




# Mussel farms counteracting eutrophication *in the Baltic Sea*

Susanna Minnhagen, Kalmar municipality  
+ Coauthor Martyn Fytter, Sw. Univ. Agricultural Science  
IWAMA workshop on nutrient reduction and recovery  
Kalmar, 14 June 2018

## Baltic Blue Growth – Initiating full scale mussel farming in the Baltic Sea

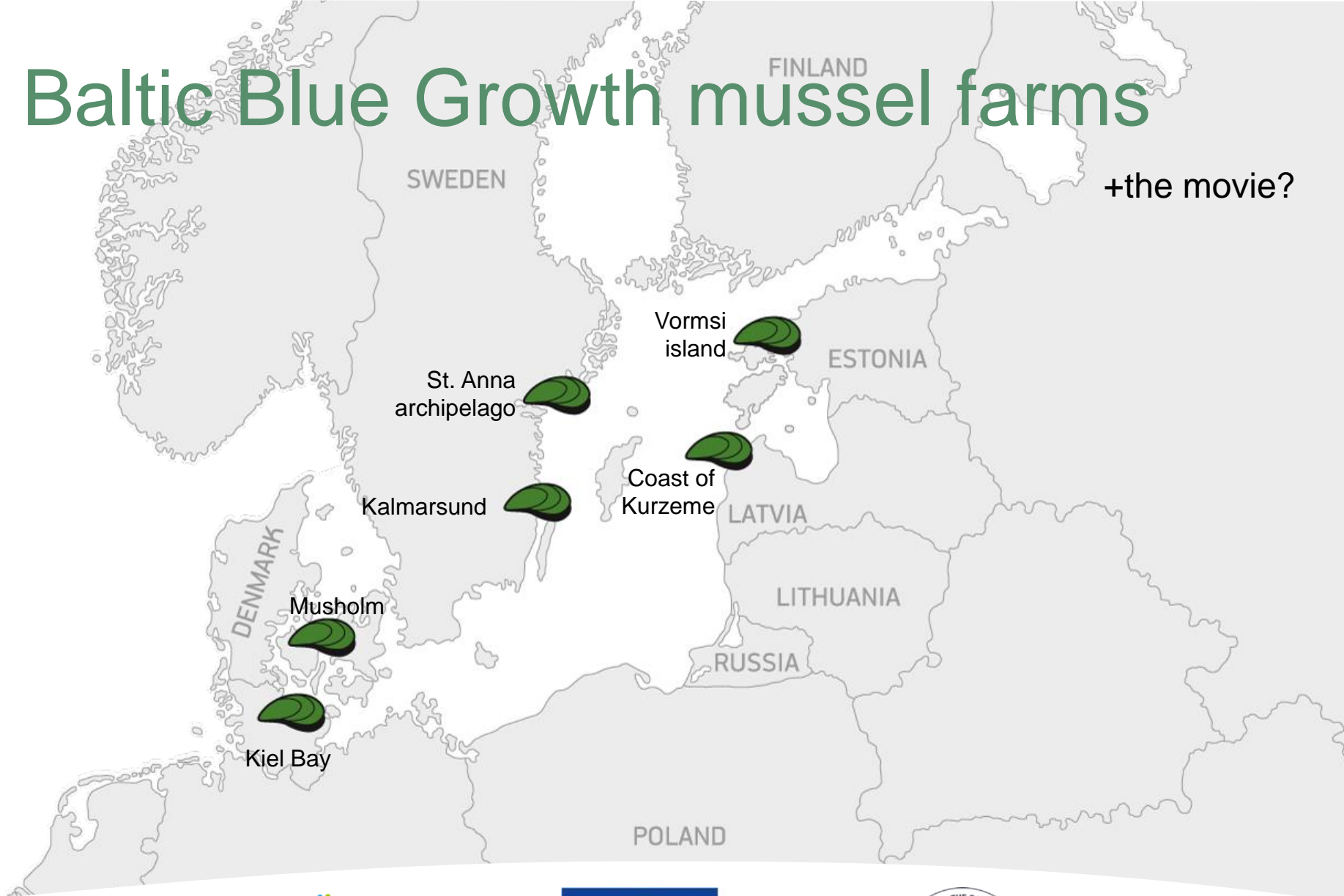
[www.balticbluegrowth.eu](http://www.balticbluegrowth.eu)  [#BalticBlueGrowth](https://twitter.com/BalticBlueGrowth)

### Objective

**Advance mussel farming in the Baltic Sea  
from experimental to full scale to improve  
the water quality and create blue growth  
in the feed industry**

# Baltic Blue Growth mussel farms

+the movie?





Harvest Result  
Expected: 25 - 30t  
What we got: 75ton!!



# What do the data show? Preliminary results from Sweden (and elsewhere in the Baltic)



- Growth is highly variable at a small geographic scale
- Based on Swedish and Estonian data, growth can be well predicted from salinity and chlorophyll
- Mussel harvest after 2 years project: 105 tons from 4 farms
- Small scale farms have minimal environmental impact
- Nutrient uptake? We are now running nutrient analysis from 6 pilot farms

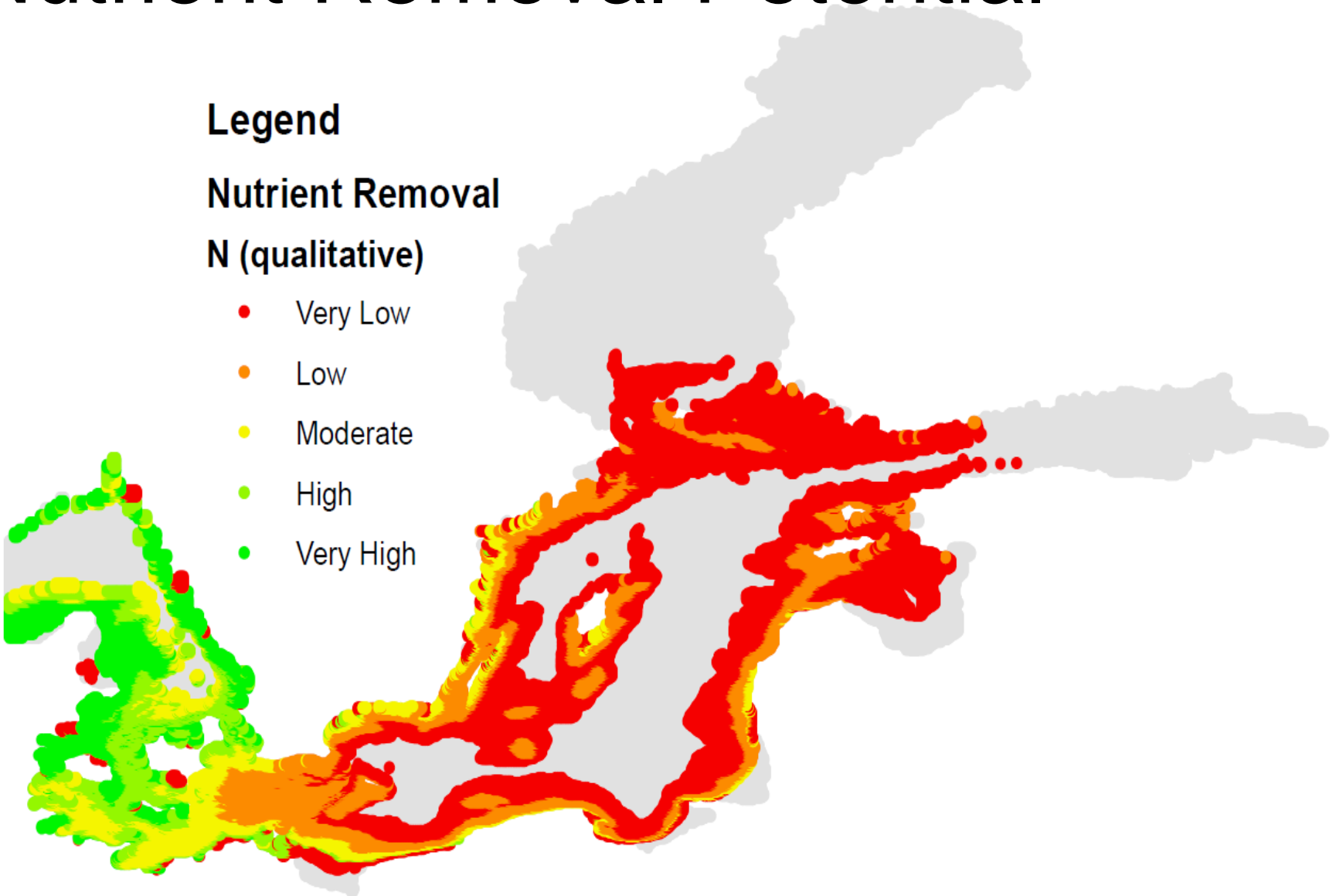
# Nutrient Removal Potential

## Legend

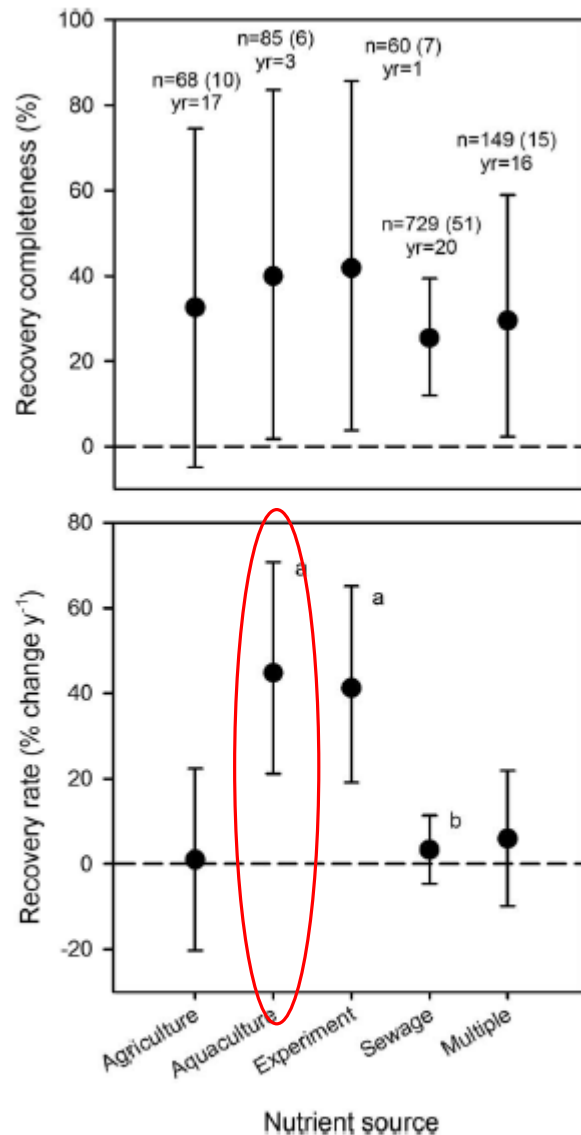
### Nutrient Removal

#### N (qualitative)

- Very Low
- Low
- Moderate
- High
- Very High



# What if it goes wrong ?



**Fig. 5.** Recovery completeness (upper panel) and recovery rate (lower panel) by ecosystem function type. Points are mean  $\pm$  95% confidence interval. The number of response variables is indicated by  $n$  and the number of studies is in parentheses. Median recovery period (in years) is also noted. Letters denote significant differences ( $\alpha=0.05$ ) among categories.

- Large farms may have large environmental impacts
- We don't know recovery times after large scale mussel farming stops.
- We know that fast recovery occurs after fish-farming (McCrackin et al. 2016)
- *We believe that*, if large scale farming has unacceptable negative consequences, they are likely to be short lived



# The local holistic perspective: Kalmar



- 70 000 inhabitants
- 20 000 ha farmland
- 400 000 tourists/year

Nutrient  
runoff:

890 ton N per year  
16 ton P per year

Need to cut down  
yearly nutrient load:

"Local  
Baltic Sea  
Action  
Plan"

72 ton N per year  
6,7 ton P per year



# Stop the nutrients on land



## Local Baltic Sea Action Plan 2027:

- New sewage treatment plant
- Storm water measures
- Get private sewers fixed
- 300 ha identified farmland-measures

23 ton  
N  
1,2 ton  
P

Municipality controlled  
measures

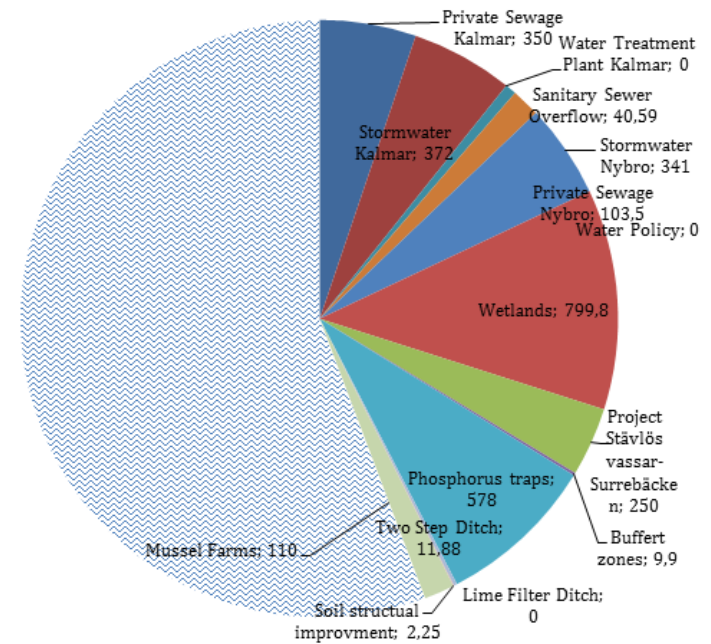
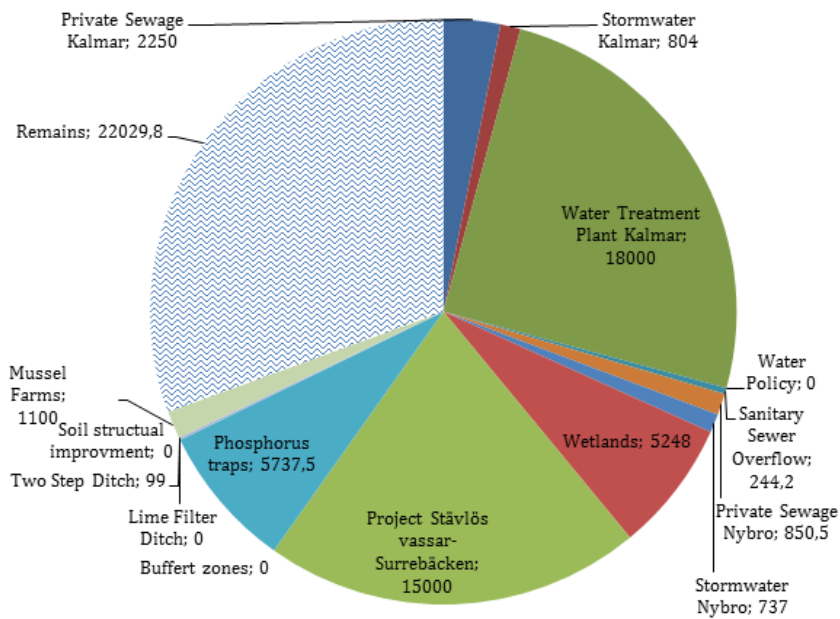
27 ton N  
1,8 ton P

Private landowner  
controlled measures

Problem 1: Most valuable farmland is next to the shore!  
Lack of space to build nutrient traps

Problem 2: Low land = Land-owners worry for  
floods if we stop up the water-flow in any way

# In 2027, if plans succeed:



Coastal nutrient load will still be too high!

We need to remove additional 22 ton N and 3,7 ton P per year if we are to reach good water status

## Cost estimate for the planned farmland measures suggested in Kalmar Local Baltic Sea Action Plan:

All cost for implementation included	530 EUR/kg P
Project management excluded	430*EUR/kg P
Maintenance, per year	17** EUR/kg P

\*Based on standard values from  
<http://viss.lansstyrelsen.se/Search.aspx?searchType=MeasureTypes>

\*\*Based on  
<http://www.jordbruksverket.se/amnesomraden/stod/jordbrukarstod/saminternet>

## Cost estimate for 3000 ton/year mussel harvest:

Scenario No market for the mussels	
All costs included	430 EUR/kg P*
Operation costs only	270 EUR/kg P*

\*\*These numbers will be adjusted with new results from the BBG musselfarms



### Litterature references:

[www.submariner-network.eu/images/BalticBlueGrowth\\_Deliverables/Farming-of-blue-mussels-Mytilus-edulis-trossulus-in-the-Baltic-Sea-a-review-of-pilot-studies-from-2007-2016.pdf](http://www.submariner-network.eu/images/BalticBlueGrowth_Deliverables/Farming-of-blue-mussels-Mytilus-edulis-trossulus-in-the-Baltic-Sea-a-review-of-pilot-studies-from-2007-2016.pdf)  
T T Nguyen, M A van Deurs, L Ravn-jonsen, E Roth: Assessment of financial feasibility of Farming Blue Mussel in the Great Belt by the "Smart Farm System"

# Musselfarming from a local holistic perspective:



- Published reports show that mussel farming can be a cost effective means of nutrient reduction in the Baltic
- Mussel farming can support other aspects of sustainability (e.g. rural jobs, circular bioeconomy)
- It will be difficult and slow to work with *only* land-based measures



# Thank you! Financed by:



EUROPEAN  
REGIONAL  
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## Baltic Blue Growth



## BALTIC SEA 2020



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