

Base line monitoring for salmon farming site in Eyrarhlíð, Dyrafjörður

Worked for Arctic Sea Farm

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July 2019
NV nr. 13-19

 NÁTTÚRUSTOFA VESTFJARÐA		Date month/year: July 2019	
		Distribution: <input type="checkbox"/> Open <input type="checkbox"/> Close until: <input checked="" type="checkbox"/> With permission of the client	
Report nr: NV nr. 13-19	Work number: 516		
Title: Base line monitoring for salmon farming site in Eyrarhlíð, Dýrafjörður		Number pages: 19	
		Number of figures: 4	Number of tables: 8
Author: Cristian Gallo		Number appendixes: 2	
Sampling date: 5.6.2018		Client's contact: Steinunn Guðný Einarsdóttir	
Site: Eyrarhlíð (Dýrafjörður)		Worked for: Arctic Sea Farm hf. Dýrafirði Sveitarfélaginu Ísafirði Lögheimili Suðurgötu 12, Ísafirði Kt.: 700807-0450	
Operative licence: 2.000 ton			
Abstract: Base line monitoring was conducted at mariculture site in Eyrarhlíð according to ISO12878 standard. Sea bottom was found muddy with high similarity in animal community between stations. Animal community found at Eyrarhlíð was predominantly made of common species found in fjord ecosystems in the Westfjords. Polychaetes were the predominant species with <i>Levinsenia gracilis</i> most abundant and good presence of species from the Maldanidae family (<i>Euchone sp.</i> and <i>Galathowenia oculata</i>). Shannon-Wiener diversity index (loge) resulted under 3 for all stations. AMBI classified the site as slightly disturbed. Considering farming was never done in proximity to this site we assume other natural conditions affect the diversity in this area. Visual and chemical parameters did not show any signs of organic impact. Redox potential was positive at all stations.			
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INTRODUCTION

Base line monitoring was conducted at mariculture site known as Eyrarhlíð located in Dýrafjörður (Iceland). Monitoring was done in accordance with ISO 12878 standard and the monitoring plan for all aquaculture sites managed by Artic Sea Farm in Dýrafjörður (Cristian Gallo and Margrét Thorsteinsson 2017).

This farming site comprises 12 cages (50 m diameter) set down in a double row in the direction north south. Salmon will be stocked in the next months, summer 2018. Site has an operative licence for production of 2.000 ton of salmon (Umhverfisstofnun 2017).

This survey intended to investigate sediment parameters and bottom animal community before farming start in order to have some base line values which could eventually be compared in order to evaluate the environmental impact of incoming production cycles. Sampling was carried out in accordance with ISO 12878 standard on 8 stations, with 2 replicates each station, on which visual, chemical and biological parameters were investigated.

Interpretation of results from the aquaculture survey needs to take into consideration several traits of the macrofauna community such as its composition, its diversity and the presence or absence of certain indicator species (Pearson & Rosenberg 1978, Rygg 2002, Dean 2008). Chemical parameters as pH, redox, TOC, TN and phosphor release demonstrated can be also used for assessing environmental impact from aquaculture (Hargrave et al. 2008, Bergheim and Åsgård 1996).

METHODOLOGY

Sampling stations

This survey was conducted the 5th of June 2018 in accordance with ISO 12878 standard. Sampling stations were located at varying distance from the cages in order to get a good picture of sea bottom in proximity to this mariculture site (Fig.1). At time of sampling only 4 cages were present but 8 more were going to be installed. A total of 8 stations were sampled with a purpose to have stations A and B located at the cage edges, one at each end of the long axis of the farm. Stations C, D and G were located at 100 m from the cages edge array, respectively: down to the middle of fjord, downstream and upstream. Stations E was intended to be located 200 m from the edge of the array of cages downstream with respect to the direction of the residual current at 15 m depth (Steinar Dalheim Eriksen and Thomas Heggem 2017). Stations F was in the middle of cages array. Station H at 1500m from the edge of the cages array, upstream, in a similar water depth and substratum type, will eventually serve as a reference station. GPS coordinates, depths and distances from cages array can be seen in Table 1.

Table 1. Position, depth and distance from the cages for sampled stations in Eyrarhlíð (Dýrafjörður).

Station	Gps coordinates <i>decimal minutes</i>	Depth (m)	Distance from cages array (m)
A	N65° 57.794' W23° 40.627'	41	0
B	N65° 55.015' W23° 40.107'	43	0
C	N65° 55.095' W23° 39.973'	44	100
D	N65° 54.863' W23° 40.020'	42	100
E	N65° 54.850' W23° 39.910'	42	200
F	N65° 54.904' W23° 40.384'	42	0
G	N65° 54.919' W23° 40.743'	42	100
H	N65° 55.195' W23° 42.582'	43	1500

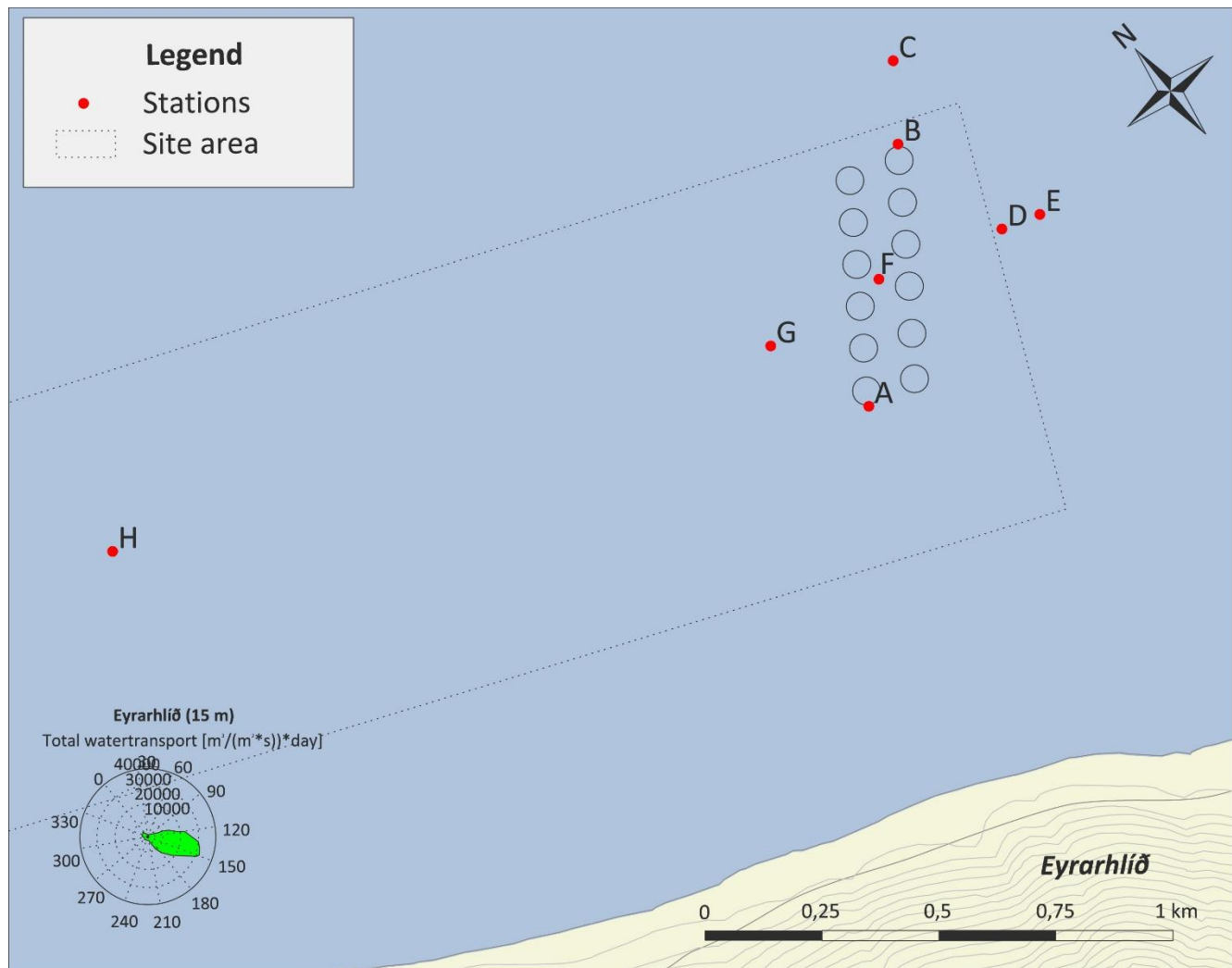


Figure 1. Map of Eyrarhlíð site with location of stations (red dots) sampled the 5th of June 2018. Stations A and B were located at cage edges. Stations C, D and G at 100 m from cages array. Stations E at 200 m from cages array. Stations F in the middle of cages array and H at 1500m from cages array. Residual current direction at 15 m depth (Steinar Dalheim Eriksen and Thomas Heggem 2017) in the lower left corner. Map: NAVE/Hulda Birna Albertsdóttir.

Sampling method

Sampling was conducted from a boat by using a Van Veen grab with 200 cm² of sampling area. Three samples were taken at all stations. Bottom samples were used for visual, chemical parameters and biological analysis. Sediments were described in colour, texture and smell. Redox potential and pH were measured on the upper 2 cm of grab content. Samples were treated according to ISO 16665 and ISO 56667-19 standard. Two samples were submerged with a fixative solution of formaldehyde (5-10%), an adequate amount of borax and individually marked. Samples were then sieved through a 500 µm (0,5 mm) sieve and the formaldehyde solution was substituted with an ethanol solution (70%) after 4-5 days. Third sample was taken, and part of the upper 2 cm sediment set into a plastic container and individually marked, these sample are kept in freezer at -18°C.

Animal samples were subsequently sieved through a 1 mm sieve so that two distinct animal samples were obtained out of each sample, one containing animals with body size between 0,5 and 1 mm and the other above 1mm. Animals were successively collected, counted and identified to the lowest feasible taxonomical level using a Leica MZ 12 stereoscope. Foraminifera, if present, were not collected.

Statistical and indices calculations

Univariate analysis and Bray-Curtis similarity test were performed using the Primer 6 program (Clarke & Warwick 1994). To avoid artificial inflation of diversity, juvenile and specimen un-identified down to species level were combined with higher taxonomical level. The Shannon-Wiener diversity index (H') and Evenness index (J') were calculated (Grey et. al 1992; Brage og Thélín 1993). AMBI benthic index was calculated using AMBI software version 5.0.

RESULTS

Visual and chemical parameters

Sediment colour was black/grey for all sampled stations. Texture was also similar between stations, mainly mud (< 250 μm) with very small amount in vegetative (algae fragments) and broken shell contents. No sulphur smell was detected in the samples. No presence of gas bubbles or mats of bacteria were visible (Table 2).

Table 2. Visual parameters (colour, smell, texture and presence of bubbles or bacterial mats bacteria) of sediment for each sampled station in Eyrarhlid (Dýrafjörður).

Station	Colour	Smell	Bubbles or mats	Texture
A	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
B	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
C	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
D	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
E	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
F	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
G	Black/grey	No	No	Mud. Less than 5% shell and algae fragments
H	Black/grey	No	No	Mud. Less than 5% shell and algae fragments

Sediments temperature, measured in the first 2 cm, was around 4,5 °C for all samples collected. Redox potential (Eh) was re-calculated according with value given by probe producer based on used filling solution. All values were higher than zero or between 56 and 234 mV. pH was slightly acidic with values ranging from 6,5 to 6, 8 (Table 3).

Table 3. Chemical parameters. Redox potential (mV), pH and temperature as average of 2 sample. All parameters were measured on top 2 cm of sampled sediment.

Station	Temp. (°C)	Redox Eh (mV)	pH
A	4,4	234	6,8
B	4,5	218	6,6
C	4,5	106	6,7
D	4,5	207	6,6
E	5	135	6,6
F	4,5	140	6,7
G	4,5	56	6,6
H	4,5	172	6,5

Benthic community

List of taxa (species, families or phylum) for each station for all animals with body size over 0,5 mm and for animals with body size over 1 mm can be seen in Table 5 and 6 in Appendix 1. Result are based on average of two samples and adapted to 1 m². Same species is expressed separately between juvenile and non-juvenile individual according with experience of the taxonomist.

Based on these findings the Pielou's evenness index (J'), the Shannon- Wiener diversity index (H') and the AMBI benthic index were calculated. Table 7 and 8 in Appendix 2 were used for statistical computations in the univariate analysis. Results of those indices can be seen in Table 4, respectively for 0,5 mm and 1 mm mesh size sieving, together with number of taxa and abundances.

Table 4. Number of taxa (S), abundance (N), evenness index (J'), Shannon-Wiener index (H' loge) and AMBI index for sampled stations taken at base line monitoring at Eyrarhlíð according to sieve size 0,5 mm and 1mm.

Stations	0,5 mm					1mm				
	S	N	J'	H' (loge)	AMBI	S	N	J'	H' (loge)	AMBI
A	34	10325	0,75	2,66	2,6	31	8475	0,77	2,63	2,5
B	23	7850	0,83	2,59	2,9	22	6100	0,83	2,57	2,8
C	26	7250	0,79	2,56	2,9	25	5675	0,77	2,49	2,8
D	33	8450	0,82	2,86	2,9	32	7250	0,83	2,88	2,8
E	36	9150	0,79	2,82	2,7	33	7375	0,80	2,81	2,6
F	29	8950	0,83	2,81	2,9	26	7300	0,87	2,83	2,8
G	30	8475	0,76	2,60	2,9	29	7900	0,77	2,60	2,8
H	32	7100	0,75	2,59	2,9	29	5350	0,80	2,71	2,7

Number of taxa ranges from 26 to 36 for 0,5 mm sieve and from 22 to 33 for 1 mm sieve size. Abundances are very similar between stations and the J' index ranged between 0,75 and 0,83, pointing out similar proportion between species in the samples, with very little difference between sieve sizes. H' (log e) ranged from 2,56 to 2,82 for 0,5 mm and from 2,49 to 2,88 for 1mm sieve. AMBI index was around 2,8 for 0,5 mm and bit lower for the 1 mm sieve size.

The animal community at Eyrarhlíð comprises two main groups Annelida Polychaeta and Gastropoda Bivalvia with polychaetes as predominant group (Figure 2). The most abundant species, looking at all animal found (body size over 0,5 mm) was a polychaeta worm *Levinsenia gracilis* which was most abundant in all stations apart for station A. In this station another polychaeta *Microphthalmus aberrans* was the predominant specie. Other common worm species were *Cossura longocirrata*, *Spio sp.*, *Sternaspis scutata*, *Chaetozone setosa*, *Euchone sp.*, *Galathowenia oculata* and *Polydora sp.*. Between bivalves, main species were *Ennucula tenuis* (predominant), *Thyasira flexuosa*, *Abra nitida*, *Nuculana pernula* and *minuta*. Nematoda was the 3th most common group and Arthropoda were not common.

Predominant species were the same between the two sieve sizes. Results from 1 mm sieve size point out a decrease in abundances for certain species more than others. Worth mentioning is the polychaeta *Cossura longocirrata* which decreased the total abundance from 6500 to 2550 individuals (60%) by changing sieve size. For other species reductions are smaller, for example *Spio sp.* (24%) and *Levinsenia gracilis* (20%).

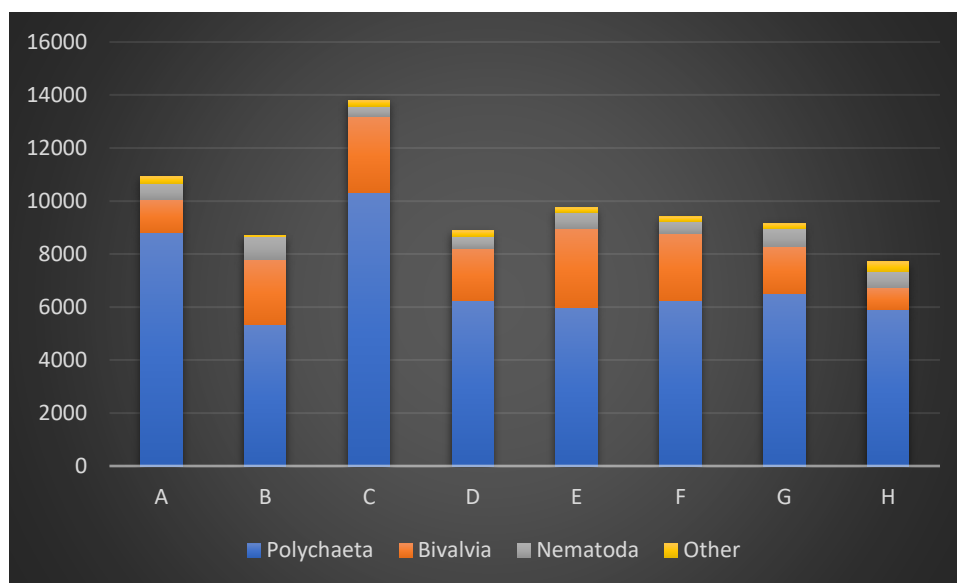


Figure 2. Major invertebrate taxa at Eyrarhlíð mariculture site (base line survey 2018, 0,5 mm sieve).

Similarity between stations

Bray-Curtis test was conducted to assess similarities between stations in this survey. Table 7 in Appendix 2 were used for the similarity test. Similarity test (group average) show very high similarity between all stations (around 75%) with station A a bit dissimilar from the rest or around 65% similar (fig. 3). Similarity test (single linkage), which consider only presence of species rather their abundances, slightly increase stations similarities with main group around 80% and A around 70% similarity (fig. 4).

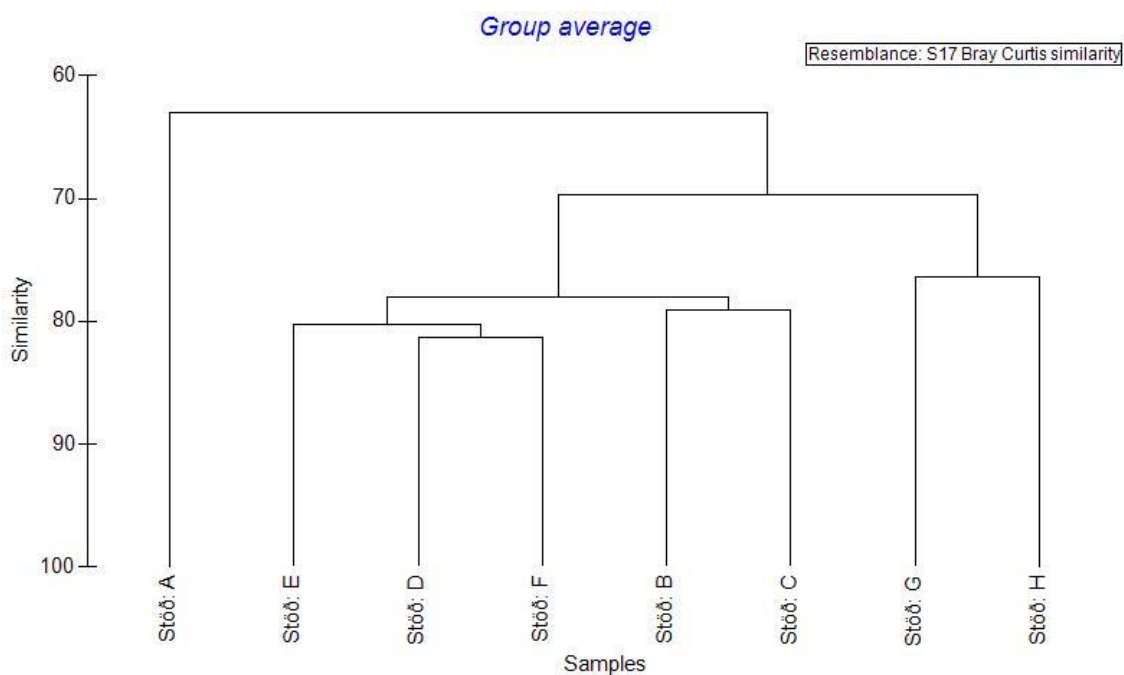


Figure 3. Bray-Curtis similarity test between stations in this survey (group average).

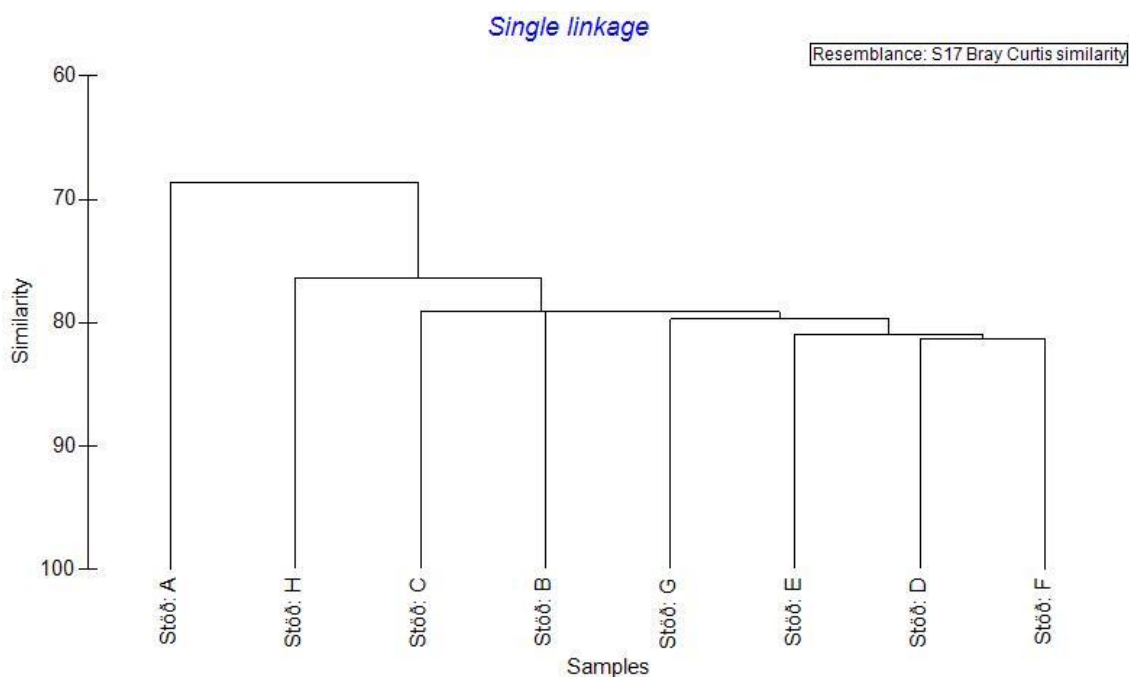


Figure 4. Bray-Curtis similarity test between stations in this survey (single linkage).

CONCLUSIONS

This survey was conducted to assess the base line status of the sediments under the mariculture site in Eyrarhlíð. Sea bottom was found muddy with high similarity in animal community between stations. Animal community found at Eyrarhlíð was predominantly made of common species found in fjord ecosystems in the Westfjords area. Polychaetes were the predominant group with *Levinsenia gracilis* most abundant and good presence of species from the Maldanidae family, for example *Euchone sp.* and *Galathowenia oculata*. Shannon-Wiener diversity index resulted not particularly high (under 3 for all stations). AMBI classified the site as slightly disturbed. Considering farming was never done in proximity to this site we assume other natural conditions affect the diversity in this area. Visual and chemical parameters did not show any signs of organic impact. Redox potential was positive at all stations.

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APPENDIX 1

Table 5. Species list of benthic community per station sampled in Eyrarhlíð aquaculture site the 5 June 2018 after sieving with 0,5mm mesh size sieve. All values (individuals/ m²) represent the average of two samples adapted to 1 m².

Taxa 0,5 mm	Stations							
	A	B	C	D	E	F	G	H
Annelida Polychaeta								
<i>Ampharete sp.</i>	0	0	0	0	50	50	25	0
Ampharetidae	50	100	0	0	100	0	75	50
<i>Apistobranchnus tullbergi</i>	0	0	0	0	0	0	0	75
<i>Capitella capitata</i>	75	0	0	0	0	0	0	0
<i>Chaetozone setosa</i>	500	425	350	475	325	500	325	325
<i>Cossura longocirrata</i>	775	500	575	800	700	1075	950	1125
<i>Eteone longa</i>	0	75	100	100	0	200	0	25
<i>Eteone sp.</i>	0	0	0	0	50	0	0	0
<i>Euchone papillosa</i>	25	25	50	50	200	50	150	0
<i>Euchone sp.</i>	125	300	150	350	275	100	325	100
<i>Flabelligera affinis</i>	25	0	0	0	25	0	0	0
<i>Galathowenia oculata</i>	350	75	125	225	275	150	200	250
<i>Harmothoe imbricata</i>	0	0	0	0	25	0	0	0
<i>Lagis koreni</i>	0	0	0	0	25	0	0	0
<i>Laphania boeckii</i>	0	0	0	50	0	0	0	0
<i>Levinsenia gracilis</i>	1525	1075	1175	1300	1525	1150	1925	1650
<i>Maldane sarsi</i>	100	0	25	50	25	200	50	25
<i>Mediomastus fragilis</i>	50	0	0	0	0	0	0	0
<i>Mediomastus/ Heteromastus sp.</i>	50	100	0	100	50	50	75	0
<i>Microphthalmus aberrans</i>	2475	75	100	75	50	0	50	0
<i>Nephtys sp.</i>	125	50	75	25	100	75	0	25
<i>Owenia fusiformis</i>	125	0	25	75	0	0	0	250
<i>Parougia nigridentata</i>	25	25	0	175	50	100	150	0
<i>Pholoe sp.</i>	0	0	0	0	50	0	25	0
<i>Polydora spp.</i>	250	350	175	200	350	200	50	75
<i>Praxillella gracilis</i>	0	200	0	125	125	50	75	100
<i>Praxillella sp.</i>	175	0	75	25	25	175	200	100
<i>Prionospio sp.</i>	0	0	50	0	50	0	0	25
<i>Prionospio steenstrupi</i>	0	0	25	50	50	100	50	0
<i>Proclymene muelleri</i>	50	0	50	0	0	0	0	0
<i>Rhodine sp.</i>	50	0	0	0	0	0	0	0
<i>Sabellides borealis</i>	75	25	50	100	0	125	50	0
<i>Scalibregma inflatum</i>	50	0	0	0	0	0	25	0
<i>Scoloplos armiger</i>	150	0	25	75	100	0	50	125
<i>Spio gonioccephala</i>	0	50	25	25	50	25	0	50
<i>Spio sp.</i>	1375	875	700	1100	750	875	1250	1100
<i>Sternaspis scutata/islandica</i>	100	1025	275	475	450	725	375	325
Syllidae	0	0	0	100	100	75	50	50
<i>Terebellides bigeniculatus cf</i>	50	0	0	0	0	0	0	0
<i>Terebellides stroemii</i>	100	0	0	125	50	200	25	50

Table continues in the next page...

Taxa 0,5 mm	Stations							
	A	B	C	D	E	F	G	H
Mollusca Bivalvia								
<i>Abra nitida</i>	200	200	175	150	275	300	300	25
<i>Astarte sp.</i>	25	0	0	0	0	0	0	0
<i>Bivalvia juv.</i>	0	0	100	25	50	75	0	25
<i>Cardium sp.</i>	0	50	0	0	0	0	0	0
<i>Crenella sp.</i>	0	0	0	0	0	0	50	0
<i>Ennucula tenuis</i>	675	900	1075	875	1450	1075	1050	500
<i>Macoma calcarea</i>	0	50	0	50	25	0	0	25
<i>Musculus niger</i>	0	0	0	0	0	0	0	50
<i>Nuculana pernula</i>	50	150	75	150	75	75	0	50
<i>Nuculana minuta</i>	0	0	0	25	150	100	100	0
<i>Thyasira flexuosa</i>	100	0	1300	300	950	275	250	125
<i>Thyasira sp.</i>	175	1100	150	400	0	625	0	0
<i>Yoldia hyperborea</i>	0	0	0	0	0	0	0	25
Arthropoda Crustacea								
<i>Ampelisca sp.</i>	0	0	0	25	0	0	0	0
Amphipoda juv.	0	0	75	0	0	25	50	0
Lysianassidae	0	0	0	0	0	0	0	50
Oedicerodidae	50	0	0	0	0	0	0	0
Arthropoda Cumacea								
<i>Diastylis sp.</i>	25	0	0	0	50	0	0	75
<i>Eudorella sp.</i>	25	0	0	25	25	0	50	25
<i>Leucon nasicooides</i>	150	50	75	150	25	50	75	150
<i>Leucon sp.</i>	0	0	0	0	50	50	0	25
Copepoda	25	0	0	0	0	25	0	0
Ostracoda	0	0	50	0	0	0	0	0
Nemertea	0	0	0	25	25	0	25	50
Sipunculidae	0	0	25	0	0	25	0	0
Nematoda	600	850	375	425	600	450	675	600

Table 6. Species list of benthic community per station sampled in Eyrarhlíð aquaculture site the 5 June 2018 after sieving with 1mm mesh size sieve. All values (individuals/ m²) represent the average of two samples adapted to 1 m².

Taxa 1mm	Stations							
	A	B	C	D	E	F	G	H
Annelida Polychaeta								
<i>Ampharete sp.</i>	0	0	0	0	50	50	25	0
Ampharetidae	25	100	0	0	100	0	75	50
<i>Apistobranchnus tullbergi</i>	0	0	0	0	0	0	0	75
<i>Capitella capitata</i>	75	0	0	0	0	0	0	0
<i>Chaetozone setosa</i>	400	225	300	425	275	425	275	275
<i>Cossura longocirrata</i>	275	150	100	375	225	325	750	350
<i>Eteone longa</i>	0	75	100	75	0	200	0	0
<i>Eteone sp.</i>	0	0	0	0	50	0	0	0
<i>Euchone papillosa</i>	25	25	50	50	200	50	150	0
<i>Euchone sp.</i>	125	150	75	300	250	50	300	50
<i>Flabelligera affinis</i>	25	0	0	0	25	0	0	0
<i>Galathowenia oculata</i>	325	75	125	225	275	150	200	250
<i>Harmothoe imbricata</i>	0	0	0	0	25	0	0	0
<i>Lagis koreni</i>	0	0	0	0	25	0	0	0
<i>Laphania boeckii</i>	0	0	0	50	0	0	0	0
<i>Levinsenia gracilis</i>	1250	650	1100	1100	1150	900	1825	1100
<i>Maldane sarsi</i>	100	0	25	50	25	200	50	25
<i>Mediomastus fragilis</i>	50	0	0	0	0	0	0	0
<i>Mediomastus/ Heteromastus sp.</i>	25	100	0	100	50	50	50	0
<i>Microphthalmus aberrans</i>	2275	50	50	25	0	0	50	0
<i>Nephtys sp.</i>	125	50	75	25	100	75	0	25
<i>Owenia fusiformis</i>	125	0	25	75	0	0	0	250
<i>Parougia nigridentata</i>	25	0	0	100	0	75	125	0
<i>Pholoe sp.</i>	0	0	0	0	50	0	25	0
<i>Polydora spp.</i>	250	350	175	200	300	200	50	75
<i>Praxillella gracilis</i>	0	200	0	125	125	50	75	100
<i>Praxillella sp.</i>	175	0	75	25	25	175	200	100
<i>Prionospio sp.</i>	0	0	50	0	50	0	0	25
<i>Prionospio steenstrupi</i>	0	0	25	50	50	100	50	0
<i>Proclymene muelleri</i>	50	0	50	0	0	0	0	0
<i>Rhodine sp.</i>	50	0	0	0	0	0	0	0
<i>Sabellides borealis</i>	75	25	50	100	0	125	50	0
<i>Scoloplos armiger</i>	125	0	25	75	100	0	50	125
<i>Spio gonocephala</i>	0	50	25	25	50	25	0	50
<i>Spio sp.</i>	1125	500	400	875	550	725	1150	900
<i>Sternaspis scutata/islandica</i>	100	1000	275	475	400	700	375	325
Syllidae	0	0	0	75	50	75	50	0
<i>Terebellides bigeniculatus cf</i>	50	0	0	0	0	0	0	0
<i>Terebellides stroemii</i>	100	0	0	125	50	200	25	50

Table continues in the next page...

Taxa 1mm	Stations							
	A	B	C	D	E	F	G	H
Mollusca Bivalvia								
<i>Abra nitida</i>	200	200	175	150	275	300	300	25
<i>Bivalvia</i> juv.	0	0	0	0	50	0	0	0
<i>Cardium</i> sp.	0	50	0	0	0	0	0	0
<i>Crenella</i> sp.	0	0	0	0	0	0	50	0
<i>Ennucula tenuis</i>	450	800	825	825	1175	900	1025	475
<i>Macoma calcarea</i>	0	50	0	50	25	0	0	25
<i>Musculus niger</i>	0	0	0	0	0	0	0	50
<i>Nuculana pernula</i>	50	150	75	150	75	75	0	50
<i>Nuculana minuta</i>	0	0	0	25	100	100	100	0
<i>Thyasira flexuosa</i>	100	0	1300	300	950	275	250	125
<i>Thyasira</i> sp.	75	1025	0	400	0	600	0	0
<i>Yoldia hyperborea</i>	0	0	0	0	0	0	0	25
Arthropoda Crustacea								
<i>Ampelisca</i> sp.	0	0	0	25	0	0	0	0
Amphipoda juv.	0	0	25	0	0	0	50	0
Lysianassidae	0	0	0	0	0	0	0	50
Oedicerodidae	50	0	0	0	0	0	0	0
Arthropoda Cumacea								
<i>Diastylis</i> sp.	25	0	0	0	50	0	0	75
<i>Eudorella</i> sp.	0	0	0	25	25	0	50	25
<i>Leucon nasicooides</i>	150	50	75	150	25	50	75	150
<i>Leucon</i> sp.	0	0	0	0	0	50	0	25
Copepoda	25	0	0	0	0	0	0	0
Nemertea	0	0	0	25	0	0	25	50
Sipunculidae	0	0	25	0	0	25	0	0
Nematoda	200	300	75	250	300	125	575	100

APPENDIX 2.

Table 7. Abundance (individuals/m²), in alphabetical order, for benthic community (0,5 mm mesh size sieve) for Eyrarhlíð mariculture site, used for indices calculations and similarity test between stations.

Taxa 0,5mm	Stations							
	A	B	C	D	E	F	G	H
<i>Abra nitida</i>	200	200	175	150	275	300	300	25
<i>Ampelisca sp.</i>	0	0	0	25	0	0	0	0
<i>Ampharete sp.</i>	50	100	0	0	100	50	50	50
Amphipoda juv.	0	0	75	0	0	25	50	0
<i>Apistobranchus tullbergi</i>	0	0	0	0	0	0	0	75
<i>Astarte sp.</i>	25	0	0	0	0	0	0	0
Bivalvia juv.	0	0	100	25	50	75	0	25
<i>Capitella capitata</i>	75	0	0	0	0	0	0	0
<i>Cardium sp.</i>	0	50	0	0	0	0	0	0
<i>Chaetozone setosa</i>	500	425	350	475	325	500	325	325
Copepoda	25	0	0	0	0	25	0	0
<i>Cossura longocirrata</i>	775	500	575	800	700	1075	950	1125
<i>Crenella sp.</i>	0	0	0	0	0	0	50	0
<i>Diastylis sp.</i>	25	0	0	0	50	0	0	75
<i>Ennucula tenuis</i>	675	900	1075	875	1450	1075	1050	500
<i>Eteone longa</i>	0	75	100	100	50	200	0	25
<i>Euchone sp.</i>	150	325	200	400	475	150	475	100
<i>Eudorella sp.</i>	25	0	0	25	25	0	50	25
<i>Flabelligera affinis</i>	25	0	0	0	25	0	0	0
<i>Galathowenia oculata</i>	350	75	125	225	275	150	200	250
<i>Harmothoe imbricata</i>	0	0	0	0	25	0	0	0
<i>Lagis koreni</i>	0	0	0	0	25	0	0	0
<i>Laphania boeckii</i>	0	0	0	50	0	0	0	0
<i>Leucon nasicooides</i>	150	50	75	150	75	100	75	175
<i>Levinsenia gracilis</i>	1525	1075	1175	1300	1525	1150	1925	1650
Lysianassidae	0	0	0	0	0	0	0	50
<i>Macoma calcarea</i>	0	50	0	50	25	0	0	25
<i>Maldane sarsi</i>	100	0	25	50	25	200	50	25
<i>Mediomastus fragilis</i>	100	100	0	100	50	50	75	0
<i>Microphthalmus aberrans</i>	2475	75	100	75	50	0	50	0
<i>Musculus niger</i>	0	0	0	0	0	0	0	50
Nemertea	0	0	0	25	25	0	25	50
<i>Nephtys sp.</i>	125	50	75	25	100	75	0	25
<i>Nuculana pernula</i>	50	150	75	150	75	75	0	50
<i>Nuculana minuta</i>	0	0	0	25	150	100	100	0
Oedicerodidae	50	0	0	0	0	0	0	0
<i>Owenia fusiformis</i>	125	0	25	75	0	0	0	250
<i>Parougia nigridentata</i>	25	25	0	175	50	100	150	0
<i>Pholoe sp.</i>	0	0	0	0	50	0	25	0
<i>Polydora spp.</i>	250	350	175	200	350	200	50	75
<i>Praxillella sp.</i>	175	200	75	150	150	225	275	200

Table continues in the next page...

Taxa 0,5mm	Stations							
	A	B	C	D	E	F	G	H
<i>Prionospio sp.</i>	0	0	75	50	100	100	50	25
<i>Proclymene muelleri</i>	50	0	50	0	0	0	0	0
<i>Rhodine sp.</i>	50	0	0	0	0	0	0	0
<i>Sabellides borealis</i>	75	25	50	100	50	125	100	0
<i>Scalibregma inflatum</i>	50	0	0	0	0	0	25	0
<i>Scoloplos armiger</i>	150	0	25	75	100	0	50	125
Sipunculidae	0	0	25	0	0	25	0	0
<i>Spio sp.</i>	1375	925	725	1125	800	900	1250	1150
<i>Sternaspis scutata/islandica</i>	100	1025	275	475	450	725	375	325
Syllidae	0	0	0	100	100	75	50	50
<i>Terebellides stroemii</i>	150	0	0	125	50	200	25	50
<i>Thyasira flexuosa</i>	275	1100	1450	700	950	900	250	125
<i>Yoldia hyperborea</i>	0	0	0	0	0	0	0	25

Table 8. Abundance (individuals/m²), in alphabetical order, for benthic community (1 mm mesh size sieve) for Eyrarhlíð mariculture site, used for indices calculations and similarity test between stations.

Taxa 1mm	Stations							
	A	B	C	D	E	F	G	H
<i>Abra nitida</i>	200	200	175	150	275	300	300	25
<i>Ampelisca sp.</i>	0	0	0	25	0	0	0	0
<i>Ampharete sp.</i>	25	100	0	0	100	50	50	50
Amphipoda juv.	0	0	25	0	0	0	50	0
<i>Apistobranthus tullbergi</i>	0	0	0	0	0	0	0	75
Bivalvia juv.	0	0	0	0	50	0	0	0
<i>Capitella capitata</i>	75	0	0	0	0	0	0	0
<i>Cardium sp.</i>	0	50	0	0	0	0	0	0
<i>Chaetozone setosa</i>	400	225	300	425	275	425	275	275
Copepoda	25	0	0	0	0	0	0	0
<i>Cossura longocirrata</i>	275	150	100	375	225	325	750	350
<i>Crenella sp.</i>	0	0	0	0	0	0	50	0
<i>Diastylis sp.</i>	25	0	0	0	50	0	0	75
<i>Ennucula tenuis</i>	450	800	825	825	1175	900	1025	475
<i>Eteone longa</i>	0	75	100	75	50	200	0	0
<i>Euchone sp.</i>	150	175	125	350	450	100	450	50
<i>Eudorella sp.</i>	0	0	0	25	25	0	50	25
<i>Flabelligera affinis</i>	25	0	0	0	25	0	0	0
<i>Galathowenia oculata</i>	325	75	125	225	275	150	200	250
<i>Harmothoe imbricata</i>	0	0	0	0	25	0	0	0
<i>Lagis koreni</i>	0	0	0	0	25	0	0	0
<i>Laphania boeckii</i>	0	0	0	50	0	0	0	0
<i>Leucon nasicooides</i>	150	50	75	150	25	100	75	175
<i>Levinsenia gracilis</i>	1250	650	1100	1100	1150	900	1825	1100
Lysianassidae	0	0	0	0	0	0	0	50
<i>Macoma calcarea</i>	0	50	0	50	25	0	0	25
<i>Maldane sarsi</i>	100	0	25	50	25	200	50	25
<i>Mediomastus fragilis</i>	75	100	0	100	50	50	50	0
<i>Microphthalmus aberrans</i>	2275	50	50	25	0	0	50	0
<i>Musculus niger</i>	0	0	0	0	0	0	0	50
Nemertea	0	0	0	25	0	0	25	50
<i>Nephtys sp.</i>	125	50	75	25	100	75	0	25
<i>Nuculana pernula</i>	50	150	75	150	75	75	0	50
<i>Nuculana minuta</i>	0	0	0	25	100	100	100	0
Oedicerodidae	50	0	0	0	0	0	0	0
<i>Owenia fusiformis</i>	125	0	25	75	0	0	0	250
<i>Parougia nigridentata</i>	25	0	0	100	0	75	125	0
<i>Pholoe sp.</i>	0	0	0	0	50	0	25	0
<i>Polydora spp.</i>	250	350	175	200	300	200	50	75
<i>Praxillella sp.</i>	175	200	75	150	150	225	275	200

Table continues in the next page...

Taxa 1mm	Stations							
	A	B	C	D	E	F	G	H
<i>Prionospio sp.</i>	0	0	75	50	100	100	50	25
<i>Proclymene muelleri</i>	50	0	50	0	0	0	0	0
<i>Rhodine sp.</i>	50	0	0	0	0	0	0	0
<i>Sabellides borealis</i>	75	25	50	100	50	125	100	0
<i>Scoloplos armiger</i>	125	0	25	75	100	0	50	125
Sipunculidae	0	0	25	0	0	25	0	0
<i>Spio sp.</i>	1125	550	425	900	600	750	1150	950
<i>Sternaspis scutata/islandica</i>	100	1000	275	475	400	700	375	325
Syllidae	0	0	0	75	50	75	50	0
<i>Terebellides stroemii</i>	150	0	0	125	50	200	25	50
<i>Thyasira flexuosa</i>	175	1025	1300	700	950	875	250	125
<i>Yoldia hyperborea</i>	0	0	0	0	0	0	0	25