

Relationship between Maritime Spatial Planning, aquaculture and its potential in the Baltic Sea

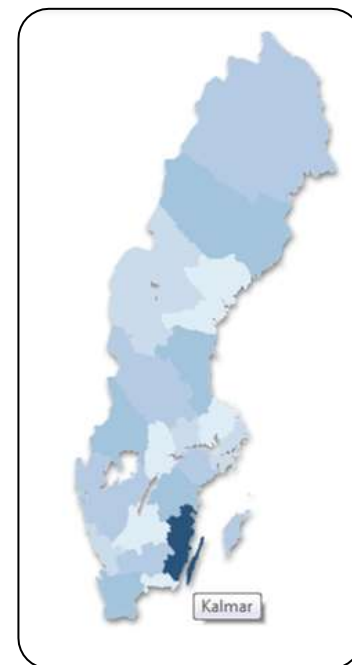
Susanna Minnhagen, PhD
Secretary of the Kalmar Sound Commission



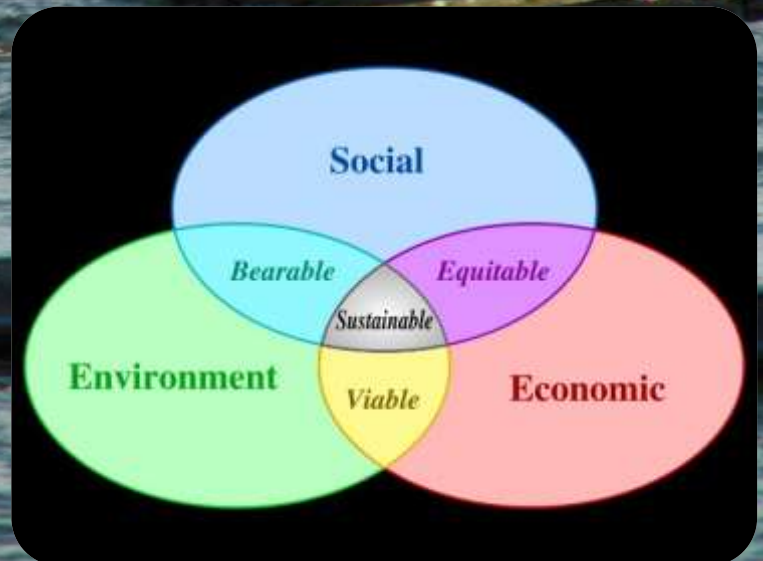
Part-financed by the European Union

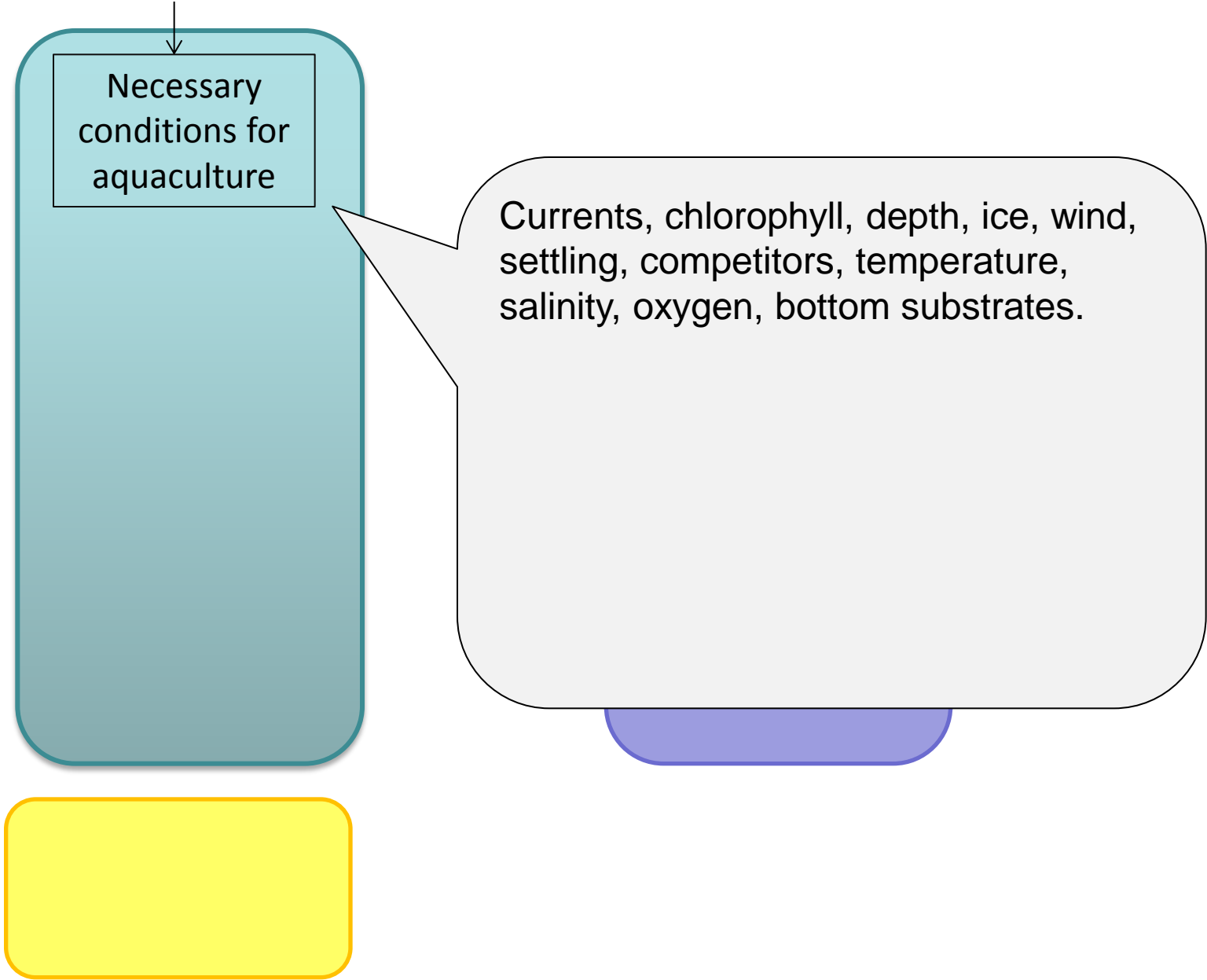
The Kalmar case (2011-2013)

The goal was to identify 12 suitable locations for mussel farms in the Kalmar region.



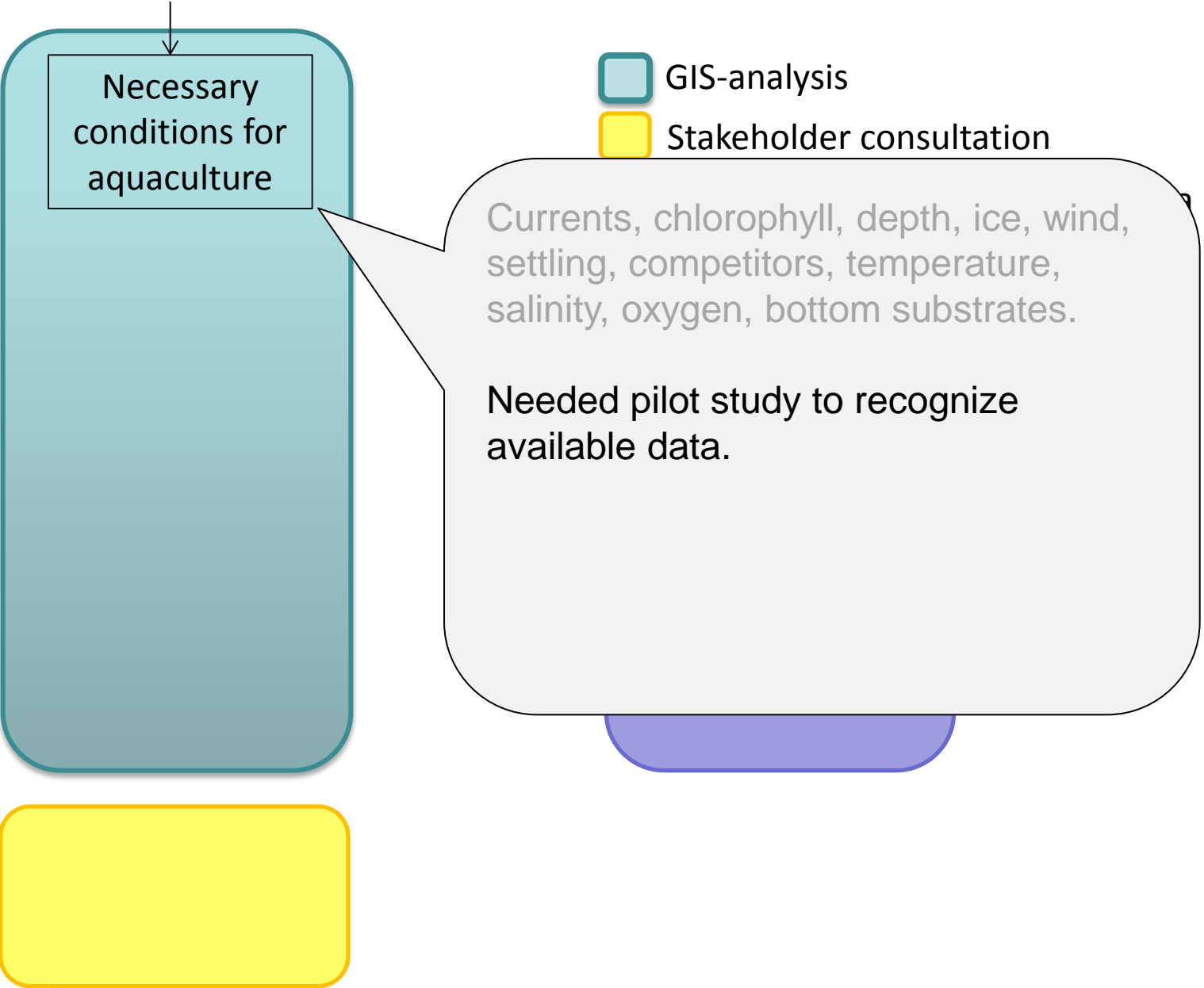
Where?





Necessary
conditions for
aquaculture

Currents, chlorophyll, depth, ice, wind,
settling, competitors, temperature,
salinity, oxygen, bottom substrates.



Necessary
conditions for
aquaculture



GIS-analysis



Stakeholder consultation

Currents, chlorophyll, depth, ice, wind,
settling, competitors, temperature,
salinity, oxygen, bottom substrates.

Needed pilot study to recognize
available data.

Table 1. Water quality parameters that are used in the algorithm for the analysis of suitable mussel farming areas

Parameter	Relevance	Grading (P) in algorithm
Salinity (PSU)	Relevant. Farming can take place at 4.0 PSU. Connection with biomass is assumed to be linear.	Variation: 5,9–7,0 $P_{SAL} = \text{Salinity} - 4$
Chlorophyll (mg/m ³)	Relevant. Expresses the net supply of mussel food, i.e. the processed nutrient values. Connection with biomass is assumed to be linear.	Variation: 0,7–3,6 $P_{CHLO} = (\text{value used directly})$
Oxygen gas (mg/l)	Critical under 2.8 mg/l. Farming ought not to take place below 5.7 mg/l. Oxygen levels of more than the stress level likely have no effect.	Variation: 7.3–11,9 $X = \text{Oxygen gas} - 5.7$ If $X > 0 \Rightarrow P_{OXYGEN} = 1p$ If $X \leq 0 \Rightarrow P_{OXYGEN} = 0p$
Renewal time (days)	Relevant. Expresses the likely net supply of new mussel food.	Variation: 0.001–302 P_{REN} : <1–5 days = 4p, 6–15 days = 3p, 16–50 = 2p, >50 days = 1p

Data from: SMHI Water Web <http://vattenwebb.smhi.modelarea>

AQUABEST
Necessary
conditions for
aquaculture



GIS-analysis



Stakeholder consultation

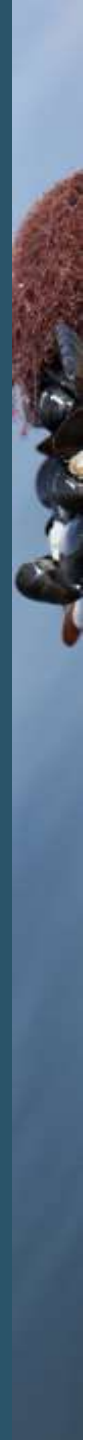
Currents, chlorophyll, depth, ice, wind, settling, competitors, temperature, salinity, oxygen, bottom substrates.

Needed pilot study to recognize available data.

Chlorophyll, salinity, oxygen, depth water exchange time.



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Necessary
conditions for
aquaculture



GIS-analysis



Stakeholder consultation

Currents, chlorophyll, depth, ice, wind,
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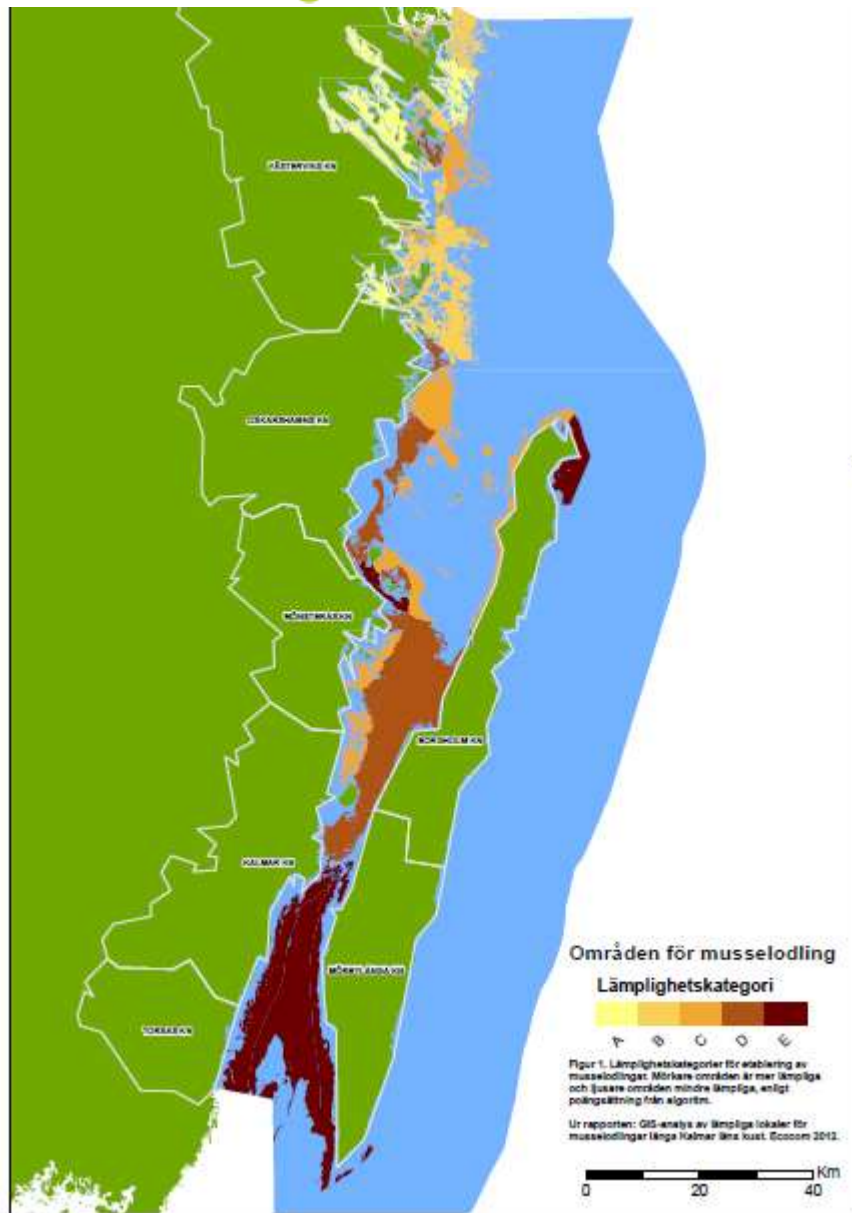
However, crude geographic scale.



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The Kalmar case.

We now have a map with what we think are suitable areas for mussel farming, without restrictions!



Resrictions:



GIS-analysis

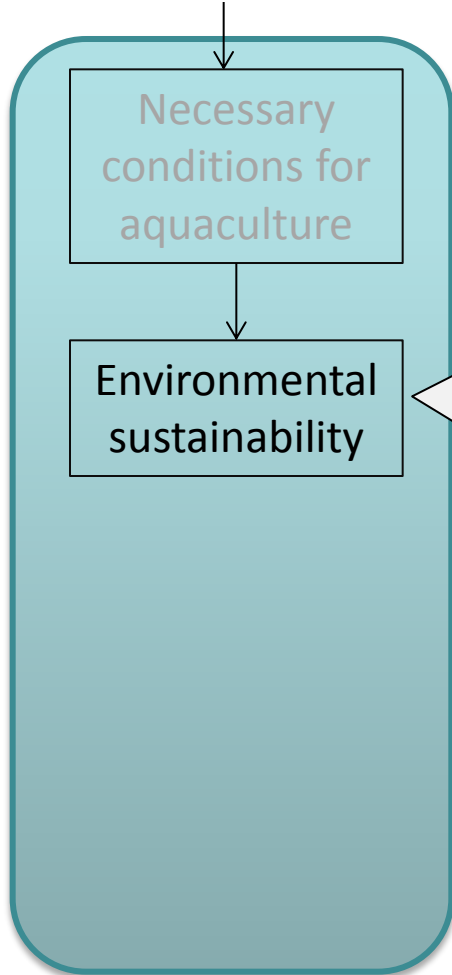


Stakeholder consultation

Necessary
conditions for
aquaculture

Environmental
sustainability

Not a big issue, some bottoms with rare plants.



GIS-analysis



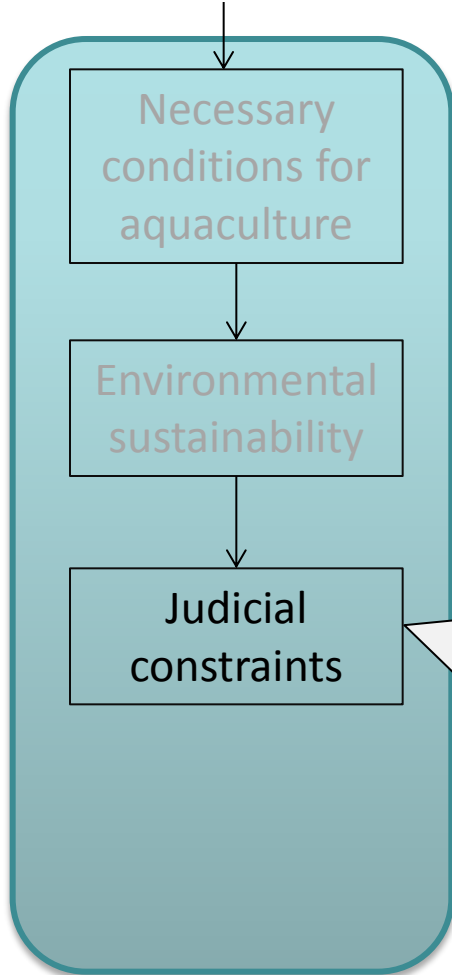
Stakeholder consultation

Not a big issue, some bottoms with rare plants.

Try to avoid accumulation bottoms to minimize the effect of mussel droppings.



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Stakeholder consultation

There are many legal regulations at the Swedish Baltic Sea coast.



Table 3. Conflicts of interest – ALL.**Scenario 1: Conflicts of interest**

Anchorage points (buffer 250 m)

Bathing places (buffer 250 m, special Böda sand)

Animal and plant protection areas

Private water

Shipping routes and ferry routes

The Birds Directive (SPA)

The Locality Directive (SCI)

Harbours (buffer 500 m)

Slipways (buffer 250 m)

Municipal detailed plan of coastal water (Borgholm/Kalmar)

Play areas, fishing

National parks (Blå jungfrun)

Nature reserves

National interest in accordance with Chap. 4, Sections 2–3 of the Environmental Code

National interest, fishing

National interest, outdoor life

National interest, culture

National interest, nature

National interest, Natura 2000

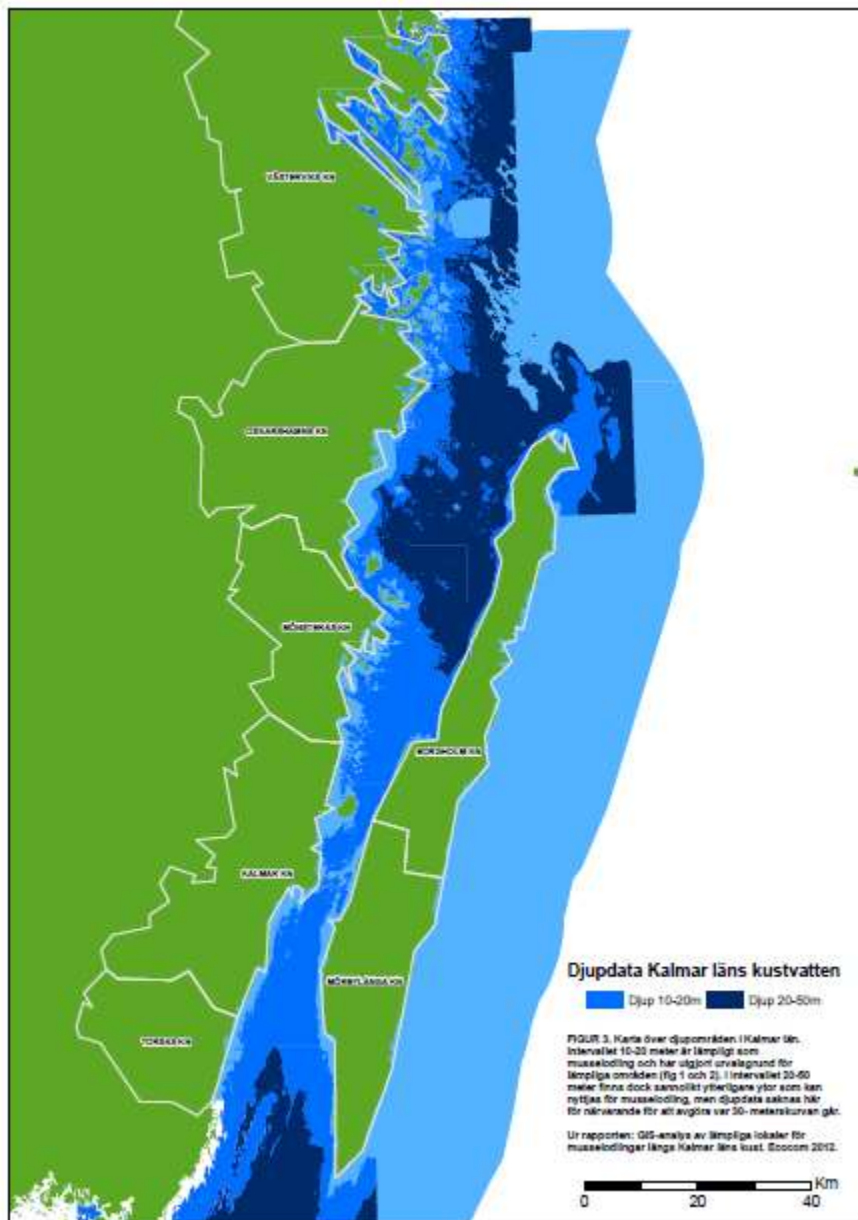
National interest, wind

Shoreline protection

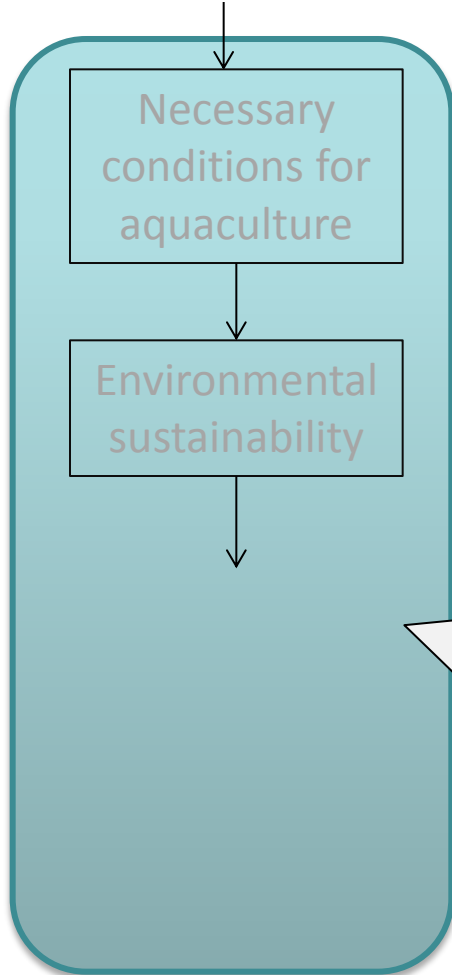
Underwater cabling and pipes (buffer 200m)

Water scooter permit

Valuable landscape



If conflict with all other interests, we have no place left for mussel farms!



GIS-analysis



Stakeholder consultation

There are many different regulation at the Swedish Baltic Sea coast.

County board: "Most regulations do not hinder mussel farms".

National interests, nature reserves, Habitats and Bird directive etc may not be in conflict with mussel farms



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Scenario 4 in Aquabest-report "GIS-analyses for suitable localities for mussel farms along the county of Kalmar's coast":

Table 4. Conflicts of interest – CONSIDERATION:

Scenario 2: Conflicts of interest

Anchorage points (buffer 250 m)

Bathing places (buffer 250 m, special Böda sand)

Shipping routes and ferry routes

Harbours (buffer 500 m)

Slipways (buffer 250 m)

Municipal detailed plan of coastal water (Borgholm/Kalmar)

Play areas, fishing

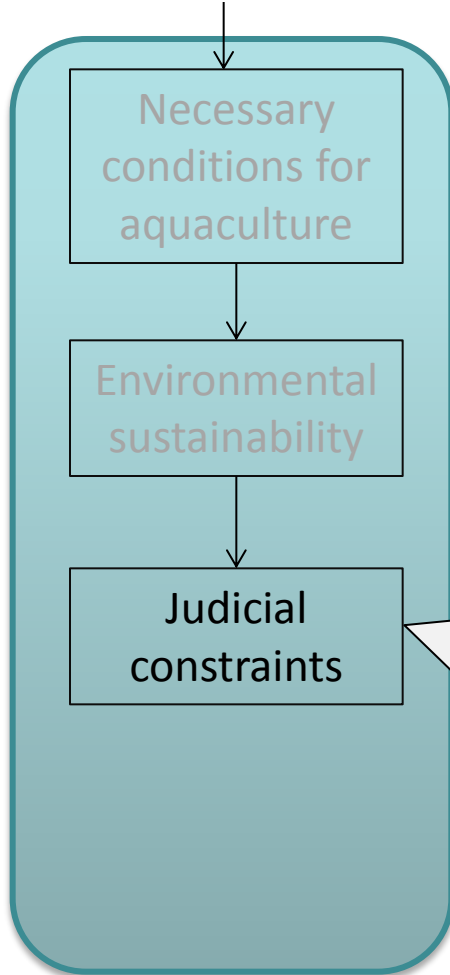
Shoreline protection

Underwater cabling and pipes (buffer 200 m)

Statement from Kalmar County board:

"The County administrative board believes, in principle, that the current knowledge situation shows no obvious conflicts between the establishment of mussel farms and scenarios 1,2,3, and 4* (*the above example),

but this may need to be tested for it to be allowed in each individual case"



GIS-analysis



Stakeholder consultation

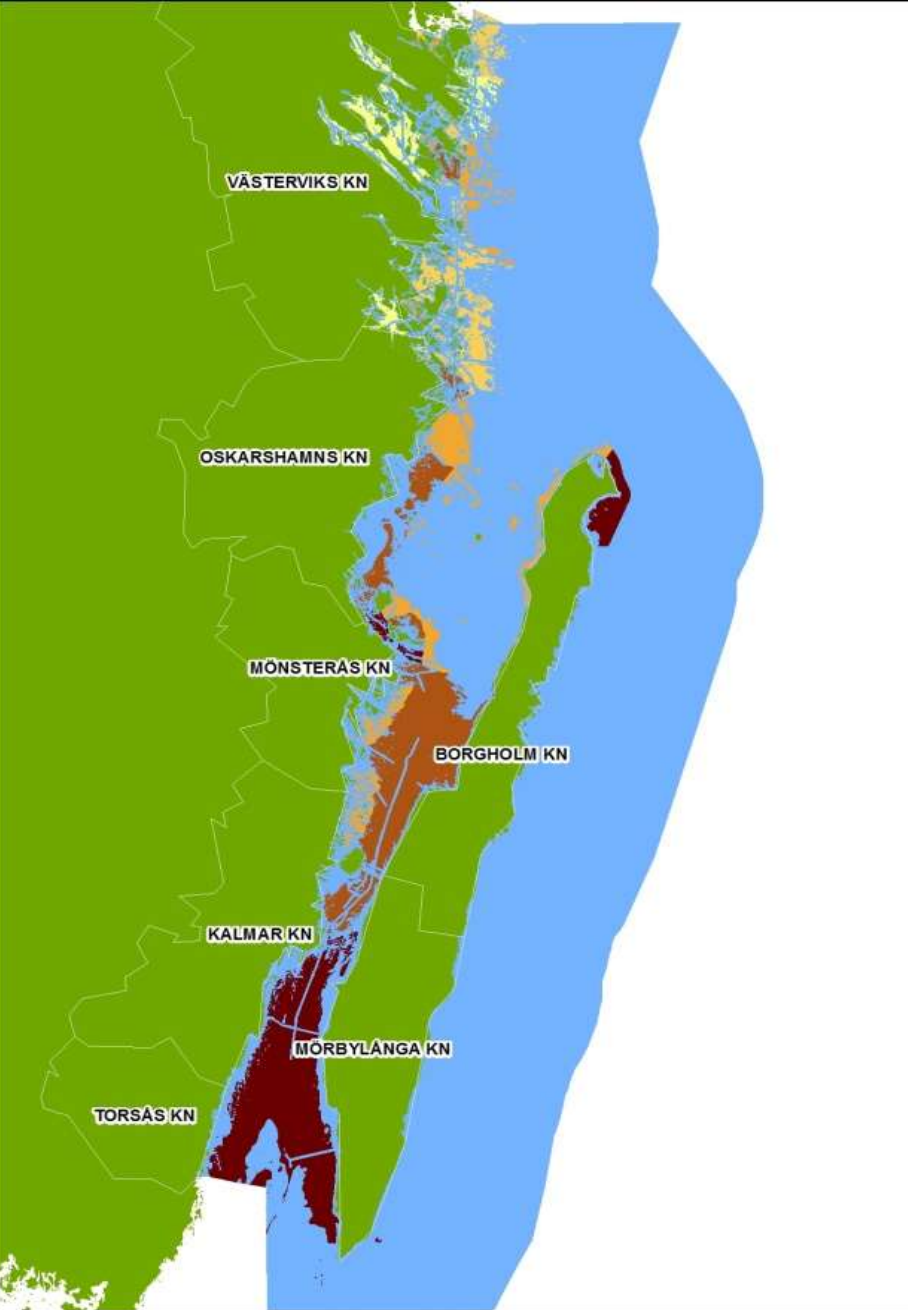
There are many different regulation at the Swedish Baltic Sea coast.

County board: Most regulations do not hinder mussel farms.

Some areas, for example seal and bird reserves, were withdrawn from the suitable areas.



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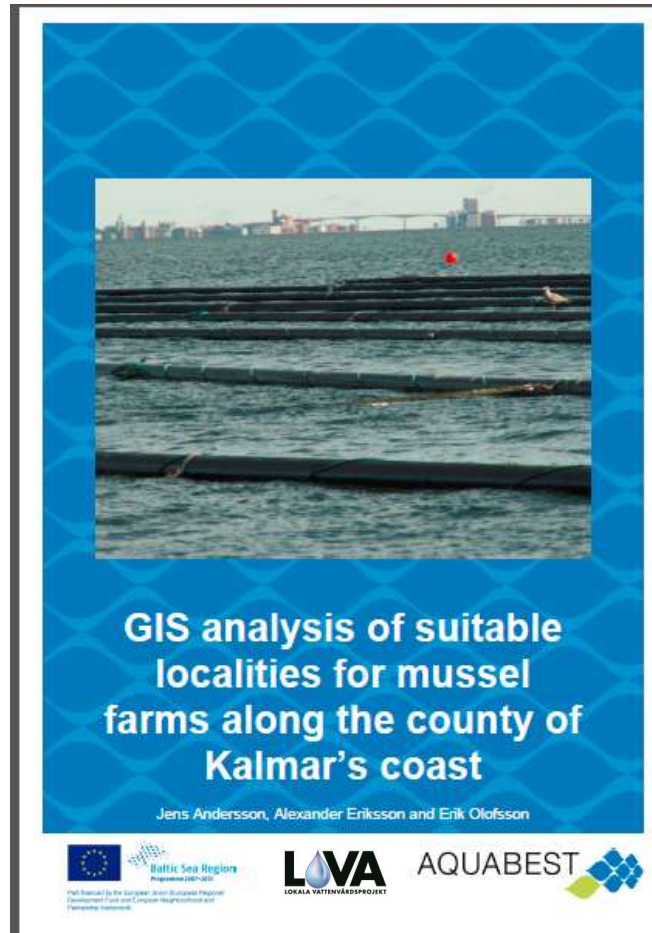
Lämplighetskategori
A B C D E

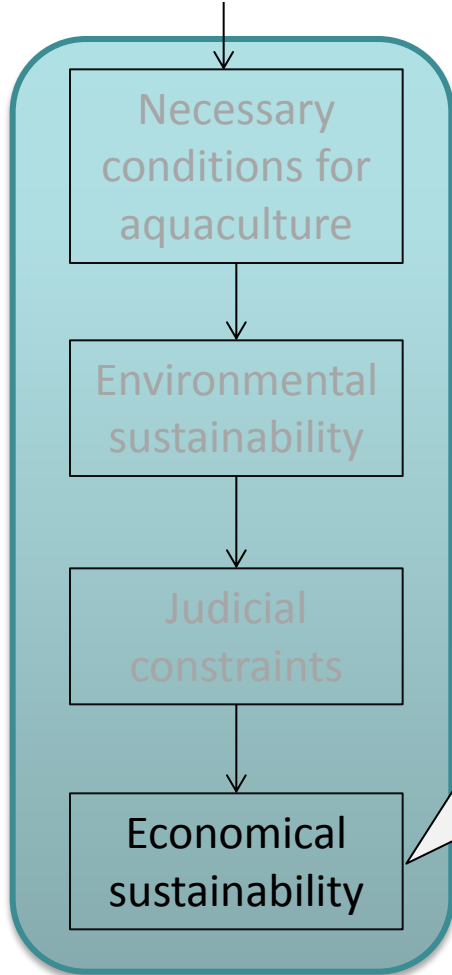
0 20 40 Km

The Kalmar case.

Final result from GIS study:
“scenario 4”

<http://www.aquabestproject.eu/reports.aspx>





GIS-analysis



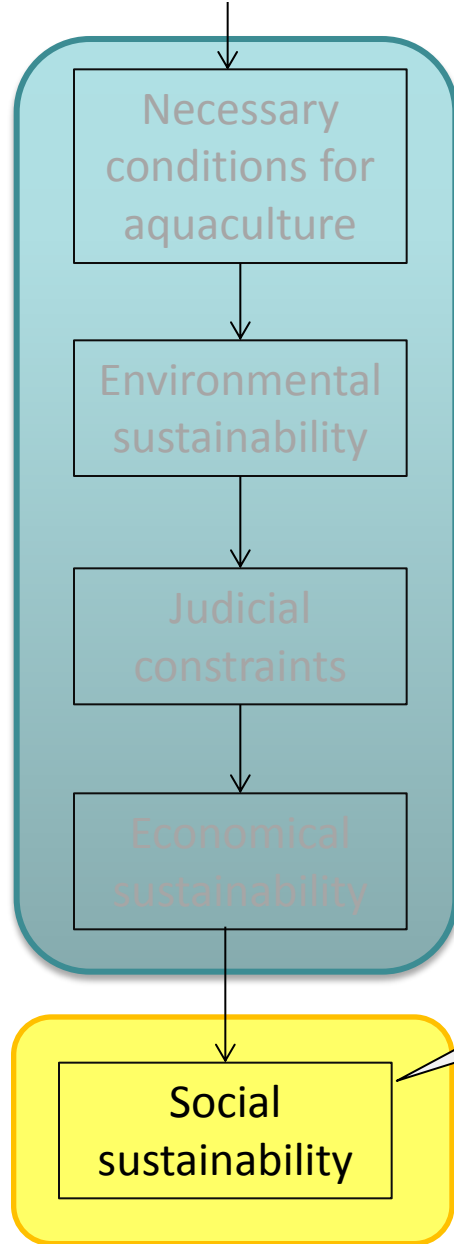
Stakeholder consultation

Lack of experience from large-scale
Baltic Sea mussel-farming

Biggest future challenge!



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Stakeholder consultation

Public consultation is very important!
Meetings with stakeholders, neighbors,
local fishermen, boat clubs etc.

Our 12 areas need to be tested IRL!



GIS-analysis



Stakeholder consultation



Collecting and analyzing field data

Environmental
evaluation

sustainability

Social
sustainability



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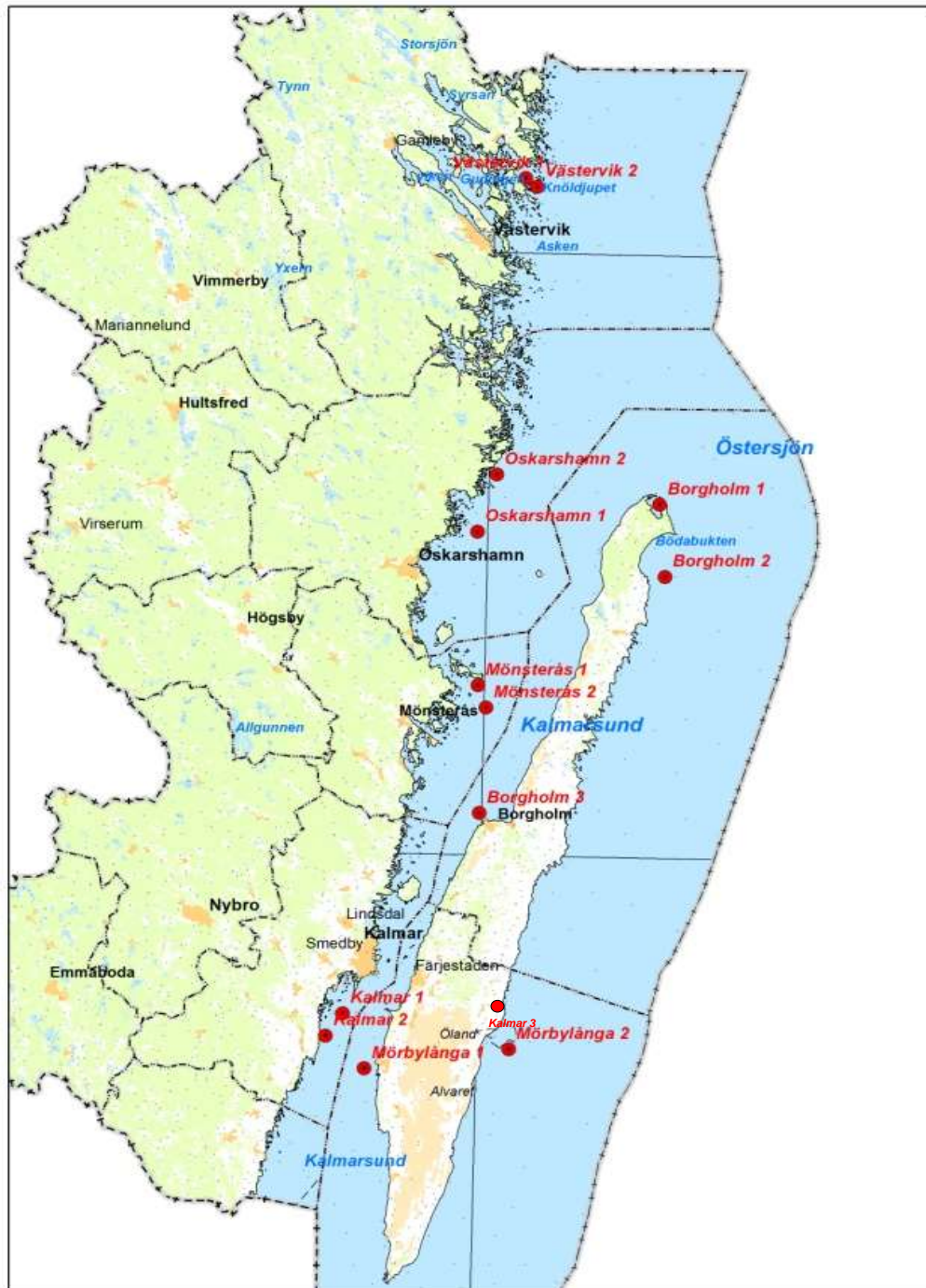
How does it work in practice?

The Kalmar case.

We need a method to explore settling conditions in a simple way....

and at the same time gain interest for mussel farming among companies and the public





SIGN UP!

for a mussel farming
competition between

NGOs,
the 7 municipalities
and the sponsors



Svensk Kärnbränslehantering AB



Startskott för musselracet

SVARTÖ

Små testodlingar av musslor placeras nu ut längs kusten i Kalmar sund.

– Syftet är att hitta en enkel och bra metod att odla musslorna i större skala och även se vilka områden som de trivs bäst i.

Markus Nord står på bryggan vid Svartö och reder ut den odling som snart ska sänkas ner i havet, med hjälp av svartöbon Curt Carlson och hans båt. Odlingen är en av tolv som ska tillbringa sommaren ute till havs. Senare i september ska odlingarna bärgas.

Frivilliga håller koll

Med hjälp av frivilliga observatörer, varav Curt Carlson är en, håller man koll på odlingarna under sommarmånaderna. Projektet går under namnet



SOLBRÄND PÅ JOBBET. Markus Nord jobbar på Naturum i Västervik men har tillbringat den senaste veckan med att placera ut små musselodlingar ute till havs. FOTO: ÅSA A CEDERBOM

Communication plan:

- Strategy: Work with **organisations**, make them spread the information to the right persons within their network (**112** organisations contacted, see right)
- Personal contacts (n=173). Ex: letters to all **coastal fisheries**, land-owners and camp owners close to the chosen sites
- Because of secrecy, persons working at juridical **water-authorithies** were contacted by the municipality employees
- **Advertisement** in the newspapers, 70 % coverage in the involved municipalities: Barometern, Östran, Ölandsbladet och Västervikstidningen

Type of organisations that were contacted (112 in total)

- Farmers association
- Employment services
- Kalmar county board
- Municipality boards
- Nature conservation NGOs
- Local societies
- Joint property units
- Boat clubs
- Canoe clubs
- Dive clubs
- Sport fishing clubs
- Outdoor activity clubs
- Ornithologist clubs

Public meetings

1 meeting per site was arranged

Part 1 – Information

- Why musselfarms?
- Technology & economy
- Pros- and cons
- Suitable sites

Coffee

Part 2 – Discussion

- Discussion about conditions and possible conflicts at the site in question



Results

Table 1. Suitability of experimental farms for the establishment of large-scale mussel farms (> 10 hectares)

ID	Municipality	Suitability	Comment
A	Västervik	High	No obvious conflicts.
B	Västervik	Low	Difficult to "fit in the farm". Conflict with tourism, boat-ing/swimming.
C	Oskarshamn	Low	Long distance to the nearest harbour (> 20 km). If the harbour by OKG can be used, the assessment will change, however.
D	Oskarshamn	-	The people participating in the meeting lacked the necessary knowledge of the locality, which meant that it was not possible to assess the suitability for establishing mussel farms.
E	Mönsterås	High	No obvious conflicts. Outlet from Södra Cell ought to be checked, however.
F	Mönsterås	High	No obvious conflicts. Outlet from Södra Cell ought to be checked, however.
G	Kalmar	Low	Obvious conflict with boat traffic as well as landscape.
H	Kalmar	High	No obvious conflicts.
I	Kalmar	High	No obvious conflicts.
J	Borgholm	Low	Difficult to "fit in the farm". Conflict with tourism, boat-ing/swimming.
K	Borgholm	Low	Lies close to the outlet from the treatment plant, as well as close to land. The impact can be reduced if localised further away from the land.
L	Mörbylånga	High	No obvious conflicts, although it was pointed out that severe weather conditions can occur on the eastern side of Öland.



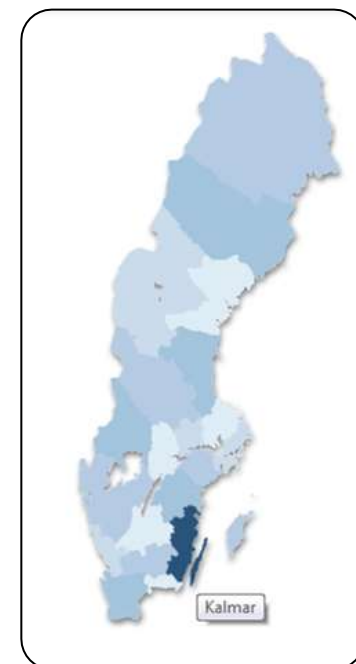
Figure 2. Localities with experimental farms which formed the basis for discussions regarding future large-scale farms at the meetings in the municipalities.

<http://www.aquabestproject.eu/reports.aspx>



The future in the Kalmar case.

- The municipalities plan to include successful sites in their ÖPs, and to EUs future marine spatial planning
- We will lobby for environmental subsidizes for mussel farmers!



Earlier musselfarm-projects in Kalmar county:



★ = Big scale
2009 – 2011

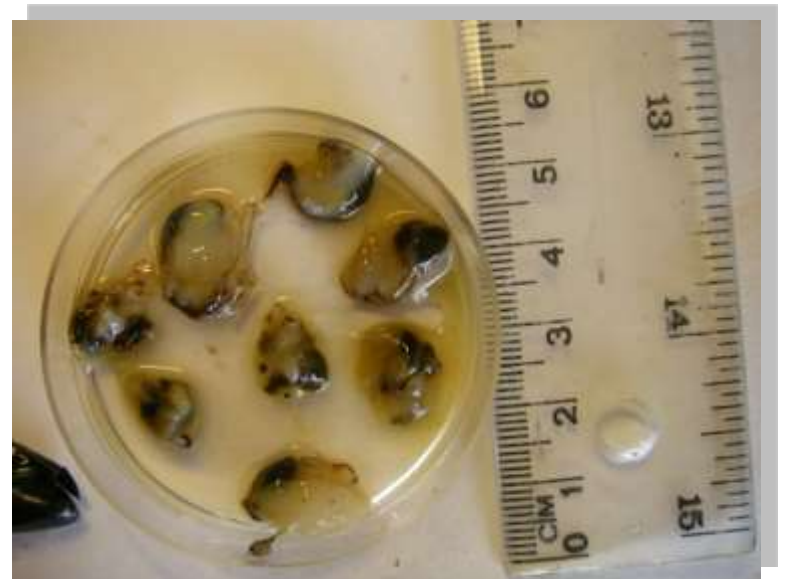


★ = Pilot farms
2008 – 2011

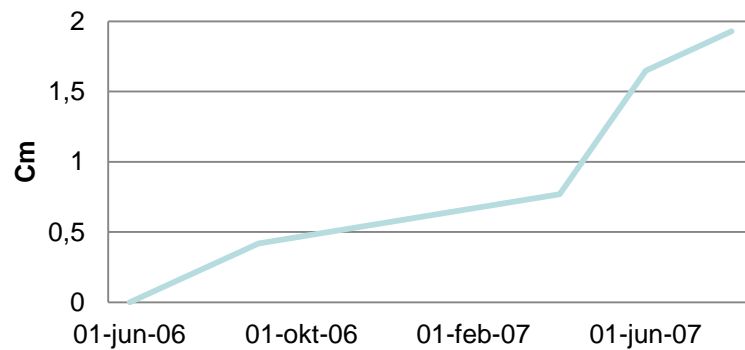


Europeiska jordbruksunionen för
landsbygdsutveckling. Europeiska
investeringar i landsbygdsområden

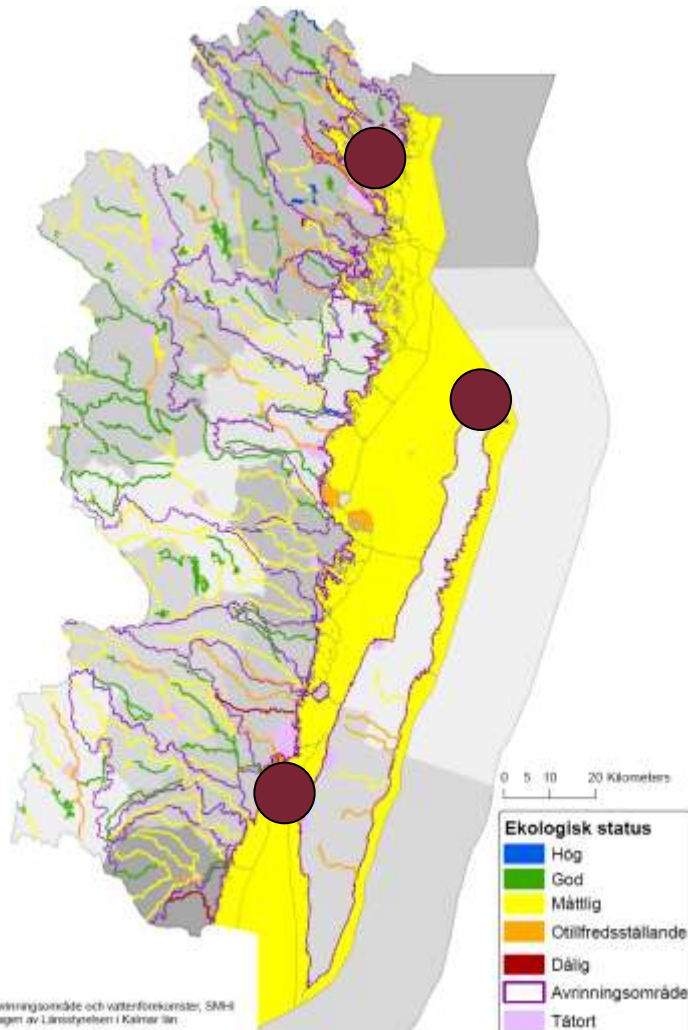




Mussel growth, Kalmar area



Present mussel farms i Kalmar county



Hasselö (municipality own, run by the Hasselö fish conservation association)

Byxelkrok (privately own)

Hagby norra fiskeläge
(privately own)

Baltic Blue Growth - potential flagship project

We will go from pilot scale....



-to large scale
feed- mussel farms
in the Baltic Sea!



Part-financed by the European Union