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Oskarshamn site investigation

Biomass production of Common reed (Phragmites australis), infauna, epiphytes, sessile epifauna and mobile epifauna

Common reed biotopes in Oskarshamn's model area

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December 2004

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Abstract

The aim of the study was to determine and estimate the total amount of Common reed biomass, *Phragmites australis*, both standing crop and the rhizome biomass, in SKB's regional modelling area in Simpevarp, Oskarshamn. The biomasses of infauna and mobile epifauna are determined as well as the carbon content in the sediment. The grand mean value for reed biomass in the Oskarshamn area is 1,254.3 g/m^2. Mean value for reed rhizome biomass in the same area is 3,705.6 g/m^2. The result from the standing crop biomass measurement corresponds with earlier studies of reed biomass, but the mean biomass value for the rhizome was almost the double. Two of the infauna taxa, *Diptera* and *Gastropoda*, were found in all of the five sites where *Gastropoda* represented the greatest biomass and Diptera the highest abundance. Epiphytes, such as macro algae, could not be detected on any reed straws. The mobile epifauna sampling did result in a relative high number of different taxa. *Gastropoda* and *Anisoptera* were the taxa that showed the highest biomass value with a relatively low abundance number. Taxa showing the reversed relation between biomass and abundance were *Isopoda* and possibly *Diptera*. Carbon content of the sediment, sampled in the edge of the reed stands was approx 11% with high variation between the sites.

Contents

1 Introduction

The common reed, *Phragmites australis*, is a highly distributed species on earth. It is associated to wetland habitats such as marshlands and in the littoral zone of lakes, streams and estuaries and occurs in both fresh- and saltwater /Soetaert et al. 2004/. Although the common reed grows with highest success in clay it can grow in a wide variety of soils. The water level limits the species and should not exceed 1–1.5 m during the vegetation period. The plant itself can be divided into two different parts. The above ground level consists of straw, leaf and panicle and dies during the autumn. This part is called the standing crop. The other part of the plant is below ground level and consists of rhizome, which can grow to 1 m down in the sediment, and roots. The underground part of the plant is perennial /Fredriksson, 2003/.

The dead parts of the common reed population can remain for several years and often constitutes the double amount of biomass than the current growing standing crop. The high amount of dead straws in combination with high resistance against decomposition can give rise to a thick detritus layer which can contain a high diversity of benthic fauna /Francis, 2003; Fredriksson, 2003/. Due to the high amount of detritus, the sediment bed often is an anoxic environment which does not affect the reed. Reed fixates oxygen above the water surface and leads it down to the parts beneath water level. Anoxic conditions can however lead to a lower amount of animals living in the sediment /Lindell, 2002/. Apart from that the sediment, reed beds are also often used as a feeding and covering area by nektons /Francis, 2003; Fredriksson, 2003/.

The distribution of the reed can partly be explained by its ability to cope with different types of environments but it has also to do with its effective reproduction. It has been found that reed can undergo ribosomal reproduction as well as spreading seeds. Nutrient inputs from septic runoff and fertilizers use also facilitates the spreading by making the surroundings more eutrophic. Other human activities like limiting tidal flow has also contributed to making it possible for the reed to colonise new areas /Lindell, 2002/.

The aim of this study is to determine and estimate the total amount of common reed biomass, both standing crop and the rhizome biomass, in SKB's regional modelling area. The biomasses of infauna, epiphytes, sessile and mobile epifauna are to be determined as well.

2 Methods

2.1 Site description

The study was conducted in 6 sites within the Oskarshamn regional modelling area (see Figure 2-1). The sampling sites were all in sheltered bay areas where the shoreline varied between hard- and soft beds. The shorelines in this area are partly covered with reed populations in varying sizes. The field study was performed in July 2004. Sampling was conducted within a test area at each locality which could differ between 100 and 20 m^2. Infauna samples were taken at the outer edge of the reed covered area. The reed biomass, epiphytes and sessile epifauna samples were taken randomly on each sides of a line from outer to inner part of the test area. Mobile epifauna was sampled were the water was considered deep enough, at least 40 cm.

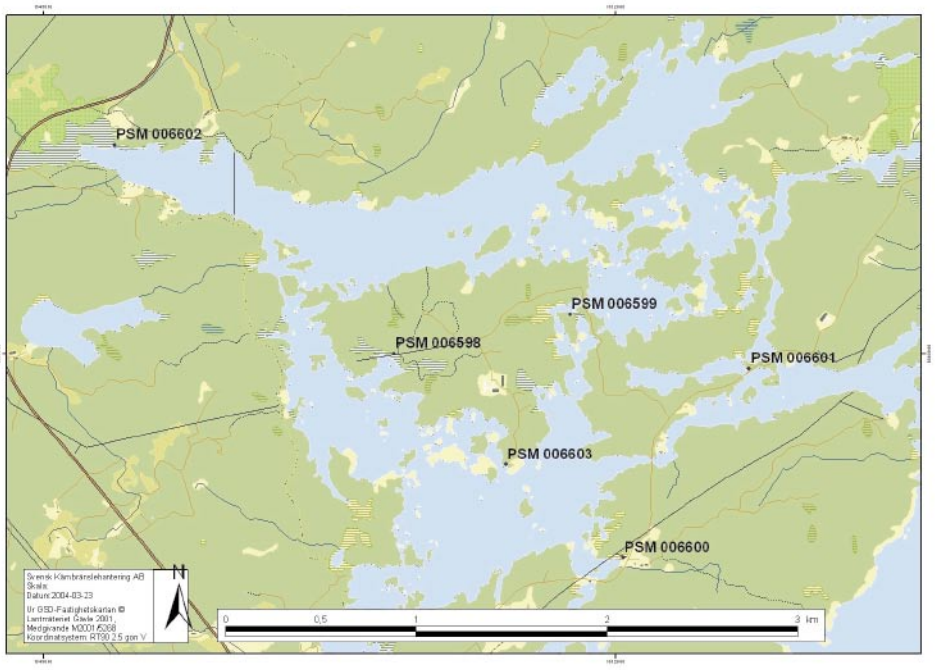

Figure 2-1. *Map of the 6 investigated sites within the Oskarshamn regional modelling area.*

2.2 Common reed biomass

To measure the standing crop biomass a 0.04 m^2 (20×20 cm) metal frame randomly was placed within the test area and in that test square all standing crop was cut down. This procedure was repeated five times in every test area. The living and the dead parts of the standing crop were separated and counted. To receive dry weight, the living part of the standing crop was taken into lab and dried in 60°C for approximately 24 h.

For the rhizome part the above-mentioned metal frame was randomly placed within the test area. All rhizomes in the test square and 20 cm below were dug up using a shovel. In each test area one rhizome sample was taken. The rhizome lump was washed to get rid of the sediment and clay that followed. The reed rhizome part was dried in 60°C for approximately 24 h.

2.3 Sediment

Five sediment cores were taken at each sampling site except for at Länsmansudde where the reed was growing directly on the rocks. With a tube corer measuring 8 cm in diameter the sediment was collected in the outer edge of the reed belt. This was because the rhizome was impossible to penetrate to reach the sediment inside the reed belts. The first 10 cm of the sediment was used for analysis of water and carbon content. The analysis was conducted at the University of Kalmar. Method used for determination of carbon content was loss on ignition, at standard temperature 550°C, and water content was determined by weigh loss after the samples had been dried in 105°C. Each sample was measured two times. The carbon content can be calculated from the loss on ignition by dividing the value from loss on ignition with 2 /Håkansson and Jansson, 1983/, if the loss on ignition exceeds 10% of dry weight. Here, carbon contents of all samples were calculated by dividing loss on ignition by 2, when no other method was available.

2.4 Infauna

The infauna samplings were conducted with regard to biomass and abundance. The sampling was conducted with the same tube corer as used for sediment sampling. The first 10 cm of the sediment was used for analysis which is enough as the major part of the animals lives in the first 10 cm /Fredriksson, 2003/. The samples were riddled out with a sieve with 1 mm mesh size. The animals found were kept in alcohol in order to conserve them before they were properly analysed. After taxa determination the samples were dried in room temperature for 4–5 days to receive constant weight.

2.5 Epiphytes

In connection with standing crop a sample of five dead reed straws from each site were collected for further analysis. The major part of epiphytes lives on dead straws and therefore only the dead straws were collected for this sampling /Fredriksson, 2003/. A section of 10 cm was cut of from the water surface (at normal water level) and down for each reed straw. The samples were sent to University of Kalmar for further analysis.

2.6 Sessile epifauna

Five living reed straws were collected at each site for analysis of sessile epifauna when living straws contains a higher density of sessile epifauna compared to dead straws /Fredriksson, 2003/. The straws were cut from the water surface to the sediment bed. The samples were sent to University of Kalmar for further analysis. Due to mail deliverance problems when the samples were sent away for analysis, the samples had started to decompose when they arrived at University of Kalmar. Because of this unfortunate reason, we did not get any results.

2.7 Mobile epifauna

The mobile epifauna was sampled with a fall trap with an area of 0.49 m^2 (70×70 cm). The trap is constructed like a box without top and bottom. The trap was placed in the reed area and lowered to the sediment bed. Using a landing net the animals were captured and then placed in alcohol for conservation. One sample from each site was taken. The macro fauna was determined to taxa as far as possible and then dried in room temperature for 4–5 days to receive constant weight.

3 Results

3.1 Common reed biomass

The two tables below shows the results from the common reed biomass sampling. Table 3-1 is the standing crop biomass and Table 3-2 shows the rhizome biomass. The grand mean value for reed biomass in the Oskarshamn area is 1,254.3 g/m^2. Mean value for reed rhizome biomass in the same area is 3,705.6 g/m^2.

Table 3-1. Number of dead and living straws and biomass for the standing crop (s c = standing crop, DW = dry weight). The values at each sampling site represent a mean of five samples. Grand mean is the mean value for the six sites and stdv is the standard deviation for the means.

Name of site	ID code	Dead number s c/m^2	Living number s c/m^2	Living s c g DW/m^2
Beseglo	PSM006598	255.0	200.0	328.1
Äspöholmen	PSM006599	110.0	270.0	552.5
Gloet	PSM006600	450.0	495.0	1,640.1
Jungfruhålet	PSM006601	115.0	335.0	1,410.6
Kärrsvik	PSM006602	50.0	255.0	1,347.7
Länsmansudde	PSM006603	335.0	380.0	2,247.2
Grand mean		219.2	322.5	1,254.3
STDEV		154.5	105.4	709.7

Table 3-2. Biomass for the rhizome (DW = dry weight).

Name of site	ID code	Rhizome g DW/m^2
Beseglo	PSM006598	470.3
Äspöholmen	PSM006599	3,425.3
Gloet	PSM006600	4,351.0
Jungfruhålet	PSM006601	7,317.3
Kärrsvik	PSM006602	4,921.3
Länsmansudde	PSM006603	1,748.8
Mean value		3,705.6
STDEV		2,421.3

3.2 Sediment

The results from the test of water content, loss on ignition and carbon content are shown in Table 3-3. The mean for carbon content for all sampling sites was 11.4% but with a high variance between the sites.

Table 3-3. Water and carbon content in the sediments. Each sample is tested two times and a mean from each sample is presented in bold below respective values.

Name of site	ID code	Water content (%)	Loss on ignition (%)	Carbon content (%)
Beseglo	PSM006598	88.140	35.44	17.72
Beseglo	PSM006598	88.447	35.52	17.76
		88.294	35.48	17.74
Äspöholmen	PSM006599	45.296	2.63	1.32
Äspöholmen	PSM006599	44.193	2.48	1.24
		44.744	2.56	1.28
Gloet	PSM006600	86.698	36.28	18.14
Gloet	PSM006600	86.771	36.13	18.06
		86.735	36.20	18.10
Jungfruhålet	PSM006601	73.623	9.28	4.64
Jungfruhålet	PSM006601	71.614	8.27	4.14
		74.564	9.73	4.39
Kärrsvik	PSM006602	87.799	31.10	15.55
Kärrsvik	PSM006602	87.691	30.47	15.24
		87.745	30.78	15.39
Mean value		76.416	22.95	11.38
Stdv		17.601	14.99	7.49

3.3 Infauna

The results from the infauna sampling are shown in Table 3-4. Infauna sampling was only performed at five sites, because of previously mentioned problems at Länsmansudde which did not hold any sediment, just reed rhizomes growing directly on the rocks.

Two of the taxa, *Diptera* and *Gastropoda*, were found in all of the five sites where *Gastropoda* represented the greatest biomass and *Diptera* the highest abundance (Table 3-5).

Table 3-4. Biomass and abundance for the taxa found in the infauna samples. All values are mean values from 5 samples.

	Beseglo		Äspöholmen		Gloet		Jungfruhålet		Kärrsvik	
	Biomass (g/m^2)	Abundance (Ind/m^2)	Biomass (g/m^2)	Abundance (Ind/m^2)	Biomass (g/m^2)	Abundance (Ind/m^2)	Biomass (g/m^2)	Abundance (Ind/m^2)	Biomass (g/m^2)	Abundance (Ind/m^2)
Anisoptera	0	0	0	0	0	0	0	0	1.194	39.789
Diptera	0.119	835.563	0.557	596.831	0.597	1,273.240	0.239	159.155	0.358	994.718
Trichoptera	0	0	0.040	79.577	0.358	318.310	0	0	0	0
Amphipoda	0	0	0	0	0	0	0	0	0.080	39.789
Isopoda	0	0	0	0	0.080	119.366	0	0	0.080	39.789
Gastropoda	1.233	79.577	5.291	198.944	5.610	159.155	1.949	119.366	4.297	119.366
Total	1.353	915.141	5.888	875.352	6.644	1,870.071	2.188	278.521	6.008	1,233.451

Table 3-5. Grand mean biomass and abundance values for two of the taxa found in the infauna samples.

	Grand mean biomass (g/m^2)	Grand mean abundance (ind/m^2)
Diptera	0.374	771.901
Gastropoda	3.676	135.282

3.4 Epiphytes

No macro epiphytes could be detected on any reed straws.

3.5 Sessile epifauna

As mentioned in methods, no results from this part were received.

3.6 Mobile epifauna

Table 3-6a and 3-6b shows the results of the mobile epifauna sampling for each site. Mean biomass and abundance values for some of the taxa can be seen in Table 3-7. The relation between biomass and abundance for some of the taxa is illustrated in Figure 3-1 and 3-2.

Table 3-6a. Biomass and abundance for the taxa found in the mobile epifauna sampling.

	Beseglo Biomass (g/m^2)	Abundance (Ind/m^2)	Äspöholmen Biomass (g/m^2)	Abundance (Ind/m^2)	Gloet Biomass (g/m^2)	Abundance (Ind/m^2)
Anisoptera	0.076	2.041	0.533	53.061	0.273	28.571
Diptera	0	0	0.004	30.612	0.002	2.041
Ephemeroptera	0	0	0.002	2.041	0.002	2.041
Heteroptera	0.014	2.041	0.002	2.041	0.004	16.327
Zygoptera	0	0	0.012	26.531	0.004	4.082
Isopoda	0	0	0.039	53.061	0.127	161.224
Mysidacea	0	0	0.563	279.592	0	0
Araneae	0	0	0.016	6.122	0.055	6.122
Gastropoda	1.433	75.510	1.539	30.612	1.073	8.163
Oligochaeta	0	0	0	0	0.002	2.041
Teleostei	0	0	0.322	1,424.490	0	0
Total	1.522	79.592	3.033	1,908.163	1.543	230.612

Table 3-6b. Biomass and abundance for the taxa found in the mobile epifauna sampling.

	Jungfruhålet Biomass (g/m^2)	Abundance (Ind/m^2)	Kärrsvik Biomass (g/m^2)	Abundance (Ind/m^2)	Länsmansudde Biomass (g/m^2)	Abundance (Ind/m^2)
Anisoptera	0.067	4.082	0	0	0.631	8.163
Diptera	0.006	8.163	0.002	6.122	0.002	2.041
Ephemeroptera	0	0	0	0	0	0
Heteroptera	0.043	16.327	0.014	16.327	0	0
Zygoptera	0.033	10.204	0.016	12.245	0.039	14.286
Isopoda	0.018	32.653	0.102	169.388	0.020	26.531
Mysidacea	0	0	0	0	0	0
Araneae	0.069	4.082	0.004	6.122	0.035	2.041
Gastropoda	0.455	10.204	0	0	0.390	12.245
Oligochaeta	0	0	0	0	0	0
Teleostei	0	0	0	0	0	0
Total	0.692	85.714	0.139	210.204	1.116	65.306

Table 3-7. Biomass and abundance for the taxa from the mobile epifauna sampling found at all sites. All values are mean values from the six different sites.

	Biomass (g/m^2)	Abundance (Ind/m^2)
Anisoptera	0.263	15.986
Diptera	0.003	8.163
Heteroptera	0.013	8.844
Zygoptera	0.017	11.224
Isopoda	0.051	73.810
Araneae	0.030	4.082
Gastropoda	0.815	22.789
Total	1.1920	144.899

4 Discussion

The result from the standing crop biomass measurement corresponds with earlier studies of reed biomass. /Soetaert et al. 2004/ received standing crop values between 587–2,179 g DW/m^2 depending on salinity levels and we got a grand mean value for standing crop in 1,254.3 g/m^2. However, our mean biomass value for the rhizome was almost the double in comparison with their study. In this study in Oskarshamn, a higher percentage share was found for rhizome biomass compared to standing crop biomass, than /Soetaert et al. 2004/ found. That could be explained by the time of the year when the sampling was made. The harvesting of standing crop was performed in middle to late July. Optimal time for reed biomass determination is in the end of the growing season in August /Björndahl and Egnéus, 1980/ and that could have affected the result. It could also be a result of that we did not distinguish between living and dead rhizome.

The carbon content of the sediment was expected to be a major part of the sediment. Three samples composed of more than 15% of carbon, but two samples composed less than 5% of carbon and one of them, Äspöholmen, consisted only to 1.3% of carbon. At this site, the sediment consisted of clays and organic compounds did not seem to accumulate at the bottom. For further calculations on organic rates in sediments, more sampling at more sites are required, because of the high spatial variation. With another type of tube corer that could penetrate the reed rhizome, the actual accumulation of carbon inside the reed stands could be detected. We do not know if the carbon content at the edge of the reed stand is representative for the whole area covered with reed.

The result from the infauna sampling gave biomass values between 6.6 and 1.3 dwg/m^2. This is in the same magnitude as infauna biomass found in other marine habitats in the Simpevarp inverstigation program /Wijnbladh, pers com/, as well as in the mobile epifauna sampling in this study (Table 3-6). The highest biomass value consisted of *Gastropoda* but *Diptera* (mainly *Chironomidae*) showed greater abundance. The sediments smelled heavily of H_2S and the environment could be considered euxinic (i.e. spatially depleted in oxygen).

Epiphytes, such as macro algae, could not be detected on any reed straws. One possible reason could be that the relatively cold, precipitation rich summer has delayed the growing period. Perhaps would a later field study give a different result? Another explanation could be that the salinity levels in these bays are not high enough for macro algae to establish. No analysis of microflora was conducted but maybe this is of interest and can be considered for another year.

As mentioned in the result part of this report, there were problems with the deliverance of the sessile epifauna samples. Some taxa were actually found in the samples despite the decomposition process. Remainders of both Ostracoda and Acari were found on the reed straws but we decided not to proceed with the biomass and abundance analysis because of the potential loss of biomass due to the decomposition process. A not so controversial thought is that the biomass level would be quite low and the abundance level rather high. Other taxa that could be considered possible to be found in fresh sessile epifauna samples are *Nematoda*, *Mollusca* and *Hirudinea*.

The mobile epifauna sampling resulted in a relative high number (11) of different taxa. Since the taxa, except *Teleostei*, were represented by invertebrates, there was a relative high abundance level with a quite low biomass level, not exceeding 1 g/m^2 in mean value for any of the taxa. *Gastropoda* and *Anisoptera* were the taxa that showed the highest biomass value with a relatively low abundance number. Taxa showing the reversed relation between biomass and abundance were *Isopoda* and possibly *Diptera*. In one site, Äspöholmen, a great number of fish fry (*Teleostei*) were captured and that was the only vertebrate group found. This site also showed a difference in fauna composition regarding crustacean groups in comparison to the other sites. The difference manifested itself in relative high numbers of caught *Mysidacea*. What the reason for this could be is hard to say, but one possible factor can once again be that the salinity level varies between the examined sites.

The methods used for this study are developed by Kalmar university /Fredriksson, 2003/. Some of the original ideas were unfortunately not possible to realize. The mobile epifauna was supposed to be sampled 5 times at each site. Because of shortage of time, both during field sampling and during analysis at laboratory, only one sample at each site was taken. This is not enough for statistical calculations, but could still be an indication on what to be found in the area in question.

The original methods proposed that the rhizome sampling should proceed on land, not in the water. The rhizome sampling at Beseglo, the first sampling site, was made in this way. At lab we found that it was almost impossible to separate reed rhizome from other grass roots and a change of strategy appeared. The rest of the rhizome samples were therefore taken in water and the big difference between Beseglo and the other samples could partly be explained by this.

Vertebrate biomass, mainly fishes and fish fry, could be as important as the invertebrate biomass but is not included in this study. The method used for mobile epifauna was not designed for catching adult fish. For calculation of total biomass in reed habitat of Oskarshamn, this should not be left out.

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Appendix Ia

Raw data for calculation of reed biomass (s c = standing crop, DW = dry weight)

Area/coordinates	Number Dead	Number Living	Dead number s c/m²	Living number s c/m²	Dry-weight living (g)	Living s c g DW/m²	Rhizome g DW/m²
Beseglo	13.00	10.00	325.0	250.0	13.42	335.5	470.3
PSM 006598	9.00	10.00	225.0	250.0	22.53	563.3	
N: 6368002	12.00	10.00	300.0	250.0	8.85	221.3	
O: 1550838	7.00	3.00	175.0	75.0	3.33	83.3	
	10.00	7.00	250.0	175.0	17.49	437.3	
Mean	10.2	8.0	255.0	200.0	13.1	328.1	
STDEV	2.4	3.1	59.7	77.1	7.4	186.2	
Area/coordinates	**Number Dead**	**Number Living**	**Dead number s c/m²**	**Living number s c/m²**	**Dry-weight living (g)**	**Living s c g DW/m²**	**Rhizome g DW/m²**
Äspöholmen	1.00	7.00	25.0	175.0	13.62	340.5	3,425.3
PSM 006599	0.00	11.00	0.0	275.0	20.80	520.0	
N: 6368206	1.00	8.00	25.0	200.0	24.32	608.0	
O: 1551763	0.00	10.00	0.0	250.0	17.17	429.3	
	20.00	18.00	500.0	450.0	34.58	864.5	
Mean	4.4	10.8	110.0	270.0	22.1	552.5	
STDEV	8.7	4.3	218.4	108.1	8.0	201.0	
Area/coordinates	**Number Dead**	**Number Living**	**Dead number s c/m²**	**Living number s c/m²**	**Dry-weight living (g)**	**Living s c g DW/m²**	**Rhizome g DW/m²**
Gloet	10.00	32.00	250.0	800.0	79.14	1,978.5	4,351.0
PSM 006600	18.00	22.00	450.0	550.0	67.31	1,682.8	
N: 6366933	7.00	18.00	175.0	450.0	67.83	1,695.8	
O: 1552039	19.00	11.00	475.0	275.0	59.24	1,481.0	
	36.00	16.00	900.0	400.0	54.49	1,362.3	
Mean	18.0	19.8	450.0	495.0	65.6	1,640.1	
STDEV	11.3	7.9	282.3	197.2	9.4	235.6	

Appendix Ib

Raw data for calculation of reed biomass (s c = standing crop, DW = dry weight)

Area/coordinates	Number Dead	Number Living	Dead number s c/m²	Living number s c/m²	Dry-weight living (g)	Living s c g DW/m²	Rhizome g DW/m²
Jungfruhålet	3.00	16.00	75.0	400.0	62.49	1,562.3	7,317.3
PSM 006601	0.00	14.00	0.0	350.0	24.13	603.3	
N: 6367924	1.00	16.00	25.0	400.0	56.41	1,410.3	
O: 1552700	7.00	15.00	175.0	375.0	35.77	894.3	
	12.00	6.00	300.0	150.0	103.32	2,583.0	
Mean	4.6	13.4	115.0	335.0	56.4	1,410.6	
STDEV	4.9	4.2	123.2	105.5	30.4	760.9	
Area/coordinates	**Number Dead**	**Number Living**	**Dead number s c/m²**	**Living number s c/m²**	**Dry-weight living (g)**	**Living s c g DW/m²**	**Rhizome g DW/m²**
Kärrsvik	9.00	12.00	225.0	300.0	75.86	1,896.5	4,921.3
PSM 006602	0.00	7.00	0.0	175.0	35.15	878.8	
N: 6369095	0.00	10.00	0.0	250.0	57.78	1,444.5	
O: 1549372	0.00	11.00	0.0	275.0	54.94	1,373.5	
	1.00	11.00	25.0	275.0	45.81	1,145.3	
Mean	2.0	10.2	50.0	255.0	53.9	1,347.7	
STDEV	3.9	1.9	98.4	48.1	15.1	378.2	
Area/coordinates	**Number Dead**	**Number Living**	**Dead number s c/m²**	**Living number s c/m²**	**Dry-weight living (g)**	**Living s c g DW/m²**	**Rhizome g DW/m²**
Länsmansudde	2.00	9.00	50.0	225.0	48.68	1,217.0	1,748.8
PSM 006603	58.00	14.00	1,450.0	350.0	73.32	1,833.0	
N: 6367421	2.00	17.00	50.0	425.0	130.10	3,252.5	
O: 1551424	0.00	20.00	0.0	500.0	104.93	2,623.3	
	5.00	16.00	125.0	400.0	92.40	2,310.0	
Mean	13.4	15.2	335.0	380.0	89.9	2,247.2	
STDEV	25.0	4.1	624.9	102.2	30.9	772.8	

Appendix IIa

Raw data for calculations of infauna

Area/coordinates	Sample	Group	Number	Dry weight (g)	Biomass (g/m^2)	Abundance ($Nr\ ind/m^2$)
Beseglo	1	*Diptera* (larva)	10	0.001	0.199	1,989.437
PSM 006598	2	*Gastropoda*	1	0.02	3.979	198.944
N: 6368002	3	*Diptera* (larva)	7	0.001	0.199	1,392.606
O: 1550838		*Gastropoda*	1	0.011	2.188	198.944
	4	*Diptera* (larva)	4	0.001	0.199	795.775
	5	No fauna found				
Area/coordinates	**Sample**	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m^2)**	**Abundance ($Nr\ ind/m^2$)**
Äspöholmen	1	*Diptera* (larva)	1	0.001	0.199	198.944
PSM 006599		*Trichoptera* (larva)	2	0.001	0.199	397.887
N: 6368206	2	*Gastropoda*	2	0.027	5.371	397.887
O: 1551763	3	*Diptera* (larva)	1	0.001	0.199	198.944
		Gastropoda	3	0.106	21.086	596.831
	4	*Diptera* (larva)	1	0.01	1.989	198.944
	5	*Diptera* (larva)	12	0.002	0.398	2,387.324
Area/coordinates	**Sample**	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m^2)**	**Abundance ($Nr\ ind/m^2$)**
Gloet	1	*Diptera* (larva)	2	0.001	0.199	397.887
PSM 006600		*Trichoptera* (larva)	4	0.003	0.597	795.775
N: 6366933		*Gastropoda*	1	0.113	22.479	198.944
O: 1552039	2	*Diptera* (larva)	8	0.004	0.796	1,591.549
		Isopoda	3	0.002	0.398	596.831
		Gastropoda	2	0.016	3.183	397.887
	3	*Diptera* (larva)	8	0.007	1.392	1,591.549
		Gastropoda	1	0.012	2.387	198.944
	4	*Diptera* (larva)	12	0.002	0.398	2,387.324
	5	*Diptera* (larva)	2	0.001	0.199	397.887
		Trichoptera (larva)	4	0.006	1.194	795.775

Appendix IIb

Raw data for calculations of infauna

Area/coordinates	Sample	Group	Number	Dry weight (g)	Biomass (g/m²)	Abundance (Nr Ind/m²)
Jungfruhålet	1	*Diptera* (larva)	2	0.002	0.398	397.887
PSM 006601	2	*Gastropoda*	1	0.034	6.763	198.944
N: 6367924	3	*Diptera* (larva)	1	0.003	0.597	198.944
O: 1552700	4	*Diptera* (larva)	1	0.001	0.199	198.944
		Gastropoda	1	0.014	2.785	198.944
	5	*Gastropoda*	1	0.001	0.199	198.944
Area/coordinates	**Sample**	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m²)**	**Abundance (Nr Ind/m²)**
Kärrsvik	1	*Diptera* (larva)	1	0.002	0.398	198.944
PSM 006602	2	*Diptera* (larva)	15	0.001	0.199	2,984.155
N: 6369095		*Gastropoda*	1	0.061	12.134	198.944
O: 1549372	3	*Diptera* (larva)	3	0.003	0.597	596.831
		Gastropoda	1	0.044	8.753	198.944
	4	*Diptera* (larva)	5	0.002	0.398	994.718
		Amphipoda	1	0.002	0.398	198.944
		Isopoda	1	0.002	0.398	198.944
	5	*Diptera* (larva)	1	0.001	0.199	198.944
		Anisoptera (larva)	1	0.03	5.968	198.944
		Gastropoda	1	0.003	0.597	198.944

Appendix IIIa

Raw data for calculations of mobile epifauna

Area/coordinates	Group	Number	Dry weight (g)	Biomass (g/m²)	Abundance (Nr ind/m²)
Beseglo	*Heteroptera*	1	0.007	0.01	2.04
PSM 006598	*Anisoptera* (larva)	1	0.037	0.08	2.04
N: 6368002	*Gastropoda*	37	0.702	1.43	75.51
O: 1550838					
Area/coordinates	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m²)**	**Abundance (Nr ind/m²)**
Äspöholmen	*Teleostei* (fry)	698	0.158	0.322	1,424.490
PSM 006599	*Anisoptera* (larva)	26	0.261	0.533	53.061
6368206	*Diptera* (larva)	15	0.002	0.004	30.612
1551763	*Mysidacea*	137	0.276	0.563	279.592
	Ephemeroptera (larva)	1	0.001	0.002	2.041
	Araneae	3	0.008	0.016	6.122
	Gastropoda	15	0.754	1.539	30.612
	Zygoptera (larva)	13	0.006	0.012	26.531
	Isopoda	26	0.019	0.039	53.061
	Heteroptera	1	0.001	0.002	2.041
Area/coordinates	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m²)**	**Abundance (Nr ind/m²)**
Gloet	*Araneae*	3	0.027	0.055	6.122
PSM 006600	*Anisoptera* (larva)	14	0.134	0.273	28.571
N: 6366933	*Gastropoda*	4	0.526	1.073	8.163
O: 1552039	*Isopoda*	79	0.062	0.127	161.224
	Zygoptera (larva)	2	0.002	0.004	4.082
	Heteroptera	8	0.002	0.004	16.327
	Ephemeroptera (larva)	1	0.001	0.002	2.041
	Diptera (larva)	1	0.001	0.002	2.041
	Oligochaeta	1	0.001	0.002	2.041
Area/coordinates	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m²)**	**Abundance (Nr ind/m²)**
Jungfruhålet	*Anisoptera* (larva)	2	0.033	0.067	4.082
PSM 006601	*Zygoptera* (larva)	5	0.016	0.033	10.204
N: 6367924	*Heteroptera*	8	0.021	0.043	16.327
O: 1552700	*Gastropoda*	5	0.223	0.455	10.204
	Araneae	2	0.034	0.069	4.082
	Diptera (larva)	4	0.003	0.006	8.163
	Isopoda	16	0.009	0.018	32.653

Appendix IIIb

Raw data for calculations of mobile epifauna

Area/coordinates	Group	Number	Dry weight (g)	Biomass (g/m^2)	Abundance (Nr ind/m^2)
Kärrsvik	*Isopoda*	83	0.05	0.102	169.388
PSM 006602	*Zygoptera* (larva)	6	0.008	0.016	12.245
N: 6369095	*Heteroptera*	8	0.007	0.014	16.327
O: 1549372	*Araneae*	3	0.002	0.004	6.122
	Diptera (larva)	3	0.001	0.002	6.122
Area/coordinates	**Group**	**Number**	**Dry weight (g)**	**Biomass (g/m^2)**	**Abundance (Nr ind/m^2)**
Länsmansudden	*Anisoptera* (larva)	4	0.309	0.631	8.163
PSM 006603	*Zygoptera* (larva)	7	0.019	0.039	14.286
N: 6367421	*Gastropoda*	6	0.191	0.390	12.245
O: 1551424	*Diptera* (larva)	1	0.001	0.002	2.041
	Araneae	1	0.017	0.035	2.041
	Isopoda	13	0.01	0.020	26.531

Appendix IV

Photos of the reed sampling sites in Oskarshamn

Beseglo PSM 006598

Äspöholmen PSM 006599

Gloet PSM 006600

Jungfruhålet PSM 006601

Kärrsvik PSM 006602

Länsmansudde PSM 006603