

Sustainable use of Baltic Sea natural resources based on ecological engineering and biogas production

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Climate Change

Eutrophication (erosion from land, more rain)

Ocean acidification (CO₂)

Alien species (milder maritime climate ,1.0 C)

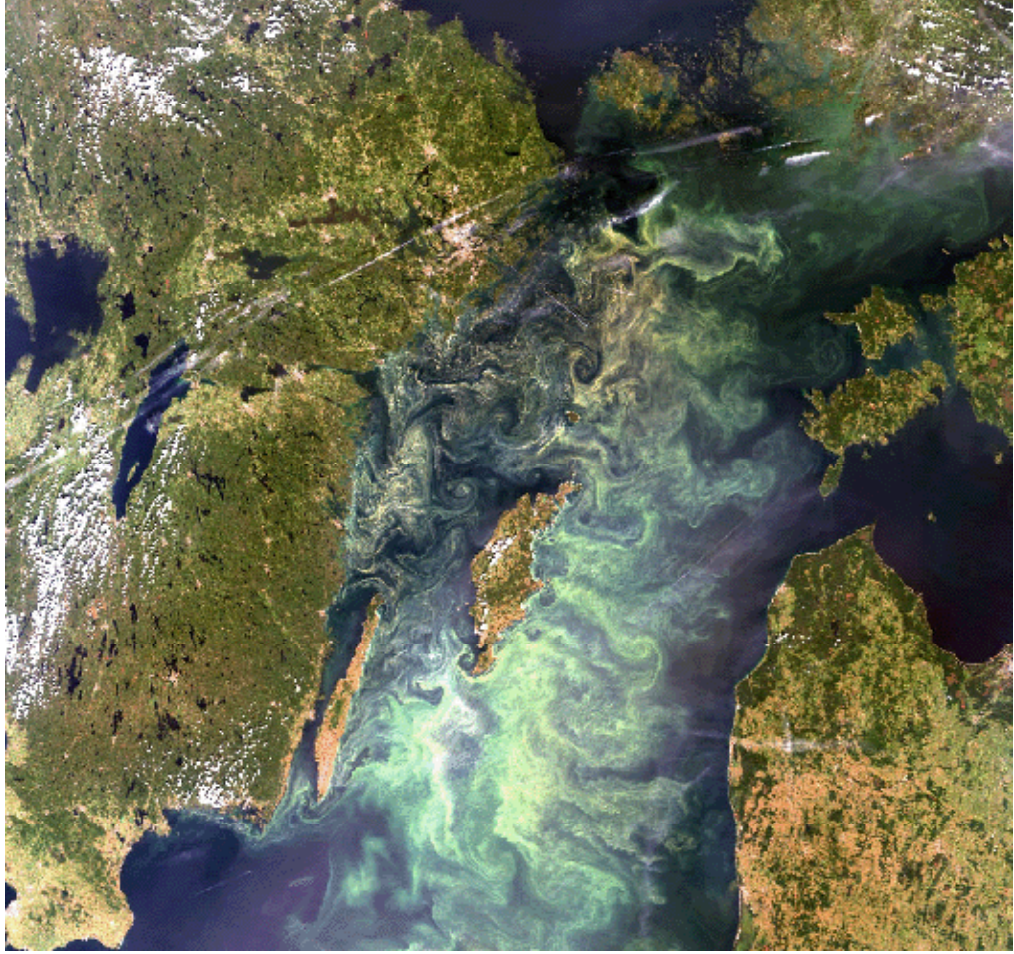
Organic pollutants (erosion from land)











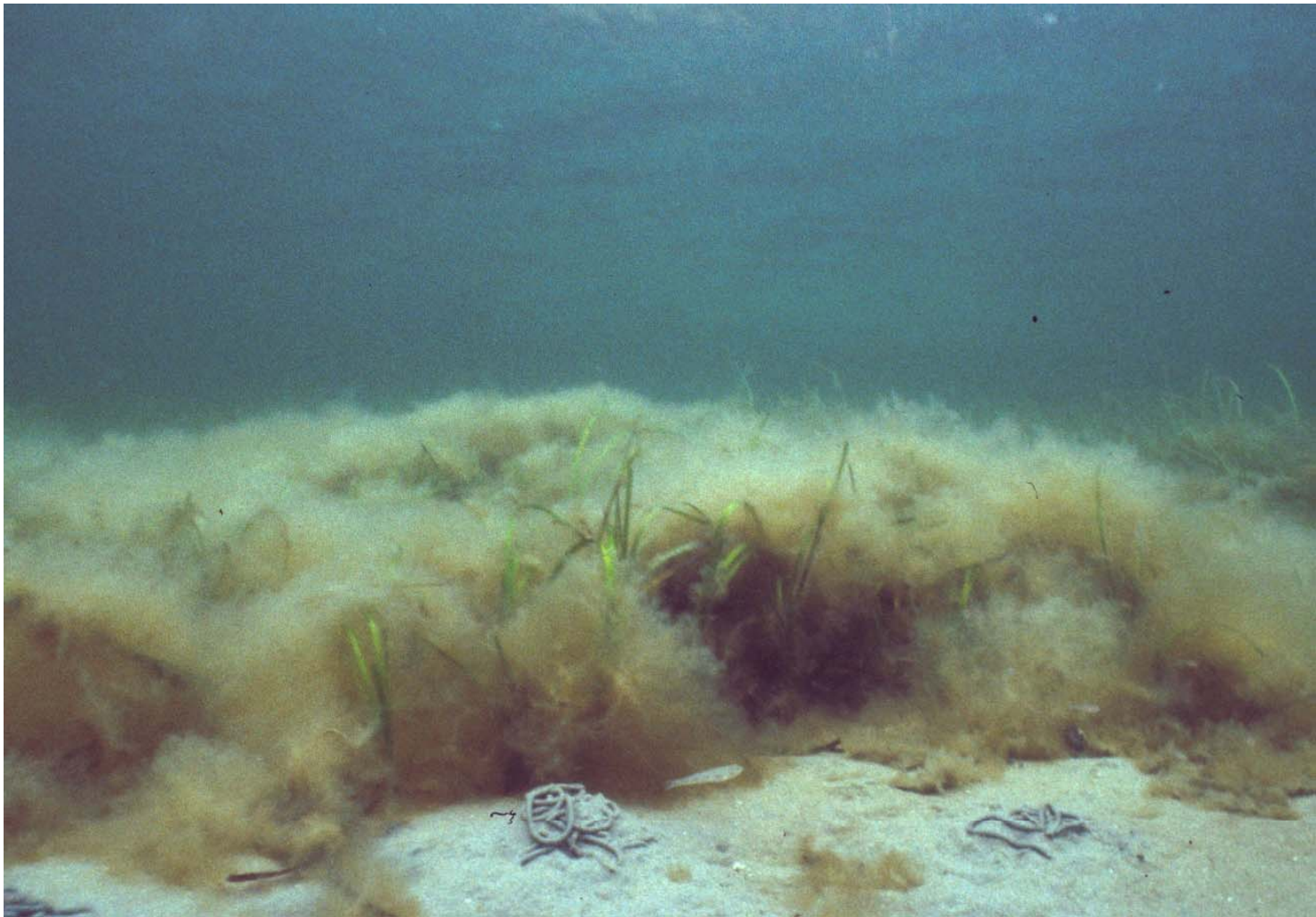
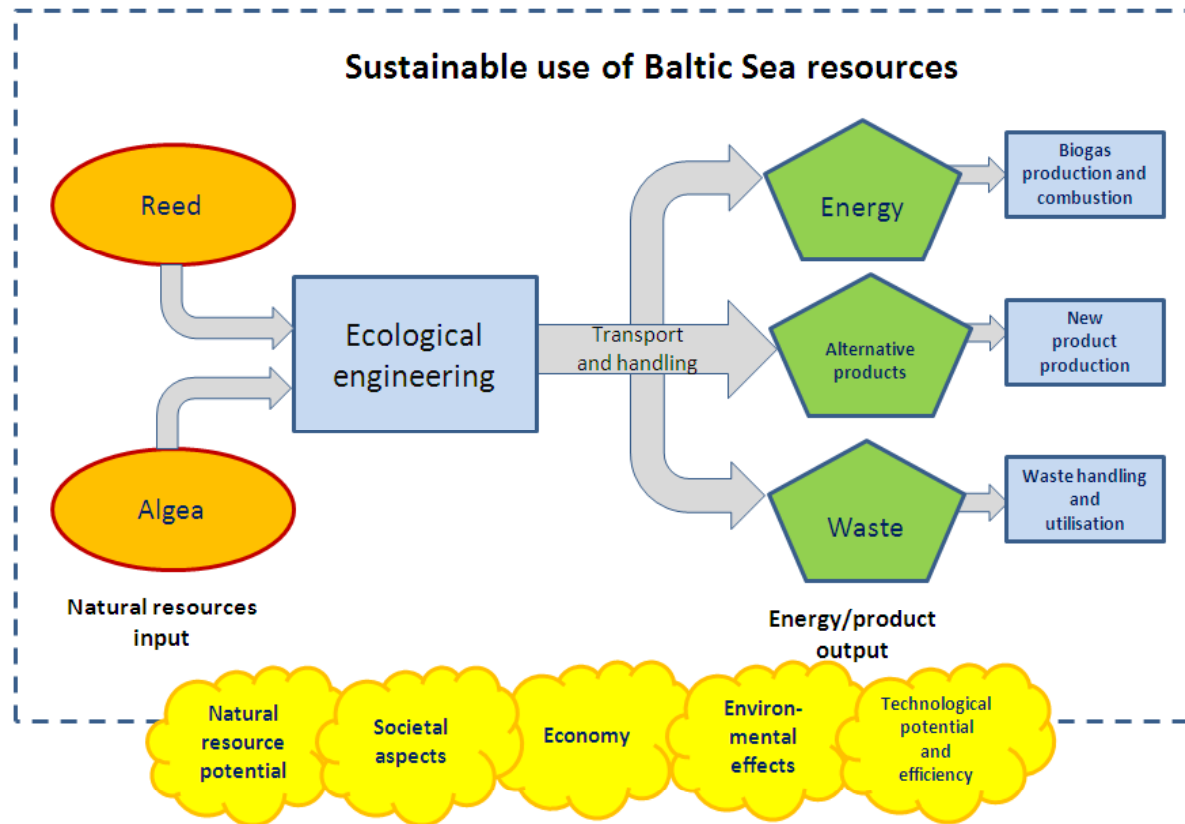
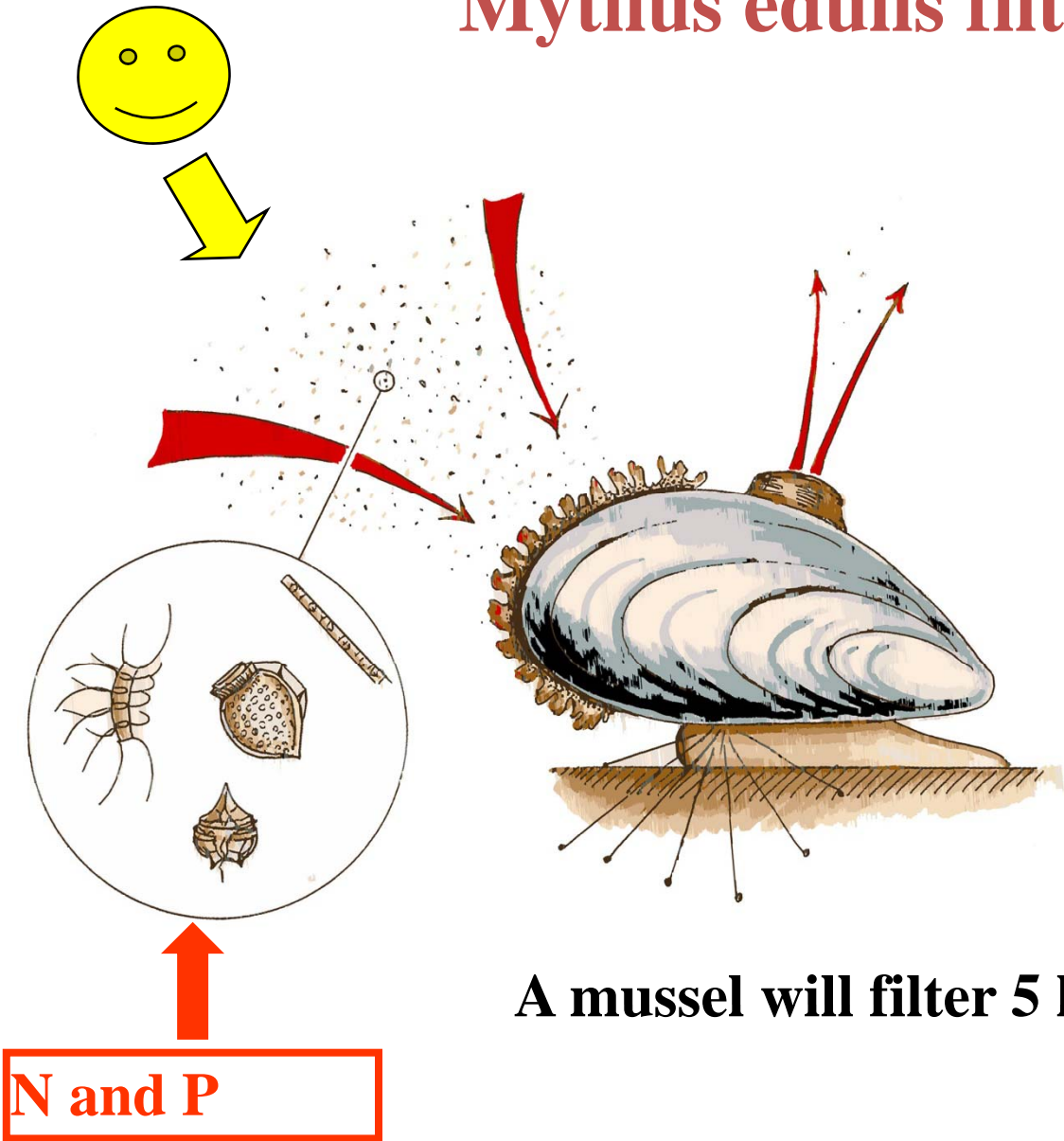


Figure 1. Sustainable use of Baltic sea biomass resources based on ecological retrieval of biomass (reed and algae) for production of energy and new innovative products (including fertilizers) with an associated waste stream. Blue squares indicate technology dependent processes and the yellow clouds shows the sustainability and feasibility aspects. Gröndahl et. al. 2008

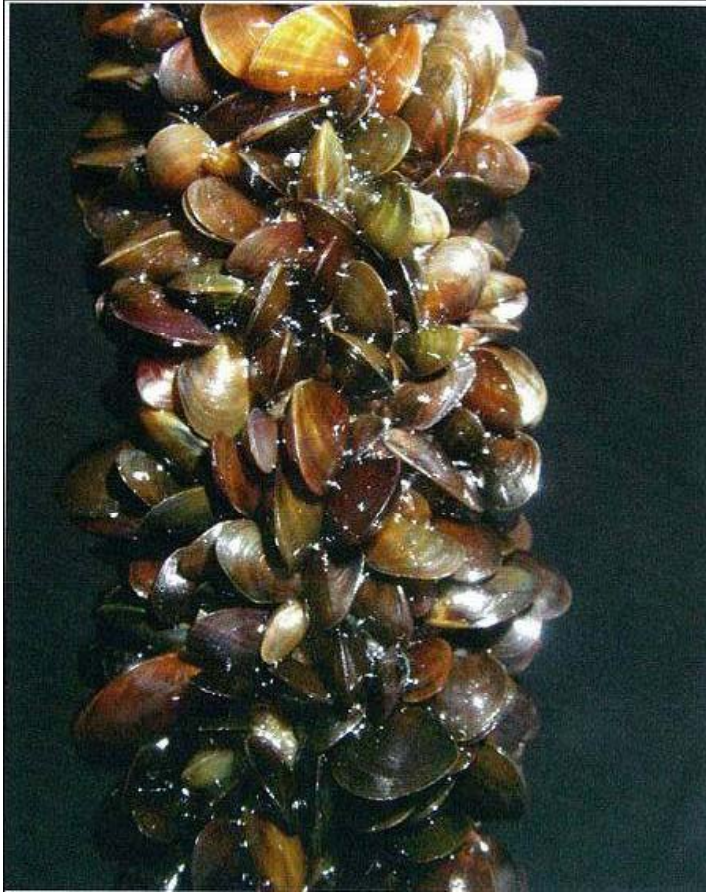


Mytilus edulis filtering



A mussel will filter 5 l t^{-1}

Kalmarsund, 14 month



The biomass after 1 year was 4 kg m^{-1}
or 16 kg for a long line.





Figure 1: *Nodularia spumigena*
(Helcom, 2004)

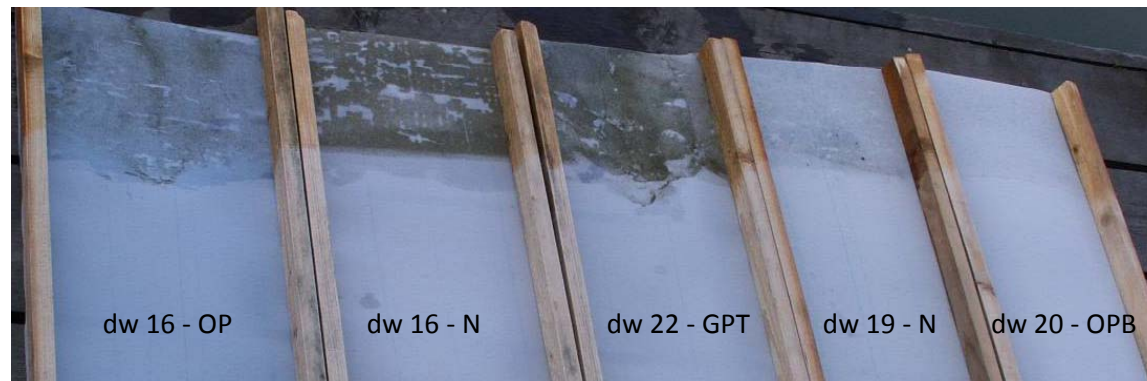
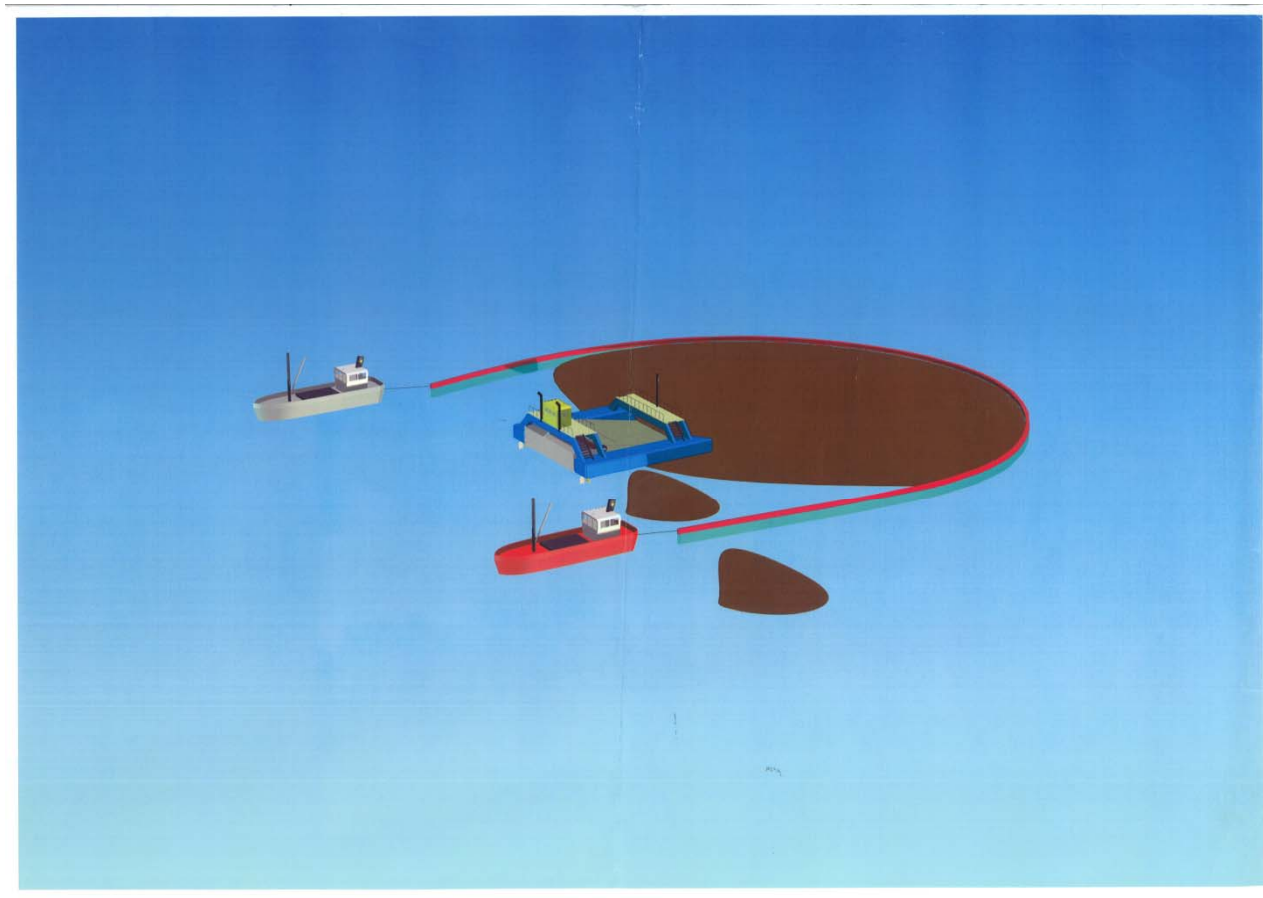


Figure 11: The forming fabrics after being pulled through algal rich water

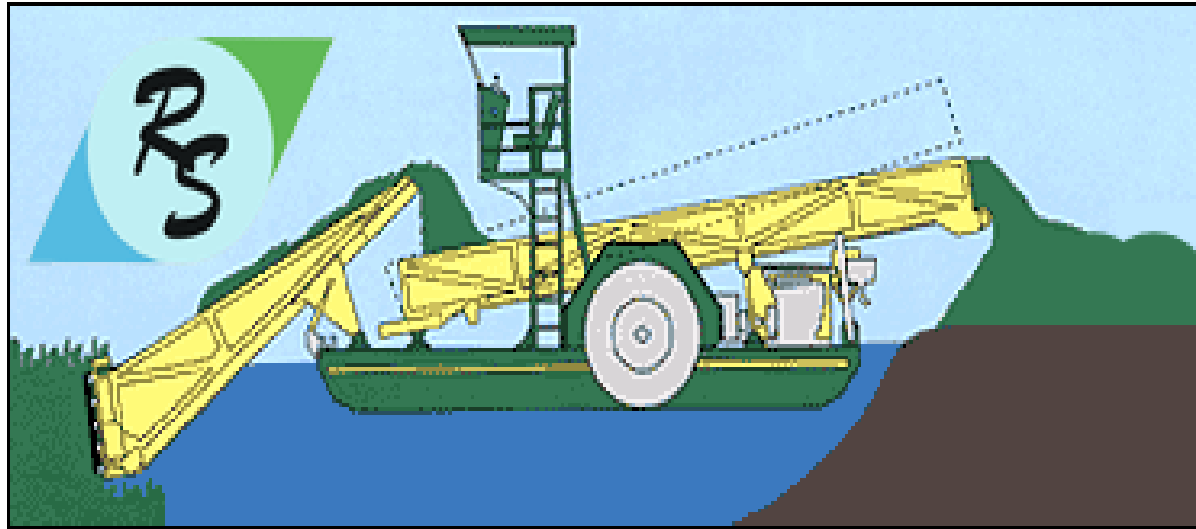


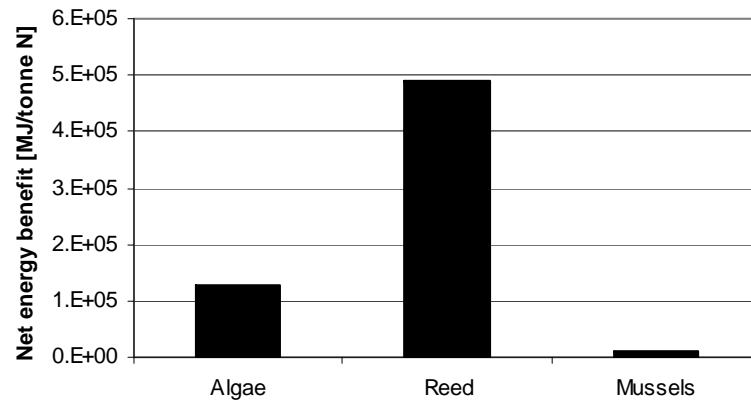
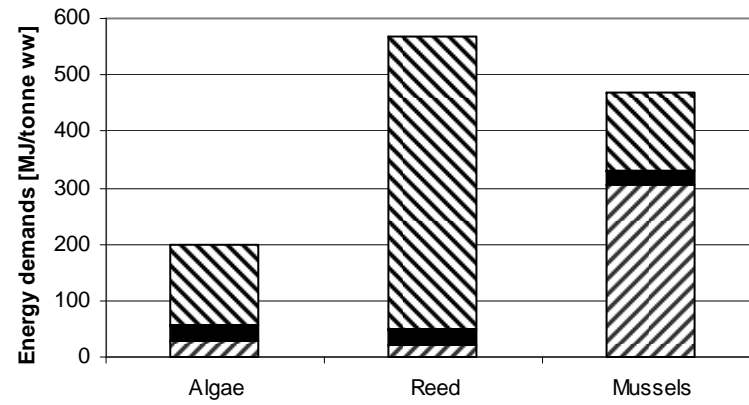
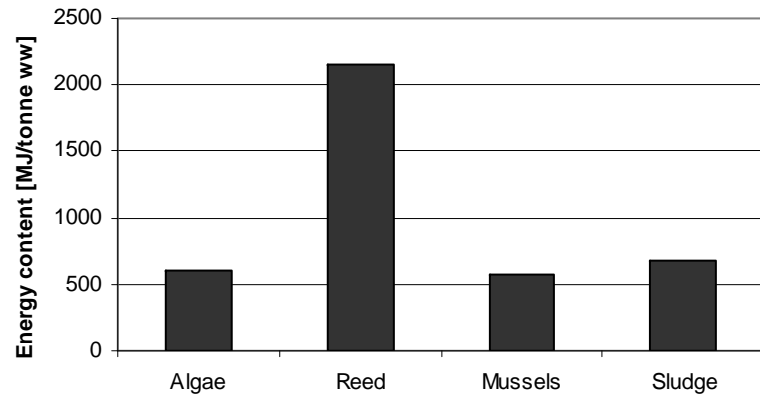
Harvesting of Cyanobacteria

Gröndahl F. 2009. Ambio 38 (2) 79-84



Harvesting of Reed, Vänern Fredriksson, SLU 2002





Advantage with Biomanipulation and the production of Biogas

- Biogas means less CO₂ and is thus an important contributor to decreasing climate change.
- The establishment of wetlands will stimulate biological diversity in the region and will deal with the nutrient load from surrounding farm land.
- Harvesting of the reed belt will remove the nutrients from the wetland area.
- Harvesting of macro algae will remove nutrients and heavy metals from the Baltic Sea and improve local beaches for recreation purposes.
- The removal of Cyanobacteria will remove nutrients from the Baltic Sea, but perhaps the most important contribution is that it will improve recreational value in the region.
- When the shallow coastal waters are cleansed from oxygen-depleting, decaying accumulated macro algae, large areas will again become available to sustain the growth of juvenile fish.