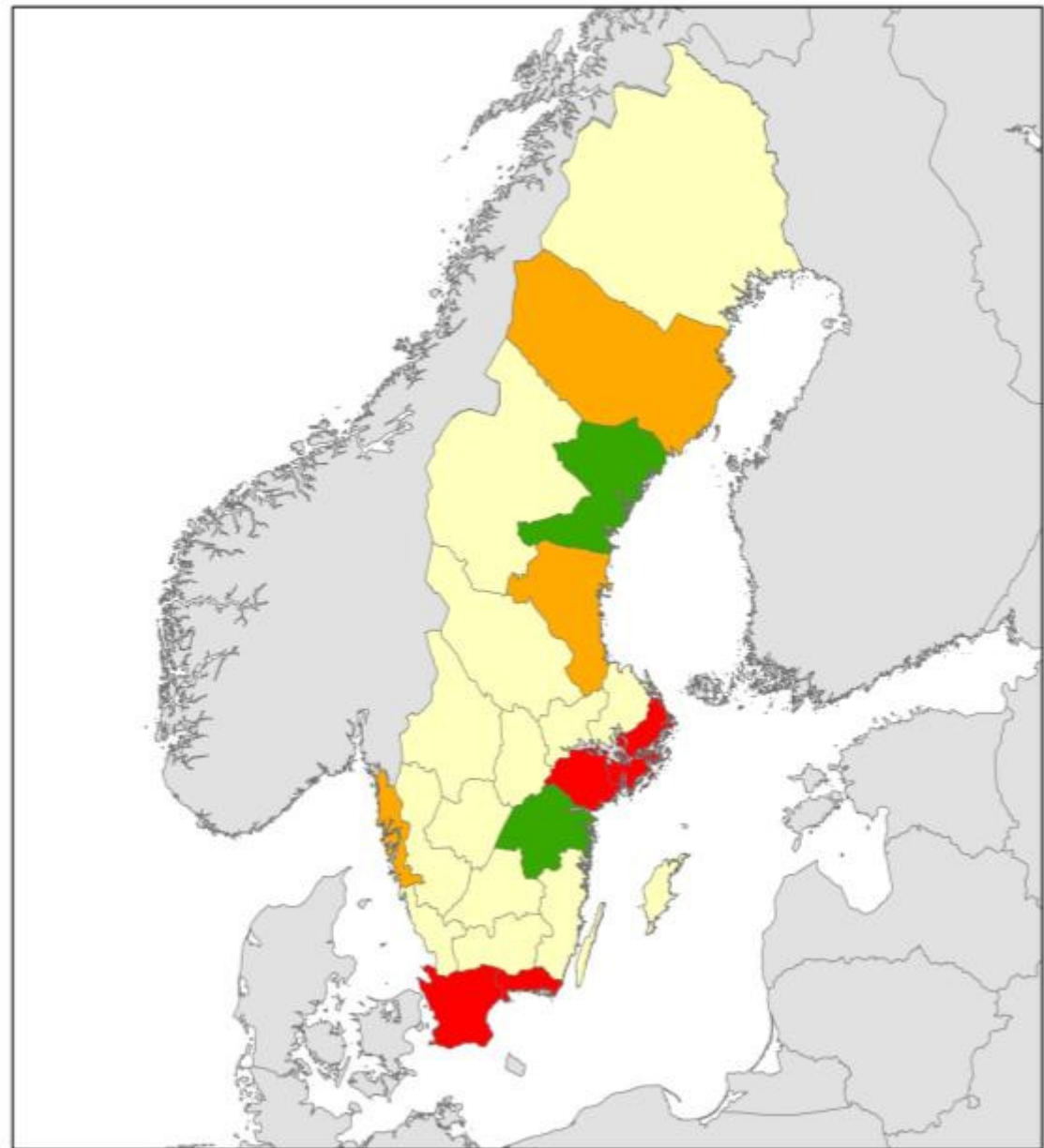
# Thank you!



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## Swedish Counties Modelling activity



Havs  
och Vatten  
myndigheten



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