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Improving Marine Water Quality by Mussel Farming: A Profitable Solution for Swedish Society

Odd Lindahl, *Rob Hart*, *Bodil Hernroth*, *Sven Kollberg*, *Lars-Ove Loo*, *Lars Olrog*, *Ann-Sofi Rehnstam-Holm*, *Jonny Svensson*, *Susanne Svensson*, *Ulf Syversen*

Author Affiliations +

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Abstract

Eutrophication of coastal waters is a serious environmental problem with high costs for society globally. In eastern Skagerrak, reductions in eutrophication are planned through reduction of nitrogen inputs, but it is unclear how this can be achieved. One possible method is the cultivation of filter-feeding organisms, such as blue mussels, which remove nitrogen while generating seafood, fodder and agricultural fertilizer, thus recycling nutrients from sea to land. The expected effect of mussel farming on nitrogen cycling was modeled for the Gullmar Fjord on the Swedish west coast and it is shown that the net transport of nitrogen (sum of dissolved and particulate) at the fjord mouth was reduced by 20%. Existing commercial mussel farms already perform this service for free, but the benefits to society could be far greater. We suggest that rather than paying mussel farmers for their work that nutrient trading systems are introduced to improve coastal waters. In this context an alternative to nitrogen reduction in the sewage treatment plant in Lysekil community through mussel farming is presented. Accumulation of bio-toxins has been identified as the largest impediment to further expansion of commercial mussel farming in Sweden, but the problem seems to be manageable through new techniques and management strategies. On the basis of existing and potential regulations and payments, possible win-win solutions are suggested.

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