

Pilot Mussel

Deliverable 4.10.1 Verification report
Katarina Elofsson

NutriTrade - A Flagship project of the EU Baltic Sea region strategy



INTRODUCTION

Harvest of blue mussels (*Mytilus edulis*) is a relatively new method for reducing phosphorous (P) and nitrogen (N) loads in the Baltic Sea Proper. Previous experiments in the Baltic Sea have indicated that cultivation of blue mussels has potential to be a cost effective measure to reduce nutrient loads. The project NutriTrade set out to arrange a tender for mussel harvest contracts, where the mussels were to be harvested in 2017 and 2018. This verification report summarizes the achievements of this tender in terms of contracts erected, planned and achieved mussel harvests, achieved reductions of nutrient loads, and costs for compensation. Information on the design of the tender can be found in the earlier report for Pilot Mussel, Deliverable 4.9.1 Final report.

RESULTS OF THE MUSSEL FARMING TENDER

In the first round, mussel farms were contracted aiming at a start of the farm in the spring 2016, and harvests in the autumn 2017. The second round of tender implied farming and harvesting one year later. Table 1 shows planned and actual outcomes of the contracts. Contracts included an agreement on the planned harvest volume and a price per kg of wet mussels. In case the harvest exceeded planned harvest, mussel farmers could be compensated provided that the budget permitted doing so. The compensation level, in terms of SEK per kilo wet mussels, for harvests in excess of the planned level was then equal to that for the lowest bid in the tender. The lowest bid was the chosen as the lowest contracted price among the mussel farmers that succeeded in harvesting, which was 12 SEK per kg mussels.

The nitrogen and phosphorus content of the mussels was measured by the Animal Nutrition Laboratory, Department of Animal Nutrition and Management, Swedish University of Agricultural Sciences. These measurements were carried out within the framework of the Baltic Blue Growth project. We used these measurements to calculate nitrogen and phosphorus removal by harvest taken and in total, see Table 2. As can be seen in the table, mussel harvests within the project removed 65 kilo phosphorus and 1870 kg nitrogen.

The contracts allowed farmers to retain ownership of the mussels, and were free to use or sell those as they wished. The mussels could, however, not be disposed of in the sea, and general environmental regulations should be adhered to. With exception for the VCO harvest in 2017, which was sent to a biogas facility, the mussels were used as fertilizers, see Table 3.

Table 1. Planned and actual harvest, contracted price, total payment for contracted and excess harvest, nitrogen and phosphorus removal for all mussel farms contracted by NutriTrade, as known 6 September 2018.

	Planned harvest (ton)	Actual harvest (ton)	Contracted price (SEK/kg harvested mussels) ^a	Total payment for contracted harvest (SEK)	Total payment for excess harvest (SEK)
<i>Bids 1st tender:</i>					
VCO, Östergötland ^b	30	30	12	360,000	0
<i>Bids 2nd tender:</i>					
VCO, Östergötland ^b	20	51.483	12	240,000	377,796
Kalmar municipality ^c	15	20.161	20	300,000	61,932
Bohus havsbruk	50	0	11.75	0	0
Ålands landskapsregering	15	0	21,50	0	0
Ålands fiskodlarförening	4	1.2875	25	32,187.5	0
<i>Sum</i>	<i>134</i>	<i>102.9315</i>		<i>932,187.5</i>	<i>439,728</i>

^a When actual harvest exceeded planned harvest, the excess harvest was compensated by 12 SEK per kilo.

^b Harvests were taken December 2017 (15.54 t), May 2018 (37.93 t), September 2018 (12.47 t).

^c Harvests were taken April 2018 (10.891 t), August 2018 (2.525 t), November 2018 (6.745 t).

Table 2. Nutrient content in mussel samples, percentage and total. When measurements from multiple samples were collected for a harvest, the average concentration was used.

	Actual harvest (ton)	Phosphorus in fresh sample (%)	Nitrogen in fresh sample (%)	Phosphorus (kg)	Nitrogen (kg)
Ålands fiskodlarförening	1.288	0.063	0.751	0.81	9.67
Kalmar municipality, April 2018	10.891	0.107	1.037	11.65	112.94
Kalmar municipality, August 2018	2.525	0.059	2.011	1.49	50.78
Kalmar municipality, November 2018	6.745	0.051	1.808	3.44	121.95
VCO, Östergötland December 2017	15.540	0.074	1.080	11.50	167.83
VCO, Östergötland May 2018	53.472	0.054	2.116	28.87	1131.47
VCO, Östergötland September 2018	12.470	0.060	2.212	7.48	275.84
<i>Sum</i>	<i>102.931</i>			<i>65.25</i>	<i>1870.47</i>

Table 3. Final use of mussels.

Ålands fiskodlarförening	Kalmar municipality	VCO, Östergötland
Fertilizer on own arable land	Fertilizer on own arable land	Harvest 2017: biogas. Harvest 2018: fertilizer.