Compensatory culturing of Zebra mussels – Opening new lines of feed production and closing the nutrient loop

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- *Drawing by M. Orlova 1999*

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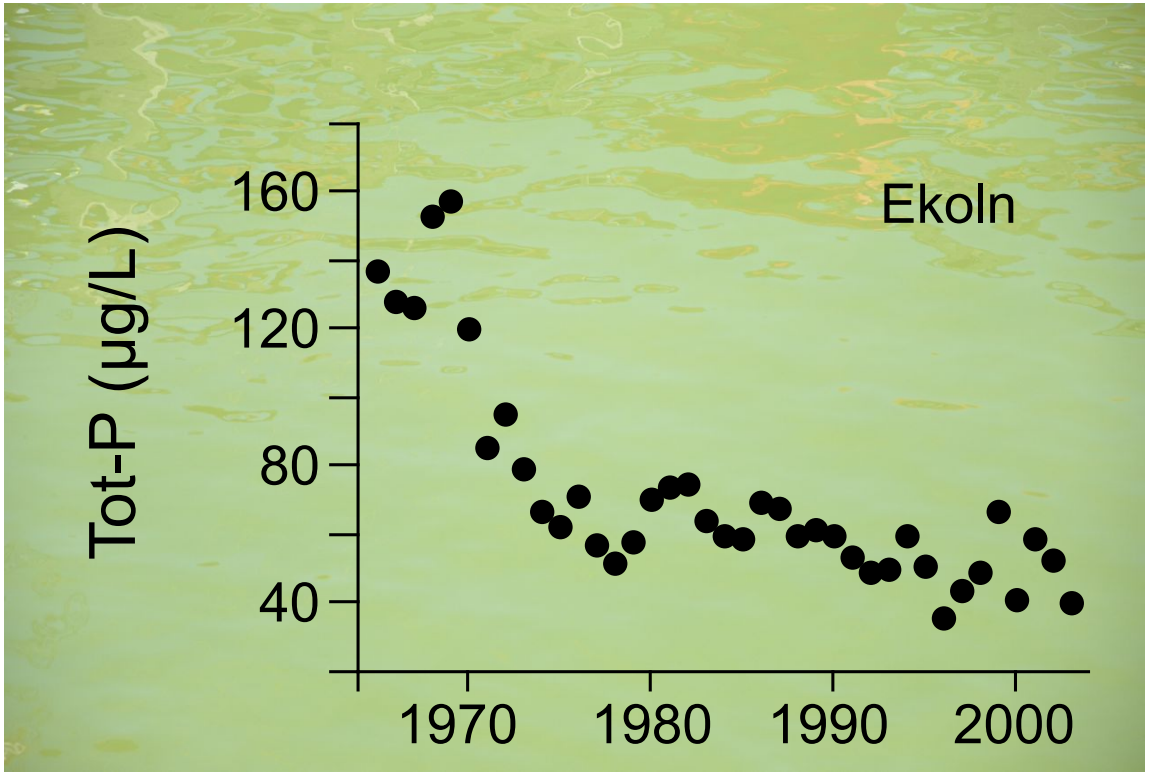
Why compensatory culturing?

- For the environment! – inverting the fluxes of nutrients from land to water and contribute to better water quality



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Why compensatory culturing?

- For sustainable feed production! – Phasing out of fish meal

Foto: Wikimedia

10 Dec 2013:
”The European Parliament has voted against a ban on deep-sea fishing by trawlers”.

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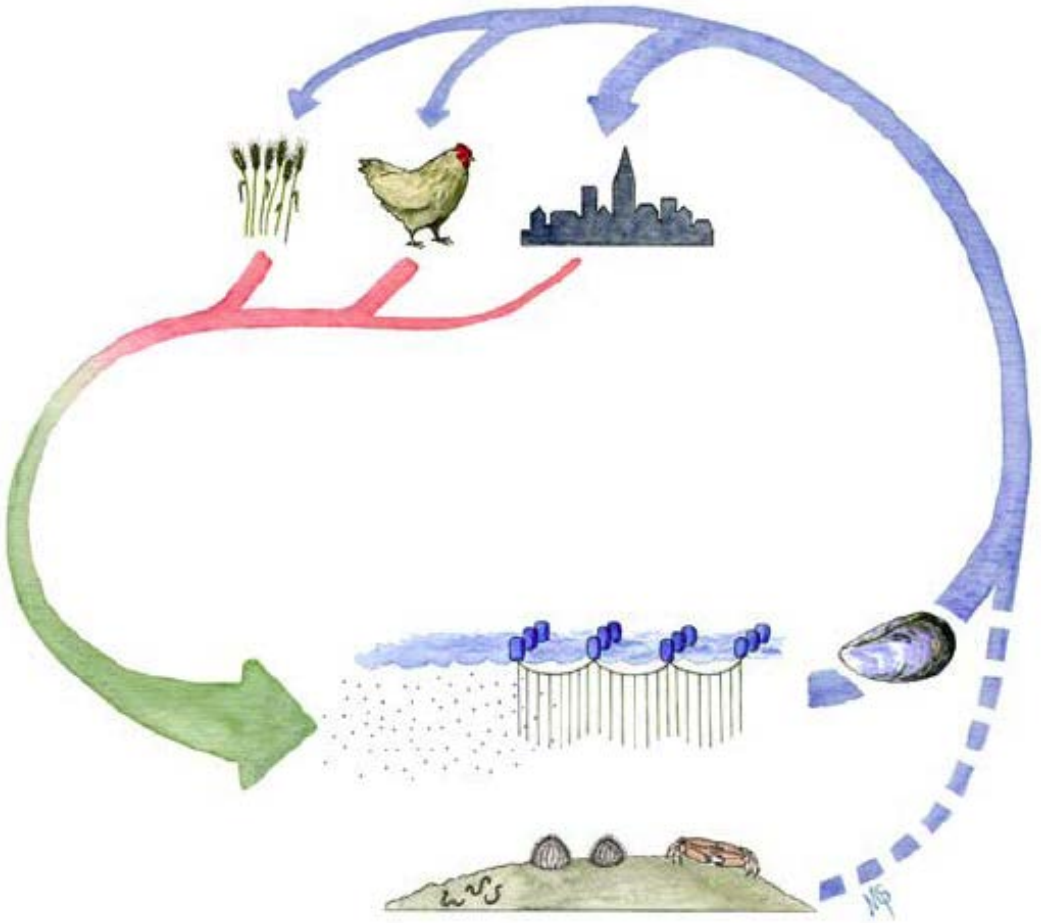
Agro-aqua recycling
(Lindahl, Kollberg, Tauson m.fl.)



From: Kollberg och Lindahl (2006).

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Zebra mussels in Sweden

From von Proschwitz (2005)

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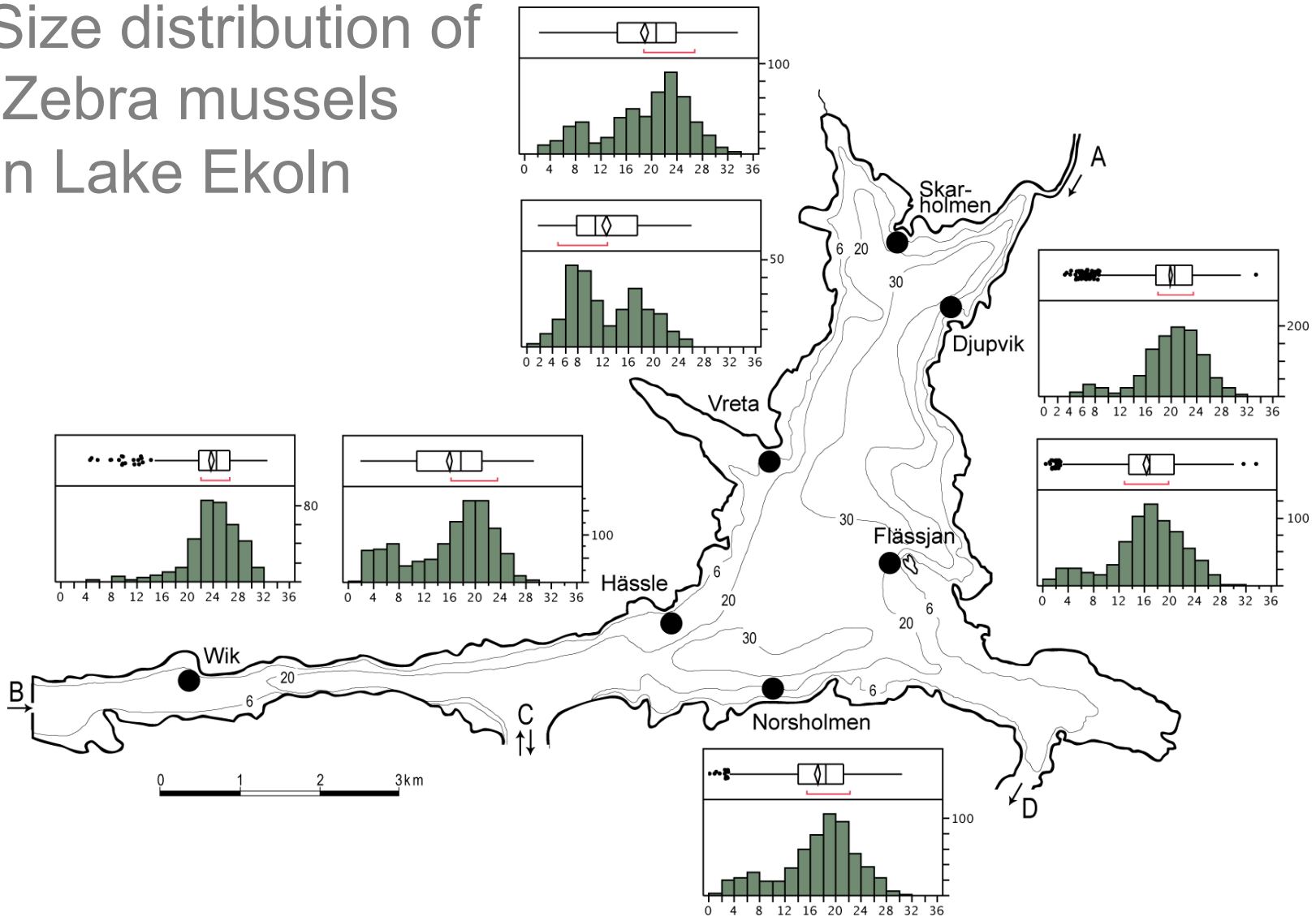
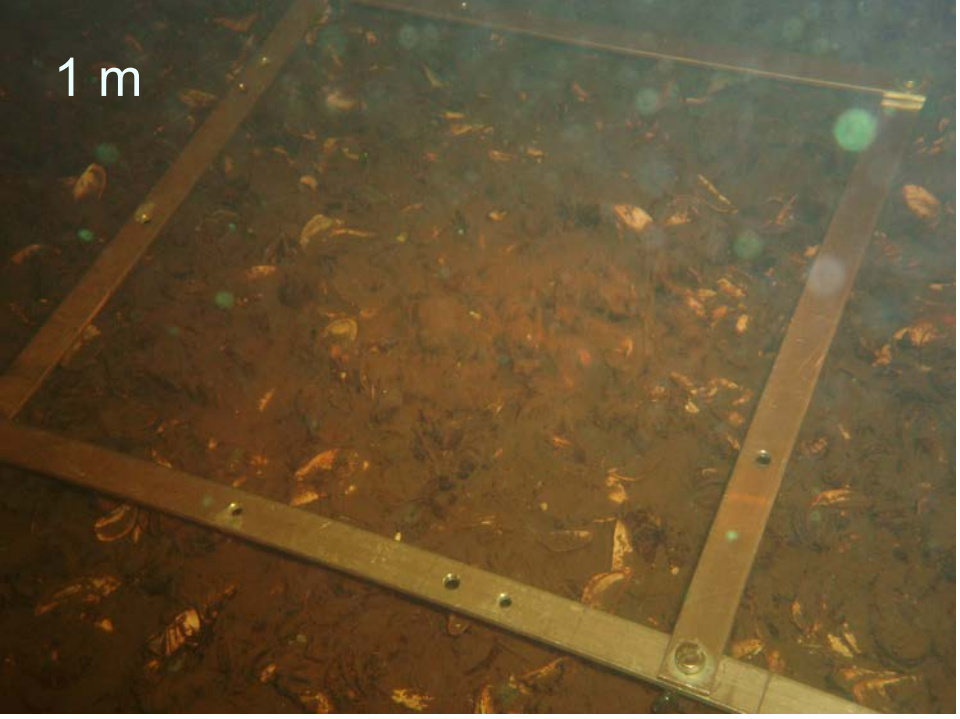
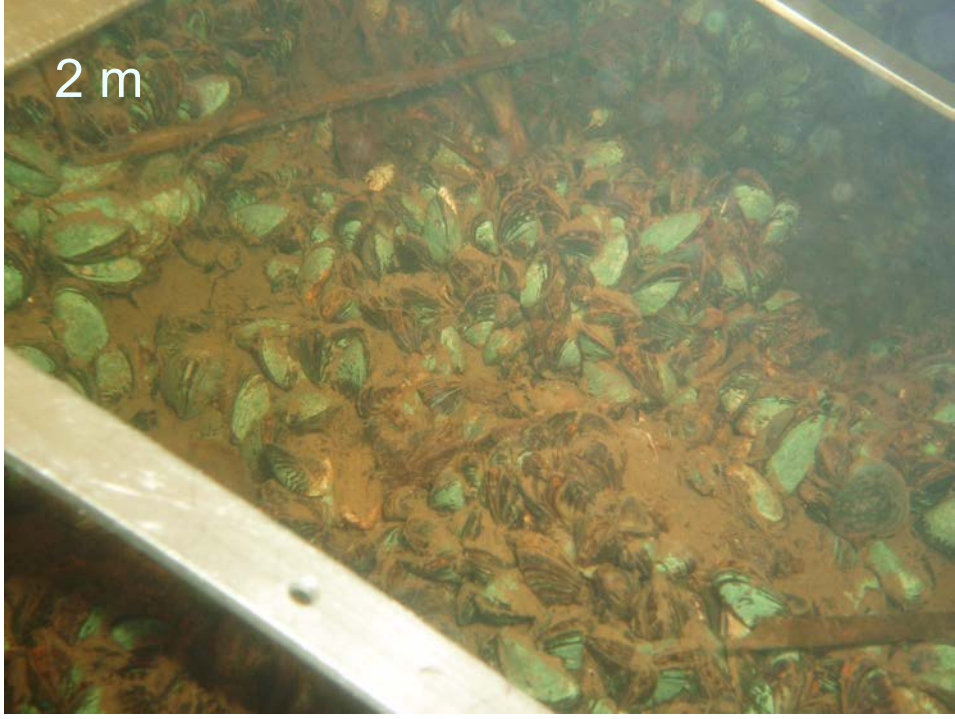
Size distribution of Zebra mussels In Lake Ekoln




1 m

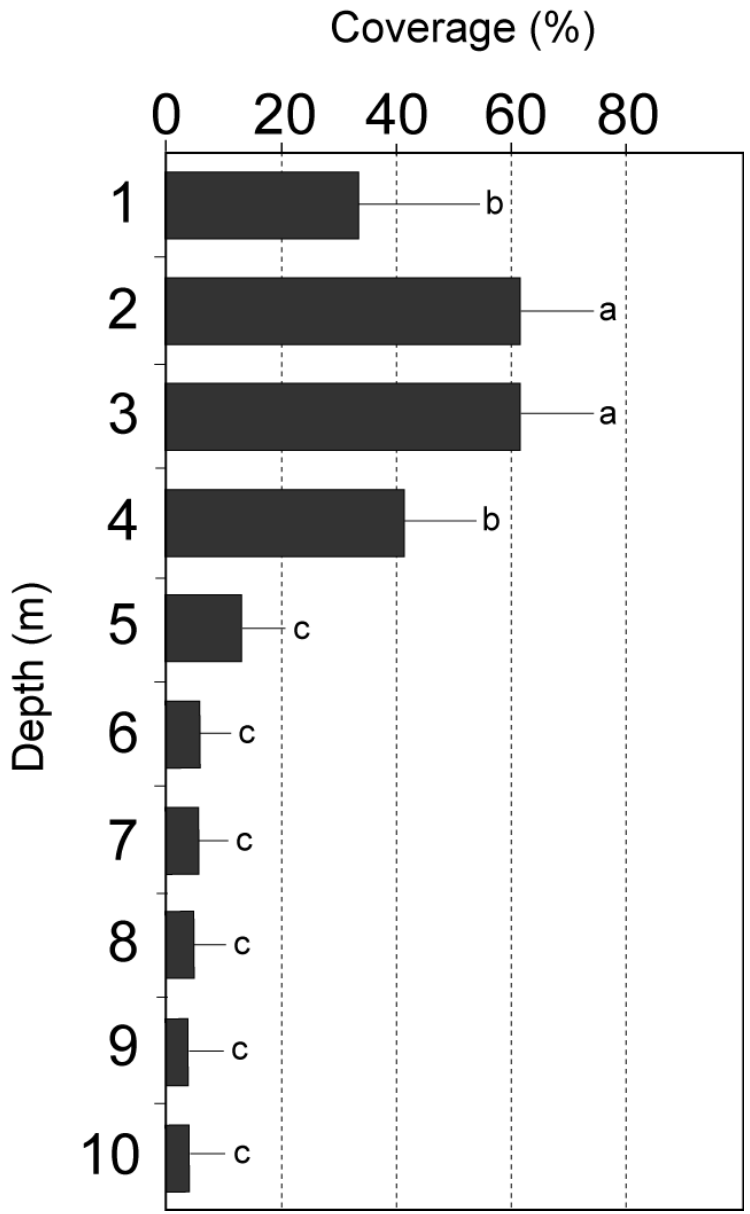

2 m


3 m


4 m

Coverage on Bottoms of Lake Ekoln

Goedkoop et al. 2011.
Biol. Invasions 13: 1077–.



Zebra mussels in Lake Ekoln:

- 3200 ± 2100 ind/m^2
- 220 ± 26 billion ind
- 9,3 mg P/g dw
- 100,9 mg N/g dw
- 37±4,3 ton N in mussels
- 3,4±0,4 ton P in mussels

Filtrerar 19±2,3 km^3/y
= hela Ekoln i 8–10 d

Se: Goedkoop et al. 2011. Biol. Invasions 13: 1077–.

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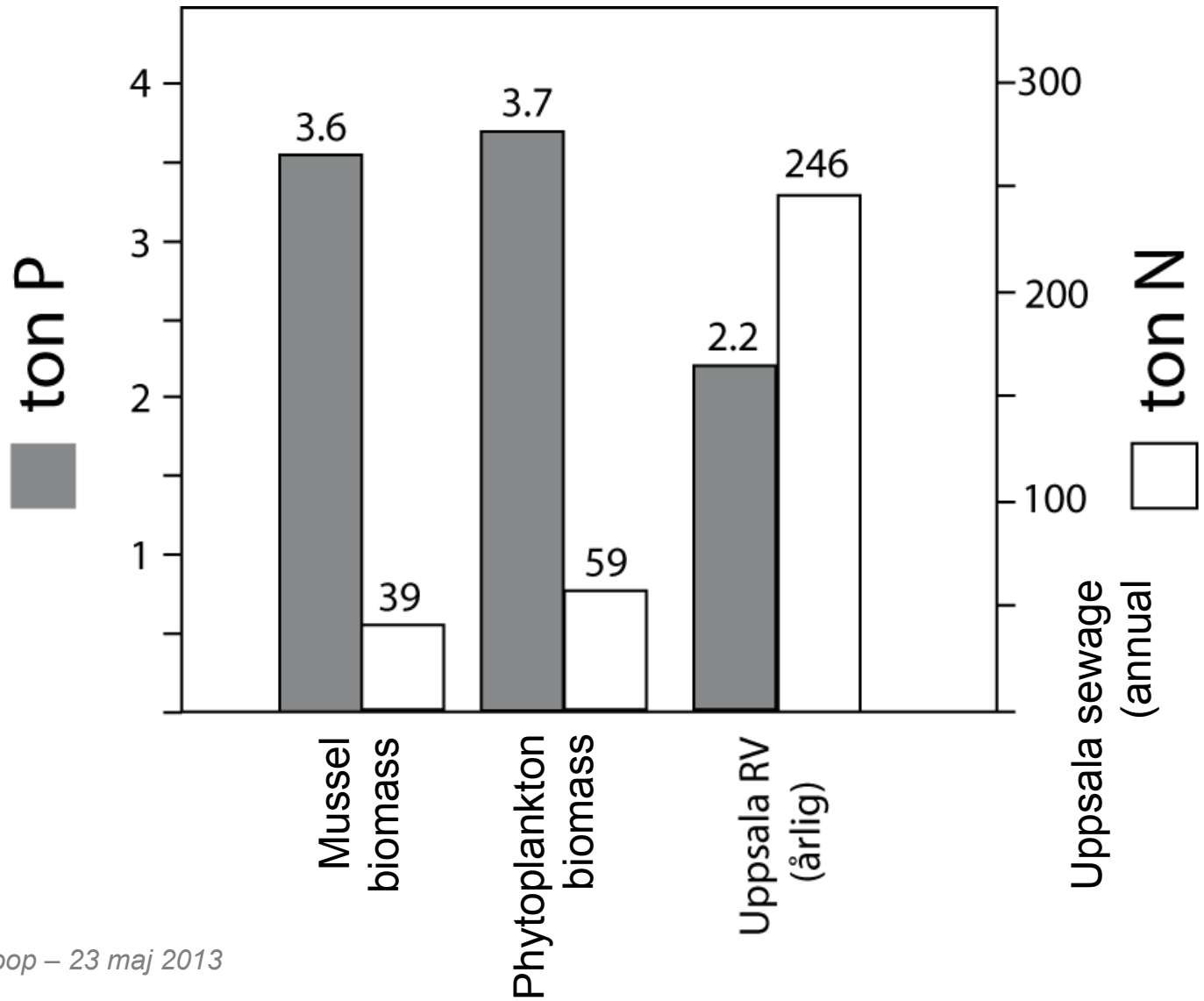
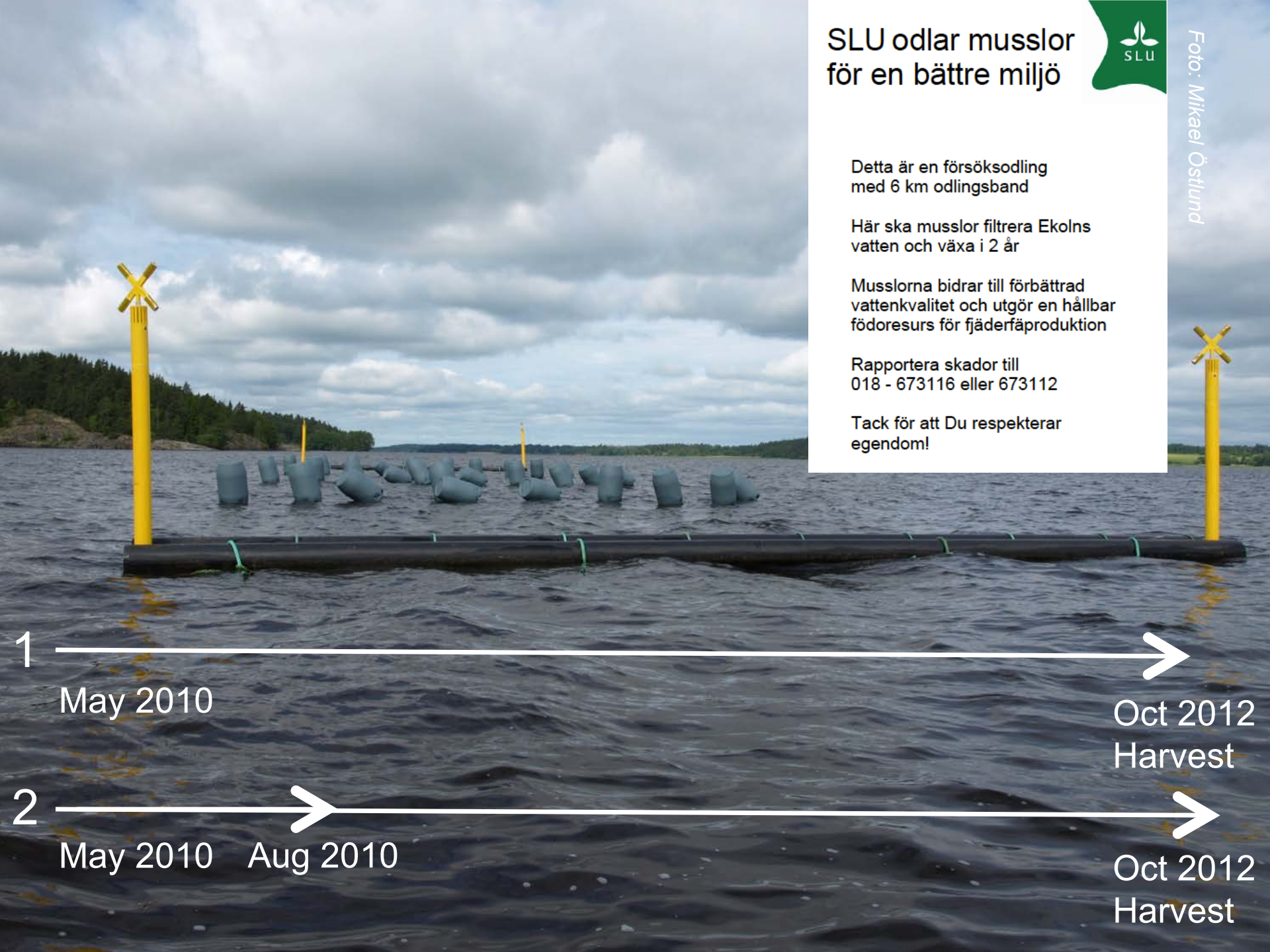
Goedkoop et al. 2011. Biol. Invasions 13: 1077–.




SLU odlar musslor
för en bättre miljö
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Detta är en försöksodling
med 6 km odlingsband
Här ska musslor filtrera Ekolns
vatten och växa i 2 år
Musslorna bidrar till förbättrad
vattenkvalitet och utgör en hållbar
födoresurs för fjäderfäproduktion
Rapportera skador till
018 - 673116 eller 673112
Tack för att Du respekterar
egendom!
Foto: Mikael Östlund
1
May 2010
Oct 2012
Harvest
2
May 2010
Aug 2010
Oct 2012
Harvest

Harvest in Ekoln in fall 2012

Photo: David Landbecker

Harvested in Lake Ekoln 2012 from 2 experimental units:

- Ca 2,8 ton fw mussels
- Ca 5 kg P
- Ca 50 kg N

- => a full culture unit (50x200 m) could fix ca 10–20 kg P och 100–200 kg N per 2y
- Corresponds to the annual leakage of some 25 ha of agricultural fields

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Harvests can be further improved through:

- Better anchoring (more stable conditions)
- Submersing the cultures under ice during winter (prevents damage)
- Use nets instead of bands (larger surface)
- Safe part of population (for more rapid recolonization after harvest)

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Advantages…

- Innovative way to trap surplus nutrients!
- Recycling within the agricultural sector!
- Improved water quality!
- Sustainable feed/food production!
- Technique is established!
- ”Add-on” for conventional farming!
- Contribute to Sweden’s environmental goals

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Vision

- Compensatory mussel cultures are an integrated part of remediation measures in the Uppsala-Stockholm region and in the Lake Hjälmaren catchment
- Farmers with ”water rights” play an important role in remediation
- And contribute to sustainable feed production
- Farmers get paid also for the ecosystem service they provide
- Improved water quality

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Photo: SLU

It’s all about perception!

Goedkoop – 11 nov 2013

Photo: Anna Lundqvist

Mussels are agriculture's best friend!

Acknowledgements
Ulf Grandin (SLU)
Odd Lindahl (Gothenburg Univ)
Lake Malaren Water Board
Swedish Agency for Marine and Water Management
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