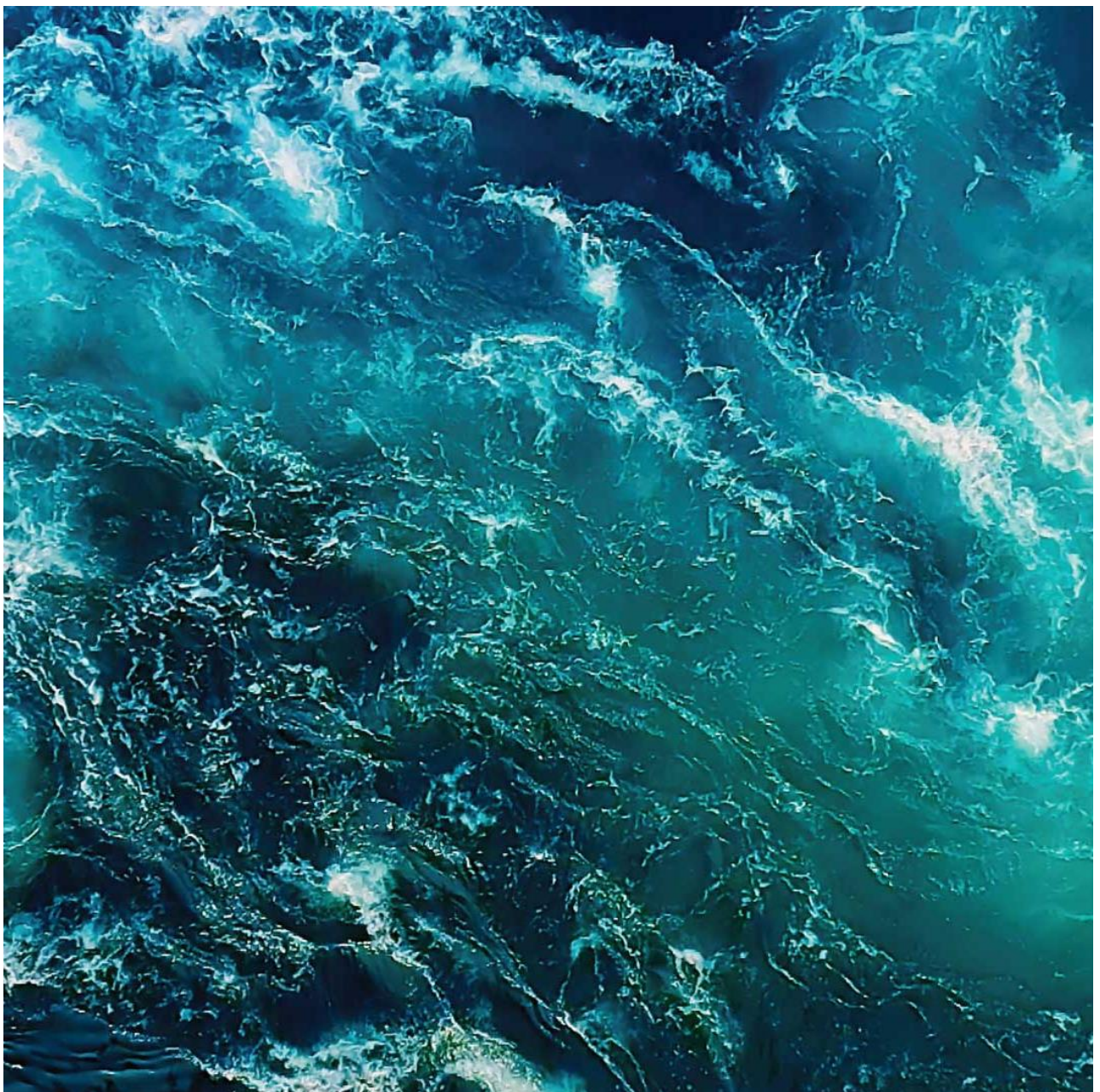


# C-survey at Eyrarhlíð 2, 2023

Arctic Sea Farm ehf

**Akvaplan-niva AS Report: 2023 65177.01**



# Arctic Sea Farm ehf. C-Survey at Eyrarhlíð 2, 2023.

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## Summary

The results from the monitoring at the farming site Eyrarhlíð 2 in August 2023 showed that the sediment was somewhat loaded with organic carbon and the copper level in the sediment at C1 was 41.1 mg/kg and is categorized into environmental limit II or "low values" (Reglugerð um varnir gegn mengun vatns nr. 796/1999). EMB concentration was below 50 ng/kg and thus below the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is fulfilling the "good status standard" according to the SEPA standard.

No load effect was recorded in the fauna and nEQR values were above 0.6 indicating relatively good faunal conditions at the stations. The diversity index  $H'$  varied from 3.63 to 4.01. The NS 9410:2016-assessment of the community in the local impact zone (C1) showed environmental condition 1 (Very good). No pollution indicators were recorded among the top-10 at any of the stations.

The redox measurements (pH/Eh) gave point 0 acc. Appendix D in NS 9410:2016 for all the sampling stations. The oxygen saturation in August was good in the whole water column with 72 % in the bottom water.

## Approval



Project leader

Quality control

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## Preface

Akvaplan-niva carried out a type C (NS 9410:2016) environmental survey at the Eyrarhlíð 2 site. It includes pH/redox measurements (Eh), hydrography, geochemical analyses, and analyses of the bottom fauna from six stations at the fish farming site. The following personnel contributed:

Snorri Gunnarsson	Akvaplan-niva	Field work, report, project leader.
Hans-Petter Mannvik	Akvaplan-niva	Identification of bottom fauna (Echinodermata). Report, professional assessments, and interpretations.
Kamila Szybor	Akvaplan-niva	QA report, professional assessments, and interpretations.
Roger Velvin	Akvaplan-niva	Identification of bottom fauna (Various taxa).
Rune Palerud	Akvaplan-niva	Identification of bottom fauna (Crustaceans). Statistics.
Jesper Hansen	Akvaplan-niva	Identification of bottom fauna (Mollusca).
Charlotte P. Ugelstad	Akvaplan-niva	Identification of bottom fauna (Polychaeta).
Vegard Holen	Akvaplan-niva	Hydrographical vertical profiles
Kristine H Sperre	Akvaplan-niva	Coordination of sorting of bottom fauna.
Ingar H. Wasbotten	Akvaplan-niva	Coordination of geo-chemical analyses.

Akvaplan-niva would like to thank Arctic Sea Farm ehf and Maria E. Chiarandini for good cooperation.

### Accreditation information:

The survey was carried out by Akvaplan-niva AS with ALS Laboratory Group (Czech Republic) as a sub-contractor.



Akvaplan-niva AS is accredited under NS-EN ISO/IEC 17025 by Norwegian Accreditation for field sampling of sediments and fauna, analyses of TOC, TOM, TN, particle size and macrofauna, and for professional evaluations and interpretations. Our Accreditation number is TEST 079.

Czech Accreditation  
Institute (Lab nr 1163)

ALS Laboratory Group is accredited by the Czech Accreditation  
Institute (Lab nr 1163) for copper analyses.

Non-accredited services: Hydrographical measurements and mapping of bottom topography (Olex).

Kodagu, 29.11 2023

Snorri Gunnarsson (Project Manager)

# 1 Data Summary

Client information			
Report title:	C-Survey at Eyrarhlíð 2, 2023.		
Report nr.	2023 65177.01	Site:	Eyrarhlíð 2
Municipality:	Ísafjarðabær	Map Coordinates (construction):	65°55,488 N 23°43,509 W
MTB permitted or estimated Biomass:	7.250	Operations manager:	Bernharður Guðmundsson
Client:	Arctic Sea Farm ehf		

Biomass/production status at time of survey (29.08.2023)			
Fish group:	A. salmon	Biomass on examination:	-
Feed input:	-	Produced amount of fish:	-
Type/time of survey			
Maximum biomass:		Follow up study:	
Fallow (resting period):	X	New location:	

Results from the C study /NS 9410 (2016) – Main results from soft bottom fauna			
Faunal index nEQR (Veileder 02:2018)		Diversity index H' (Shannon-Wiener)	
Fauna C1 (impact zone)	0.623	Fauna C1 (impact zone)	3.63
Fauna C2	0.693	Fauna C2	3.84
Fauna C3	0.701	Fauna C3	3.71
Fauna C4 (deep area)	0.707	Fauna C4 (deep area)	4.01
Fauna C5	0.695	Fauna C5	3.88
Fauna C6	0.701	Fauna C6	3.79
<b>Date fieldwork:</b>	29.08.2023	<b>Date of report:</b>	29.11.2023
<b>Notes to other results (sediment, pH/Eh, oxygen)</b>			nTOC from 24.9 to 29.1 mg/g. Copper 41.1 mg/kg at C1 Eh positive at all stations O <sub>2</sub> -conditions were good throughout the water column.
Responsible for field work:	Signature: SGU	Project manager Snorri Gunnarsson	Signature: SGU

## 2 Introduction

### 2.1 Background and aim of the study

On behalf of Arctic Sea Farm ehf, Akvaplan-niva completed a survey (type C) for a fish farming site at Eyrarhlíð 2 (Figure 1), with reference to Chapter 5.0 in NS 9410:2016 which follows the methodology for C- study. A survey (type C) is aimed at studying the environmental conditions of the bottom sediments along a transect sector from the fish farm that extends from the local, to the intermediate and to the regional impact zones. The main emphasis is on the study of the soft bottom fauna which is conducted according to standards ISO 5567-19:2004 and ISO 16665:2014. The obligatory parameters that are included in the survey are described in NS 9410:2016. Simultaneously the survey fulfils the requirements of the Icelandic authorities for bottom surveys according to ISO 12878 and the requirements for environmental bottom surveys (according to Vöktunaráætlun).

A classification or threshold values for this type of survey have not been developed by Icelandic officials so it is not possible to strictly apply the classification based on Norwegian threshold values to Icelandic conditions. We do however report the results with the same indexes with reference to Norwegian threshold values but it should be emphasized that some of these (such as NSI) are developed according to Norwegian conditions. For further descriptions of these indexes see details in Appendix 1 and Miljødirektoratets Veileder 02:2018.

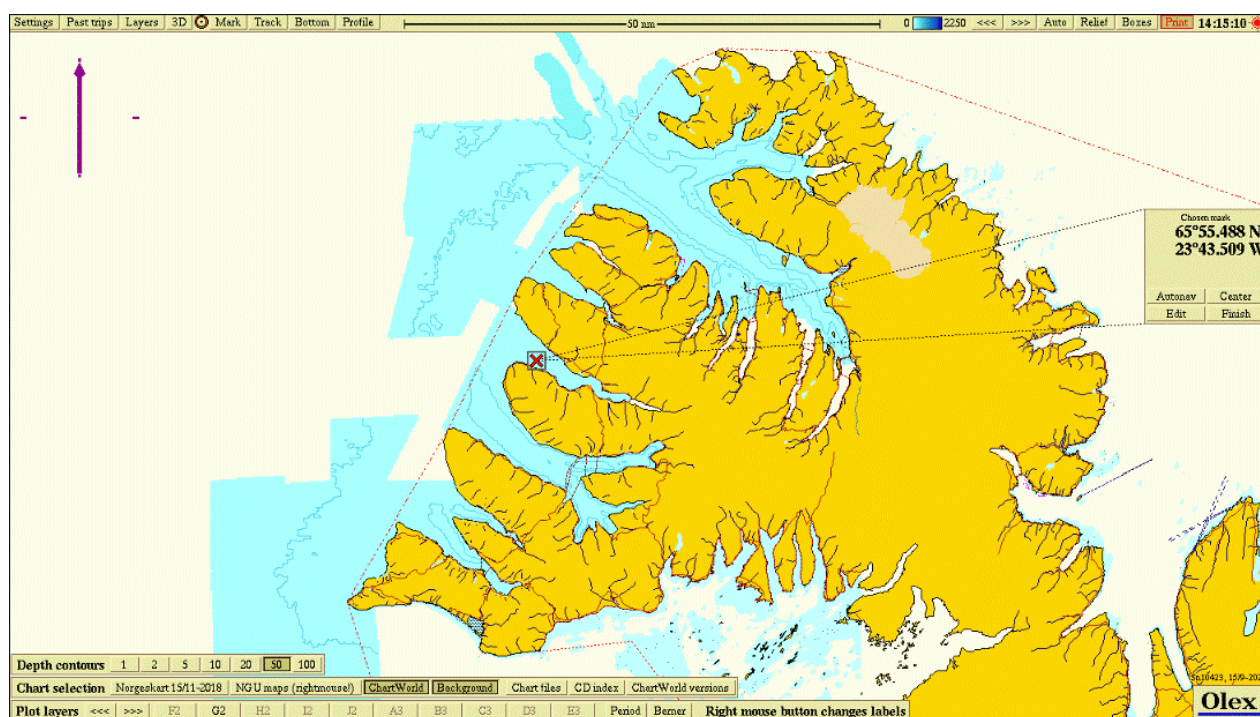


Figure 1 Overview of Dýrafjörður with the farming site Eyrarhlíð 2 (red cross). The map coordinates for the midpoint of the farming site are given to the right.

## 2.2 Site operation and feed use

The Eyrarhlíð 2 site is located in Dýrafjörður about 11 km from Þingeyri. The cages are lined in a north-western direction from land (289 degrees). The depth under cages ranges from about 36 - 44 m. The plant is a single frame mooring with a total of fourteen 160 metre circumference. During the last production cycle all fourteen cages were used.

Previously there has been farmed one generation salmon at the site. The site has been in fallow state for over 12 months (started 13<sup>th</sup> of August 2022) at the sampling of the site 29<sup>th</sup> of August 2023.

In Iceland, the MTB (maximum allowed biomass) limit is not given at a site level as in Norway. The MTB limit determines how much live fish the holder of the permit can have standing in the sea at any time. In Iceland the allowed production is regulated at two levels, site level and company level. For this site the estimated maximal standing biomass for the next generation is 7.250 tonnes, used as MTB here (Frederik Hansen Mosti, pers. reference).

## 2.3 Previous surveys

An overview of previous C-surveys carried out at Eyrarhlíð 2 is shown in Table 1.

Table 1: Previous C-surveys at Eyrarhlíð 2.

Survey date	Report reference (author, year)	Production (tonnes)
03.03.2022	Sztybor and Gunnarsson, 2022	5.389
15.04 2021	Sztybor and Gunnarsson, 2021	0



## 3 Materials and methods

### 3.1 Survey program

The choice of study parameters, placement of sampling stations and other criteria for the study is based on descriptions in NS 9410 (C-surveys). An overview of the planned professional program is given in Table 2.

Akvaplan-niva is accredited for field work, analyses of samples and for the professional evaluation of results in accordance with applicable standards and guidelines ("Veiledere"). For implementation and follow through, the following standards and quality assurance systems were used:

- ISO 5667-19:2004: *Guidance on sampling of marine sediments*.
- ISO 16665:2014. *Water quality – Guidelines for quantitative sampling and sample processing of marine soft-bottom macro fauna*.
- NS 9410:2016. *Miljøovervåking av bunnpåvirkning fra marine oppdrettsanlegg*.
- Internal procedures. *Quality Manual for Akvaplan-niva*.
- Veileder 02:2018 (rev. 2020). *Klassifisering av miljøtilstand i vann*. Norsk klassifiseringssystem for vann i henhold til Vannforskriften. Veileder fra Direktoratgruppen.

Table 2: Survey program for the C-survey at Eyrarhlíð 2, 2023. TOC = total organic carbon. GSA = grain size analysis sediment. TOM = total organic material. TN = total nitrogen. Cu = Copper. pH/Eh = acidity and redox potential.

Station	Type analyses/parameters
C1 (local impact zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. Cu. pH/Eh.
C2 (transition zone outer)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. pH/Eh.
C3 (transition zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. pH/Eh. Emamectinbenzoat.
C4 (transition zone, deep area)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. Hydrography/O <sub>2</sub> . pH/Eh.
C5 (transition zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. pH/Eh.
C6 (transition zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. pH/Eh.

Field work was completed on 29.08.2023.

### Placement of stations and local conditions

The number of stations was calculated with reference to the sites estimated maximal standing biomass for the first generation which is 7.250 tonnes (used as MTB here). According to the standard six sampling stations should be examined. Depth and position of the stations are given in Table 3 and shown in Figure 2. The stations were placed in the direction of the main oceanic current direction (E/SE) measured at 39 m depth (Gustavsson, 2019).

Table 3: Depth, distance between the nearest frame of the fish farm and sampling stations and coordinates for C-stations at Eyrarhlíð 2, 2023.

Station	Depth, m	Distance from frame, m	Position	
			N	W
C1	44	25	65°55.444	23°42.021
C2	43	500	65°55.276	23°42.546
C3	44	125	65°55.429	23°42.894
C4	44	200	65°55.410	23°42.805
C5	44	275	65°55.398	23°42.707
C6	44	350	65°55.378	23°42.620

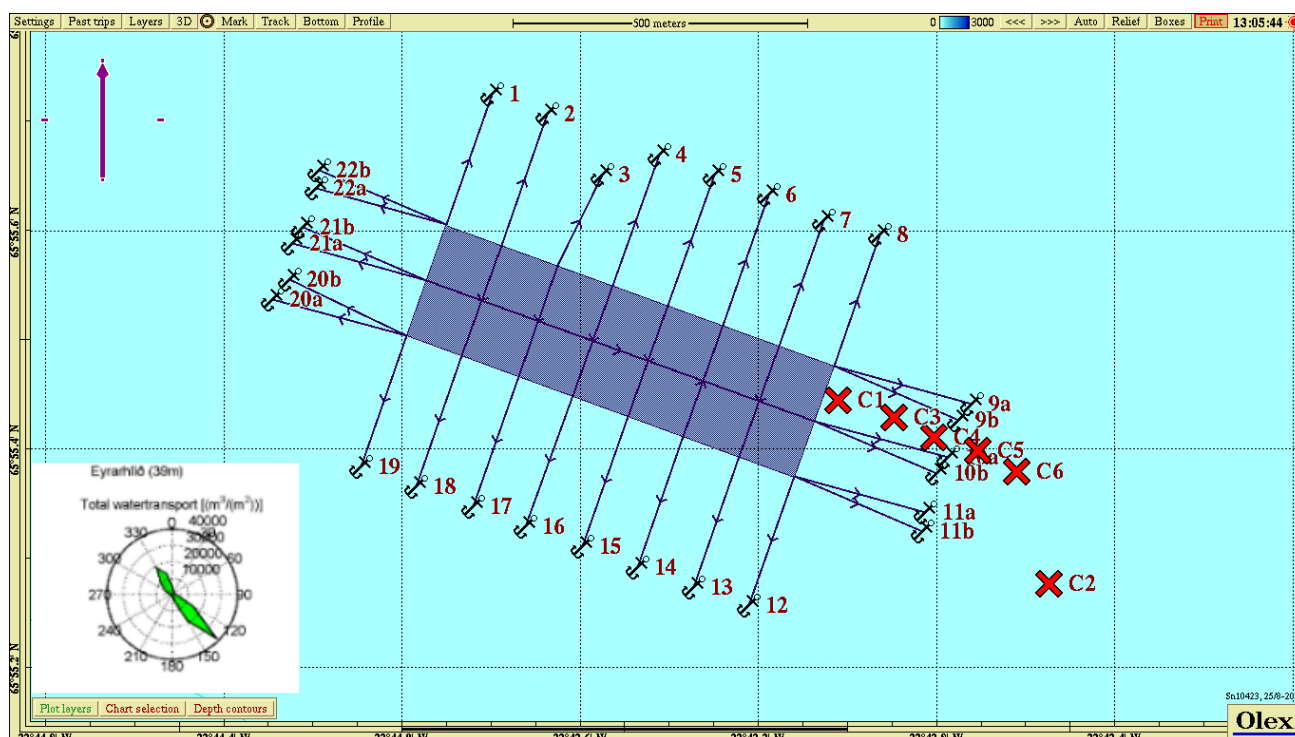


Figure 2. Map showing the sampling stations for the C-survey at Eyrarhlíð 2, 2023. Current measurements used were from 39 m depth (Gustavson, 2019).

## 3.2 Hydrography and oxygen

At station C4, hydrographic measurements, salinity, temperature, density, and oxygen saturation were taken for vertical surface to bottom profiles using a Sensordata CTDO 204 probe.

## 3.3 Soft bottom sampling and analyses

### 3.3.1 Fieldwork

Sediment samples were collected with a 0.1 m<sup>2</sup> bottom grab (van Veen). The sample material was collected through inspection openings. Samples for TOC, TN and Cu were taken from the top 1 cm layer of the sediment and for TOM and grain size analyses from the top 5 cm using a hollow pipe.

Only samples with an undisturbed surface were used. The samples were frozen prior to further processing in the laboratory.

### **3.3.2 Total organic material (TOM)**

The amount of TOM in sediment was determined by weight loss after combustion at 495 °C. The percent weight loss was calculated. The reproducibility of the TOM analyses is checked during the analyses by using a standard sediment that contains TOM with a known level. Standard calcium carbonate was burned together with the samples as a control of the amount of carbonate that was not burned in the analyses process.

### **3.3.3 Total nitrogen (TN)**

After drying the samples at 40°C, the amount of total nitrogen (TN) was quantified by electrochemical determination using Akvaplan niva internal method that is based on NS-EN 12260:2003 (Vannundersøkelse – Bestemmelse av bundet nitrogen (TNb) etter oksidasjon til nitrogenoksider).

### **3.3.4 Total organic carbon (TOC) and grain size**

The proportion of fine material, the fraction less than 63 µm, was determined gravimetrically after wet sieving of the samples. The results are presented as proportion of fine material on a dry weight basis.

After drying the samples at 40 °C, the content of total organic carbon (TOC) was determined by NDIR-detection in accordance with DIN19539:2016 (Investigation of solids – Temperature-dependent differentiation of total carbon (TOC<sub>400</sub>, ROC, TIC<sub>900</sub>)). To classify the environmental conditions based on the content of TOC, the measured concentrations are normalized for the proportion of fine substance (nTOC) using the equation:  $nTOC = TOC + 18(1 - F)$ , where TOC and F represent a measured TOC value and the proportion of fine substance (%) in the sample (Aure *et al.*, 1993).

### **3.3.5 Metal analysis - copper (Cu)**

The samples for metal analysis were freeze-dried before being placed in a microwave oven in a sealed Teflon container with concentrated ultrapure nitric acid and hydrogen peroxide. The concentration of copper (Cu) was determined by means of ICP-SFMS. The levels of copper are classified in accordance with Icelandic regulation 769:1999.

### **3.3.6 Emamectin benzoate (EMB)**

The sediments were lyophilized prior to solvent extraction. The actual quantification was determined by high-resolution liquid chromatography coupled to tandem mass spectroscopy (HPLC-MS/MS). The LOD and LOQ are determined in accordance with the guidelines of the EU's reference laboratories for pesticide analyses, SANTE/2020/12830, 24/02/2021. The results are evaluated according to the Scottish Environmental Protection Agency (SEPA) standards (SEPA, 2022 & 2023).

### 3.3.7 Redox- and pH measurements

At all the stations, a quantitative chemical examination of the sediment was carried out. Acidity (pH) and redox potential (Eh) were measured using electrodes and the YSI Professional Plus instrument. In accordance with the manual of the instrument, 200 mV was added to the measured ORP (the Oxidation Reduction Potential) value.

## 3.4 Soft bottom fauna investigation

### 3.4.1 About effect of organic material on bottom fauna

The emission of organic material from fish farms can contribute to the deterioration of conditions for many of the organisms living in the bottom sediment. Negative effects in the bottom fauna can best be assessed through quantitative bottom fauna analyses. Many soft bottom species have low mobility, the fauna composition will largely reflect the local environmental conditions. Changes in the bottom fauna communities are a good indication of unwanted organic loads. Under natural conditions, the communities typically consist of many species. High number of species (diversity) is, amongst other things, that is dependent on favourable conditions for the fauna. However, moderate increases in organic load can stimulate the fauna and result in an increased number of species found. Larger organic loads can result in less favourable conditions where opportunistic species increase their individual numbers, while the species not suited are knocked out resulting in a reduced diversity of species. Changes in species diversity near emission points of feed and faecal matter can, to a large degree, be attributed to changes in organic content (from the feed and faecal matter) in the sediment.

### 3.4.2 Sampling and fixation

All the bottom fauna samples were taken with a 0.1 m<sup>2</sup> van Veen grab. Only grab samples where the grab was completely closed and the surface undisturbed were approved. The contents were washed through a 1 mm sieve and the remaining material fixed with 4 % formalin with Bengal Rose dye added and then neutralized with borax. In the laboratory, the animals were sorted from the remaining sediment.

### 3.4.3 Quantitative bottom fauna analysis

At all stations, two samples (replicates) were collected in accordance with guidelines in NS 9410 (2016). After sorting the sample material was processed quantitatively. The bottom fauna was identified to the lowest taxonomic level possible and quantified by specialists (taxonomists). The quantitative lists of species were statistically analysed. See Appendix 1 for description of analysis methods. The following statistical methods were used to describe community structure and to assess the similarity between different communities:

- Shannon-Wiener diversity index ( $H'$ )
- Hurlberts diversity index ( $ES_{100}$ ) – expected number of species pr. 100 individuals
- Pielou's evenness index ( $J$ )
- Sensitivities index ( $\text{\Omfintlighet}$ ) ( $ISI_{2012}$ ), unsuitable at low individual/species number
- Sensitivity index (NSI)

- Composite index for diversity of species and sensitivity (NQI1)
- Sensitivities index which is included in NQI1 (AMBI)
- Normalized EQR (nEQR)
- Number of species plotted against the number of individuals in geometric classes
- Cluster analyses
- The ten most dominant taxa per station (top-ten)

## 4 Results

### 4.1 Hydrography and oxygen

The hydrographical profile for the deep station C4 in August 2023 is presented in Figure 3.

Temperature was 11 °C in the surface and dropped to around 9.5 °C in the bottom water. Oxygen saturation was 96 % in the upper layer and 72 % in the bottom layer.

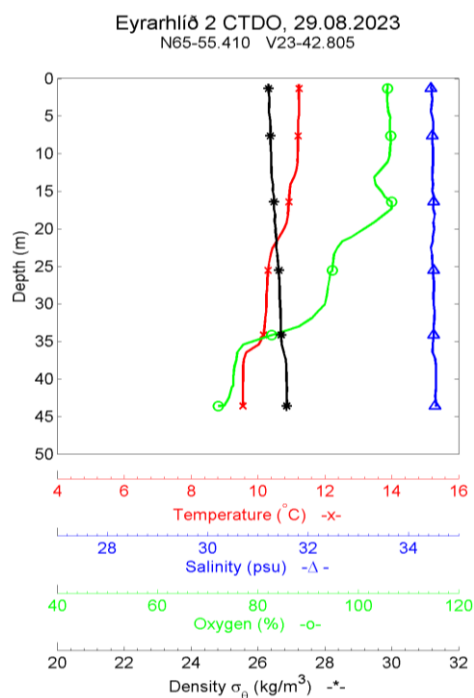


Figure 3. Vertical profiles. Temperature, salinity, density, and oxygen at C4 at Eyrarhlíð 2, 2023.

### 4.2 Sediment

#### 4.2.1 TOC, TOM, TN, C/N, grain size and pH/Eh

Levels of total organic material (TOM), total organic carbon (TOC), total nitrogen (TN), C/N-relationship, grain size distribution in sediment (pelite) and pH/Eh in the sediment are presented in Table 4.

TOM-levels varied from 7.9 to 8.9 %. TN-levels were low (3.3 – 5.0 mg/g) as was the C/N-ratio. TOC was somewhat high at all stations and nTOC varied from 24.9 to 29.1 mg/g TS. The bottom sediments grain size was moderately fine with a pelite ratio ranging from 69.5 to 80.4 %.

Redox measurements (pH/Eh) gave a point of 0 for all the sampling stations according to Appendix D in NS 9410:2016.

Table 4. Sediment description, TOM (%), TOC (mg/g), TN (mg/g), C/N, grain size distribution (pelite ratio % <0,063 mm) and pH/Eh. Eyrarhlíð 2, 2023.

St.	Sediment description	TOM	TOC	nTOC	TN	C/N	Pelite	pH/Eh
C1	Olive green mud, no smell of H <sub>2</sub> S.	7.9	19	24.9	3.3	6.0	69.5	7.5/245
C2	Olive green mud, no smell of H <sub>2</sub> S.	8.9	23	26.5	4.0	5.7	80.4	7.8/300
C3	Olive green mud, no smell of H <sub>2</sub> S.	8.5	21	26.2	3.8	5.4	69.4	7.7/301
C4	Olive green mud, no smell of H <sub>2</sub> S.	8.8	24	29.1	5.0	4.8	72.4	7.7/323
C5	Olive green mud, no smell of H <sub>2</sub> S.	8.2	22	25.4	4.4	4.9	79.2	7.6/310
C6	Olive green mud, no smell of H <sub>2</sub> S.	8.8	22	25.6	4.4	5.0	78.4	7.6/310

## 4.2.2 Copper

Level of copper in bottom sediment at C1 is shown in Table 5. The level of copper was 41.1 mg/kg or limit II "low values (according to Reglugerð um varnir gegn mengun vatns nr. 796/1999).

Table 5. Copper (Cu), mg/kg DS. Eyrarhlíð 2, 2023.

St.	Cu
C1	41.1

## 4.2.3 Emamectin benzoate

Concentration of emamectin benzoate in sediment at C3 is presented in Table 6. Station C3 is located 125 m from the cage edge and is thus placed outside the mixing zone (SEPA 2022).

EMB concentration is less than 50 ng/kg and thus below the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is fulfilling the "good status standard".

Table 6. Emamectin benzoate in the sediment at C3, ng/kg. Eyrarhlíð 2, 2023.

St.	Emamectin benzoate
C3	<50*

\*Not accredited result.

## 4.3 Soft-bottom fauna

### 4.3.1 Faunal indices

Results from the quantitative soft bottom faunal analyses at the C-stations are presented in Table 7.

The number of individuals varied from 494 (C1) to 890 (C5) and number of species from 30 (C1) to 51 (C4). The diversity H' varied from 3.63 to 4.01. At all stations, the overall index of nEQR was higher than 0.6. The nEQR values indicate relatively good conditions at the stations.

J (Pielous evenness index) is a measure of how equally individuals are divided between species and will vary between 0 and 1. A station with low value has a "crooked" individual distribution between

the species, indicating a disturbed bottom fauna community. The index varied from 0.73 to 0.78 which indicates a somewhat even distribution.

Table 7. Number of species and individuals pr. 0,2 m<sup>2</sup>.  $H'$  = Shannon-Wiener's diversity index.  $ES_{100}$  = Hurlberts diversity index.  $NQI1$  = overall index (diversity and sensitivity).  $ISI_{2012}$  = sensitivity index.  $NSI$  = sensitivity index.  $J$  = Pielous evenness index.  $AMBI$  = AZTI marine biotic index (part of  $NQI1$ ).  $nEQR$  = normalized EQR (excl. DI). C-stations at Eyrarhlíð 2, 2023.

St.	No. of individuals.	No. of species	$H'$	$ES_{100}$	$NQI1$	$ISI_{2012}$	$NSI$	$nEQR$	$AMBI$	$J$
C1	494	30	3.63	18.4	0.666	7.50	19.77	0.623	2.46	0.78
C2	767	45	3.84	22.2	0.732	8.42	22.92	0.693	1.90	0.74
C3	599	44	3.71	23.3	0.735	8.87	22.80	0.701	1.90	0.73
C4	789	51	4.01	24.7	0.737	8.56	22.94	0.707	1.94	0.76
C5	890	48	3.88	23.3	0.736	8.28	23.00	0.695	1.89	0.73
C6	830	49	3.79	22.4	0.724	8.82	23.23	0.701	2.03	0.73

#### 4.3.2 NS 9410 Evaluation of the bottom fauna at station C1 (local impact zone).

According to NS 9410 the classification of the environmental status in the local impact zone can also be evaluated based on the number of species and their dominance in the bottom faunal community (see Chapter 8.6.2 in NS 9410:2016).

The soft bottom communities were classified to environmental condition 1 "Very good". The criteria for condition 1 are that there are at least 20 species/0.2 m<sup>2</sup> and that none of these are in numbers exceeding 65 % of the individuals (Table 8).

Table 8. Classification of the environmental status of the soft bottom fauna at station C1 at the Eyrarhlíð 2 site 2023.

Station	Site name	Num. species	Dominating taxa	Environmental condition-NS 9410
C1	Eyrarhlíð 2	30	Thyasira sarsii – 21 %	1 – Very good

#### Geometric classes

Figure 4 shows the number of species plotted against the number of individuals, where the number of individuals is divided into geometric classes. For an explanation of the concept of geometric classes is given in Appendix 1.

All curves started relatively low ( $\leq 17$  species) and stretched out in varying degrees towards higher classes. These did not give any clear indications of fauna condition.



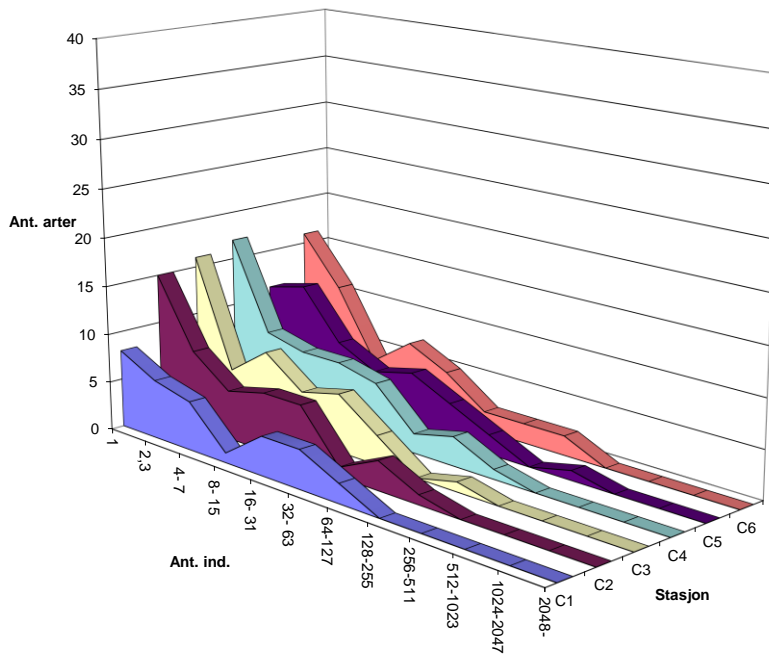


Figure 4. The soft bottom fauna shown as number of species against number of individuals pr. species in geometric classes. Eyrarhlíð 2, 2023.

### 4.3.3 Cluster analyses

To investigate the similarity of the faunal composition between the sampling stations, the multivariate technique cluster analysis was used. The results of this are presented in dendrogram in Figure 5.

The fauna composition was more than 73 % similar for most stations in the survey and C1 was 50 % similar to the other stations.

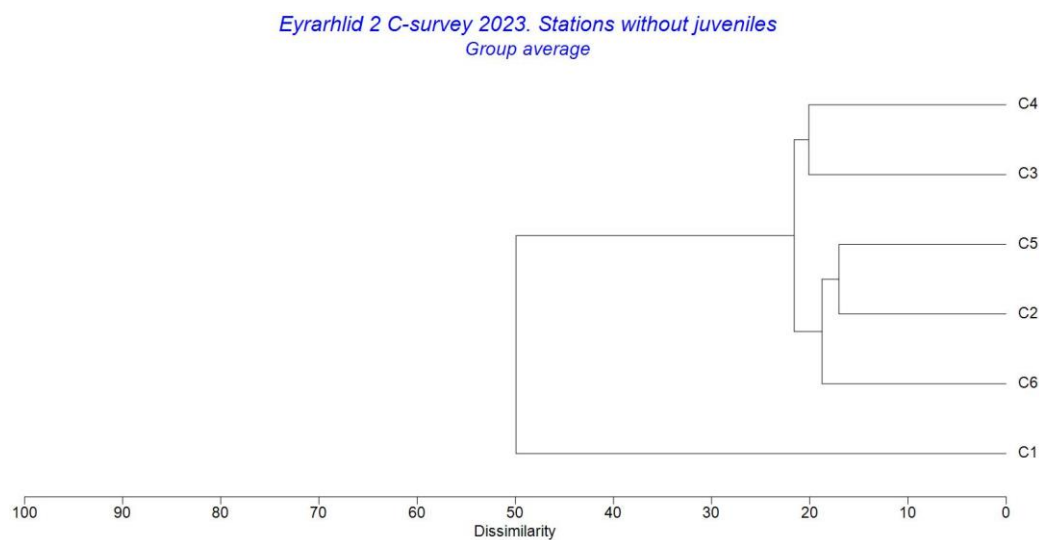


Figure 5. Cluster diagram for the soft bottom fauna at the C- sampling stations at Eyrarhlíð 2, 2023.

#### 4.3.4 Species composition

The main features of the species composition are shown in the form of a top ten species list from each station in Table 9.

In Rygg and Norling (2013) the species are divided into five ecological groups (EG) based on the value of the sensitivity index. These groups run from sensitive species (EG I) to pollution indicators (EG V).

The fauna at C1 was dominated by the opportunistic bivalve *Thyasira sarsii* with 21 % of the individuals. The other most dominant species at the stations were neutral and tolerant species.

At the other stations, the fauna was dominated by the neutral bivalve *Ennucula tenuis* with between 22 and 35 % of the individuals. The other most dominant species at the stations were mainly neutral and tolerant species together with one opportunistic species at C2, C3 and C4.

No pollution indicators were recorded among the top-10 at any of the stations.

Table 9. Number of individuals, cumulative percentage, and ecological group\* for the ten most dominant species at the C stations. Eyrarhlíð 2, 2023.

C1	EG	Ant. ind.	Kum.
<i>Thyasira sarsii</i>	IV	102	21 %
<i>Eteone flava/longa</i>	Ik	65	34 %
<i>Echiurus echiurus</i>	Ik	56	45 %
<i>Abra nitida</i>	III	55	56 %
<i>Ophelina acuminata</i>	II	44	65 %
<i>Gattyana amondseni</i>	Ik	34	72 %
<i>Ennucula tenuis</i>	II	30	78 %
<i>Galathowenia oculata</i>	III	17	81 %
<i>Leucon sp.</i>	Ik	17	85 %
<i>Nuculana pernula</i>	II	17	88 %

C2	EG	Ant. ind.	Kum.
<i>Ennucula tenuis</i>	II	170	22 %
<i>Owenia sp.</i>	II	115	37 %
<i>Galathowenia oculata</i>	III	104	51 %
<i>Levinsenia gracilis</i>	II	73	60 %
<i>Myriochele malmgreni/olgae</i>	Ik	39	65 %
<i>Sternaspis scutata</i>	Ik	31	69 %
<i>Euchone sp.</i>	II	28	73 %
<i>Nuculana pernula</i>	II	28	77 %
<i>Axinopsida orbiculata</i>	Ik	21	79 %
<i>Thyasira sarsii</i>	IV	20	82 %

C3	EG	Ant. ind.	Kum.
<i>Ennucula tenuis</i>	II	213	35 %
<i>Galathowenia oculata</i>	III	53	44 %
<i>Levinsenia gracilis</i>	II	39	51 %
<i>Euchone sp.</i>	II	36	57 %
<i>Praxillella praetermissa</i>	II	30	62 %
<i>Owenia sp.</i>	II	25	66 %
<i>Abra nitida</i>	III	23	70 %
<i>Thyasira sarsii</i>	IV	20	73 %
<i>Ampharete borealis</i>	III	19	76 %
<i>Leucon sp.</i>	Ik	16	79 %

C4	EG	Ant. ind.	Kum.
<i>Ennucula tenuis</i>	II	195	25 %
<i>Galathowenia oculata</i>	III	89	36 %
<i>Levinsenia gracilis</i>	II	80	46 %
<i>Owenia sp.</i>	II	78	56 %
<i>Sternaspis scutata</i>	Ik	40	61 %
<i>Euchone sp.</i>	II	38	66 %
<i>Praxillella praetermissa</i>	II	28	69 %
<i>Nuculana pernula</i>	II	19	72 %
<i>Thyasira sarsii</i>	IV	19	74 %
<i>Axinopsida orbiculata</i>	Ik	17	76 %

C5	EG	Ant. ind.	Kum.
<i>Ennucula tenuis</i>	II	257	29 %
<i>Owenia sp.</i>	II	110	41 %
<i>Galathowenia oculata</i>	III	78	49 %
<i>Levinsenia gracilis</i>	II	52	55 %
<i>Myriochele malmgreni/olgae</i>	Ik	50	61 %
<i>Sternaspis scutata</i>	Ik	44	66 %
<i>Euchone sp.</i>	II	38	70 %
<i>Axinopsida orbiculata</i>	Ik	28	73 %
<i>Leucon sp.</i>	Ik	23	76 %
<i>Ampharete borealis</i>	III	21	78 %

C6	EG	Ant. ind.	Kum.
<i>Ennucula tenuis</i>	II	206	25 %
<i>Levinsenia gracilis</i>	II	134	41 %
<i>Owenia sp.</i>	II	98	52 %
<i>Galathowenia oculata</i>	III	77	62 %
<i>Myriochele malmgreni/olgae</i>	Ik	49	67 %
<i>Sternaspis scutata</i>	Ik	32	71 %
<i>Leucon sp.</i>	Ik	22	74 %
<i>Praxillella praetermissa</i>	II	18	76 %
<i>Nuculana pernula</i>	II	17	78 %
<i>Axinopsida orbiculata</i>	Ik	16	80 %

\*Ecological groups: EG I = sensitive species. EG II = neutral species. EG III = tolerant species. EG IV = opportunistic species. EG V = pollution indicator species. From Rygg and Norling, 2013. Ik = unidentified group.

## 5 Summary and Conclusions

### 5.1 Summary

The results from the environmental monitoring (type C) at Eyrarhlíð 2, 2023, can be summarised as follows:

- The hydrography measurements showed good oxygen conditions throughout the water column with 72 % saturation in the bottom layer in August 2023.
- TOC was somewhat high at all stations and nTOC varied from 24.9 to 29.1 mg/g TS. TOM-levels varied from 7.9 to 8.9 %. TN-levels were low (3.3 – 5.0 mg/g) as was the C/N-ratio. The copper level in the sediment at C1 was 41.1 mg/kg and is categorized into environmental limit II or "low values" (Reglugerð um varnir gegn mengun vatns nr. 796/1999). EMB concentration was below 50 ng/kg and thus below the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is fulfilling the "good status standard". The sediment was moderately fine grained with a pelite share between 69.5 and 80.4 %. The redox measurements (pH/Eh) gave point 0 acc. Appendix D in NS 9410:2016 for all the stations.
- The number of individuals varied from 494 to 890 and number of species from 30 to 51. The diversity H' varied from 23.63 to 4.01. At all stations, the overall index of nEQR was higher than 0.6. The nEQR values indicates good conditions and no disturbance of the communities.

The number of individuals varied from 494 (C1) to 890 (C5) and number of species from 30 (C1) to 51 (C4). The diversity H' varied from 3.63 to 4.01. At all stations, the overall index of nEQR was higher than 0.6. The nEQR values indicate relatively good conditions at the stations.

### 5.2 Conclusions

The results from the monitoring at the farming site Eyrarhlíð 2 in August 2023 showed that the sediment was somewhat loaded with organic carbon and the copper level in the sediment at C1 was somewhat elevated (41.1 mg/kg) and is categorized into environmental limit II or "low values". EMB concentration was below 50 ng/kg and thus below the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is fulfilling the "good status standard".

No load effect was recorded in the fauna and nEQR values were above 0.6 indicating relatively good faunal conditions at the stations. The diversity index H' varied from 3.63 to 4.01. The NS 9410:2016-assessment of the community in the local impact zone (C1) showed environmental condition 1 (Very good). No pollution indicators were recorded among the top-10 at any of the stations.

The redox measurements (pH/Eh) gave point 0 acc. Appendix D in NS 9410:2016 for all the sampling stations. The oxygen saturation in August was good in the whole water column with 72 % in the bottom water.

Compared to previous C-survey at max biomass in March 2022 (Szttybor and Gunnarsson, 2022) the faunal index nEQR has improved at station C1 from 0,250 to 0,623 and the diversity index H' increased between the two survey from 0,83 to 3,63. The pollution indicator species *Capitella capitata*

that was the most dominant at station C1 in 2022 survey is not registered in the present survey among the top-10 species. The organic carbon levels are somewhat higher in the present survey compared to previous C survey in 2022. Copper concentrations are comparable in the sediment and are still relatively low. The oxygen saturation in the bottom water was good in both surveys.

## 6 References

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## 7 Appendix (in Norwegian)

### 7.1 Statistiske metoder

#### Diversitet

Diversitet er et begrep som uttrykker mangfoldet i dyre- og plantesamfunnet på en lokalitet. Det finnes en rekke ulike mål for diversitet. Noen tar mest hensyn til artsrikheten (mål for artsrikheten), andre legger mer vekt på individfordelingen mellom artene (mål for jevnhet og dominans). Ulike mål uttrykker derved forskjellige sider ved dyresamfunnet. Diversitetsmål er "klassiske" i forurensningsundersøkelser fordi miljøforstyrrelser typisk påvirker samfunnets sammensetning. Svakheten ved diversitetsmålene er at de ikke alltid fanger opp endringer i samfunnsstrukturen. Dersom en art blir erstattet med like mange individer av en ny art, vil ikke det gjøre noe utslag på diversitetsindeksene.

Shannon-Wieners indeks (Shannon & Weaver, 1949) er gitt ved formelen:

$$H' = - \sum_{i=1}^s \frac{n_i}{N} \log_2 \left( \frac{n_i}{N} \right)$$

der  $n_i$  = antall individer av art  $i$  i prøven  
 $N$  = total antall individer  
 $s$  = antall arter

Indeksen tar hensyn både til antall arter og mengdefordelingen mellom artene, men det synes som indekseen er mest følsom for individfordelingen. En lav verdi indikerer et artsfattig samfunn og/eller et samfunn som er dominert av en eller få arter. En høy verdi indikerer et artsrikt samfunn.

#### Pielous mål for jevnhet (Pielou, 1966)

har følgende formel, der symbolene er som i Shannon-Wieners indeks

$$J = \frac{H'}{\log_2 s}$$

#### Hurlberts diversitetskurver

Grafisk kan diversiteten uttrykkes i form av antall arter som funksjon av antall individer. Med utgangspunkt i total antall arter og individer i en prøve søker man å beregne hvor mange arter man ville vente å finne i delprøver med færre individer. Diversitetsmålet blir derved uavhengig av prøvestørrelsen og gjør at lokaliteter med ulik individtetthet kan sammenlignes direkte. Hurlbert (1971) har gitt en metode for å beregne slike diversitetskurver basert på sannsynlighetsberegning.

$ES_n$  er forventet antall arter i en delprøve på  $n$  tilfeldig valgte individer fra en prøve som inneholder total  $N$  individer og  $s$  arter og har følgende formel:

$$ES_n = \sum_{i=1}^s \left[ 1 - \frac{\binom{N-N_i}{n}}{\binom{N}{n}} \right]$$

der  $N$  = total antall individ i prøven  
 $N_i$  = antall individ av art  $i$

$n$  = antall individ i en gitt delprøve (av de  $N$ )

$s$  = total antall arter i prøven

## Plott av antall arter i forhold til antall individer

Artene deles inn i grupper/klasser etter hvor mange individer som er registrert i en prøve. Det vanlige er å sette klasse I = 1 individ pr. art, klasse II = 2-3 individer, klasse III = 4-7 individer, klasse IV = 8-15 individer, osv., slik at de nedre klassegrensene danner en følge av ledd på formen  $2^x$ ,  $x=0,1,2, \dots$ . En slik følge kalles en geometrisk følge, derfor kalles klassene for geometriske klasser. Hvis antall arter innenfor hver klasse plottes mot klasseverdien på en lineær skala, vil det fremkomme en kurve som uttrykker individfordelingen mellom artene i samfunnet. Det har vist seg at i prøver fra upåvirkede samfunn vil det være mange arter med lavt individantall og få arter med høyt individantall, slik at vi får en entoppet, asymmetrisk kurve med lang "hale" mot høye klasseverdier. Denne kurven vil være godt tilpasset en log-normal fordelingskurve.

Ved moderat forurensing forsvinner en del av de individfattige artene, mens noen som blir begunstiget, øker i antall. Slik flater kurven ut, og strekker seg mot høyere klasser eller den får ekstra topper. Under slike forhold mister kurven enhver likhet med den statistiske log-normalfordelingen. Derfor kan avvik fra log-normalfordelingen tolkes som et resultat av en påvirkning/forurensing. Det har vist seg at denne metoden tidlig gir utslag ved miljøforstyrrelse. Ved sterk forurensning blir det bare noen få, men ofte svært tallrike arter tilbake. Log-normalfordelingskurven vil da ofte gjenoppstå, men med en lavere topp og spredt over flere klasser enn for uforstyrrede samfunn.

## Faunaens fordelingsmønster

Variasjoner i faunaens fordelingsmønster over området beskrives ved å sammenligne tettheten av artene på hver stasjon. Til dette brukes multivariate klassifikasjons- og ordinasjons-analyser (Cluster og MDS).

Analysene i denne undersøkelsen ble utført ved hjelp av programpakken PRIMER v5. Inngangsdata er individantall pr. art, pr. prøve. Prøvene kan være replikater eller stasjoner. Det tas ikke hensyn til hvilke arter som opptrer. Forut for klassifikasjons- og ordinasjonsanalysene ble artslistene dobbelt kvadratrotransformert. Dette ble gjort for å redusere avviket mellom høye og lave tetthetsverdier og dermed redusere eventuelle effekter av tallmessig dominans hos noen få arter i datasettet.

## Clusteranalyse

Analysen undersøker faunalikheten mellom prøver. For å sammenligne to prøver ble Bray-Curtis ulikhetsindeks benyttet (Bray & Curtis, 1957):

$$d_{ij} = \frac{\sum_{k=1}^n |X_{ki} - X_{kj}|}{\sum_{k=1}^n (X_{ki} + X_{kj})}$$

der  $n$  = antall arter sammenlignet

$X_{ki}$  = antall individ av art  $k$  i prøve nr.  $i$

$X_{kj}$  = antall individ av art  $k$  i prøve nr.  $j$

Indeksen avtar med økende likhet. Vi får verdien 1 hvis prøvene er helt ulike, dvs. ikke har noen felles arter. Identiske arts- og individtall vil gi verdien 0. Prøver blir gruppert sammen etter graden av likhet ved å bruke "group-average linkage". Forholdsvis like prøver danner en gruppe (cluster). Resultatet presenteres i et tredigram (dendrogram).

## Ømfintlighet (AMBI, ISI og NSI)

Ømfintligheten bestemmes ved indeksene ISI og AMBI. Beregning av ISI er beskrevet av Rygg (2002). Sensitivitetsindeksen AMBI (Azti Marin Biotic Index) tilordner en ømfintlighetsklasse (økologisk gruppe, EG): EG-1: sensitive arter, EG-II: indifferente arter, EG-III: tolerante arter, EG-IV: opportunistiske arter, EG-V: forurensningsindikerende arter. Sammensetningen av makrovertebratsamfunnet i form av andelen av økologiske grupper indikerer omfanget av en forurensningspåvirkning.

NSI er en sensitivitetsindeks som ligner AMBI, men er utviklet med basis i norske faunadata og ved bruk av en objektiv statistisk metode. En prøves NSI verdi beregnes ved gjennomsnittet av sensitivitetsverdiene av alle individene i prøven.

## Sammensatte indekser (NQI1 og NQI2)

Sammensatte indekser NQI1 og NQI2 bestemmes både ut fra artsmangfold og ømfintlighet. NQI1 er brukt i NEAGIG (den nordøst-atlantiske interkalibreringen). De fleste land bruker nå sammensatte indekser av samme type som NQI1 og NQI2.

NQI1 indeksen er beskrevet ved hjelp av formelen:

$$\text{NQI1 (Norwegian quality status, version 1)} = [0.5^* (1-\text{AMBI}/7) + 0.5^*(\text{SN}/2.7)^* (N/(N+5))]$$

Diversitetsindeksen  $\text{SN} = \ln S / \ln(\ln N)$ , hvor S er antall arter og N er antall individer i prøven

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## 7.2 Statistical results Eyrarhlíð 2, 2023

### Benthos indices per replicate

st.nr.		C1_0 1	C1_0 2	C2_0 1	C2_0 2	C3_0 1	C3_0 2	C4_0 1	C4_0 2	C5_0 1	C5_0 2	C6_0 1	C6_0 2
no. ind.		244	250	329	438	289	310	337	452	456	434	384	446
no. spe.		25	25	39	33	34	35	33	47	38	40	36	39
Shannon-Wiener:		3,6	3,7	4,1	3,6	3,9	3,5	3,9	4,1	3,9	3,9	3,8	3,8
Pielou		0,77	0,79	0,77	0,71	0,77	0,68	0,77	0,75	0,74	0,73	0,73	0,72
ES100		18	19	24	20	24	23	23	26	23	23	22	22
SN		1,89	1,88	2,08	1,94	2,03	2,04	1,99	2,13	2,01	2,04	2,01	2,03
ISI-2012		7,29	7,70	8,23	8,62	9,05	8,69	8,65	8,46	8,58	7,98	8,83	8,80
AMBI		2,492	2,435	1,986	1,815	1,984	1,823	1,846	2,035	1,799	1,988	2,035	2,023
NQI1		0,66	0,67	0,74	0,72	0,73	0,74	0,73	0,74	0,74	0,73	0,72	0,73
NSI		20,1	19,4	23,1	22,8	22,8	22,8	22,8	23,1	23,0	23,1	23,3	23,2

### Geometrical classes

int.	C1	C2	C3	C4	C5	C6
1	8	15	16	17	11	16
2,3	6	8	5	8	12	11
4- 7	5	5	8	7	7	4
8- 15	1	6	5	7	5	7
16- 31	4	6	6	6	6	5
32- 63	4	1	3	2	4	2
64-127	2	3	0	3	2	2
128-255	0	1	1	1	0	2
256-511	0	0	0	0	1	0
512-1023	0	0	0	0	0	0
1024-2047	0	0	0	0	0	0
2048-	0	0	0	0	0	0

## 7.3 Species lists

### Artsliste pr stasjon

#### Eyrarhlíð 2 C-survey 2023

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
Stasjonsnr.: C1								
NEMERTINI								
			Nemertea indet.			1	-	1
PRIAPULIDA								
			Priapulus caudatus		1		-	1
ECHIURIDA								
			Echiurus echiurus		33	23	-	56
ANNELIDA								
	Polychaeta							
		Orbiniida						
			Scoloplos armiger		1		-	1
		Spionida						
			Laonice cirrata		1	1	-	2
			Prionospio steenstrupi		2	2	-	4
			Spio limicola			3	-	3
		Capitellida						
			Capitella capitata		1		-	1
			Mediomastus fragilis		1	1	-	2
		Opheliida						
			Ophelina acuminata		30	14	-	44
			Scalibregma inflatum		1	2	-	3
		Phyllodocida						
			Eteone flava/longa		41	24	-	65
			Gattyana amondseni		22	12	-	34
			Nephtys ciliata			1	-	1
			Nephtys sp.		1		-	1
		Oweniida						
			Galathowenia oculata		8	9	-	17
		Terebellida						
			Ampharete borealis		1	6	-	7
			Ampharete lindstroemi			2	-	2
			Lagis koreni		3	5	-	8
		Sabellida						
			Euchone sp.		1	4	-	5
CRUSTACEA								
	Malacostraca							
		Cumacea						
			Eudorella sp.		2	3	-	5
			Leucon sp.		7	10	-	17
		Amphipoda						
			Bathymedon obtusifrons		3	2	-	5
			Lysianassidae indet.			1	-	1
MOLLUSCA								
	Bivalvia							
		Nuculoidea						
			Ennucula tenuis		14	16	-	30
			Nuculana pernula		7	10	-	17
			Yoldia hyperborea		2	1	-	3
		Veneroidea						
			Abra nitida		21	34	-	55
			Parvicardium pinnulatum		1		-	1
			Thyasira sarsii		39	63	-	102
ECHINODERMATA								
	Ophiuroidea							
			Ophiuroidea indet. juv.		1		-	1

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
				Maksverdi:	41	63		102
				Antall arter/taxa:	26	25		31
				Sum antall individ:				495

Stasjonsnr.: C2

NEMERTINI

			Nemertea indet.		4	-		4
ANNELIDA								
	Polychaeta							
		Orbiniida	Levinsenia gracilis		45	28	-	73
			Scoloplos armiger		1	-		1
		Spionida	Chaetozone sp.			1	-	1
			Prionospio steenstrupi		4	3	-	7
			Spio decorata		1	1	-	2
			Spio limicola		1	1	-	2
		Capitellida	Maldane sarsi		4	5	-	9
			Maldanidae indet.		1	-		1
			Mediomastus fragilis		2	1	-	3
			Praxillella gracilis		8	4	-	12
			Praxillella praetermissa		1	2	-	3
			Rhodine loveni		1	-		1
		Phyllodocida	Eteone flava/longa		1	1	-	2
			Nephtys ciliata		4	4	-	8
			Nephtys hombergii		1	-		1
			Nephtys paradoxa			1	-	1
			Nephtys sp.			1	-	1
			Phyllodoce groenlandica		1	-		1
			Polynoidae indet.		1	-		1
			Syllis cornuta		1	1	-	2
		Eunicida	Scoletoma fragilis			1	-	1
		Sternaspida	Sternaspis scutata		15	16	-	31
		Oweniida	Galathowenia oculata		37	67	-	104
			Myriochele malmgreni/olgae		11	28	-	39
			Owenia sp.		54	61	-	115
		Terebellida	Ampharete borealis		5	9	-	14
			Ampharete lindstroemi		1	-		1
			Lagis koreni		1	-		1
			Laphania boeckii		2	-		2
		Sabellida	Euchone sp.		12	16	-	28
CRUSTACEA								
	Malacostraca							
		Cumacea	Eudorella sp.		3	6	-	9
			Leucon sp.		6	4	-	10
		Amphipoda	Bathymedon obtusifrons		1	3	-	4
			Lysianassidae indet.		1	-		1
MOLLUSCA								
	Caudofoveata							
			Caudofoveata indet.		1	-		1
	Bivalvia							
		Nuculoida	Ennucula tenuis		47	123	-	170
			Nuculana pernula		18	10	-	28
			Yoldia hyperborea		4	1	-	5
		Veneroida	Abra nitida		8	10	-	18
			Arctica islandica		2	2	-	4

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
			Axinopsida orbiculata		10	11	-	21
			Thyasira gouldii			3	-	3
			Thyasira sarsii		8	12	-	20
		Myoida						
			Mya sp. juv.		1		-	1
ECHINODERMATA								
	Ophiuroidea							
		Ophiurida						
			Ophiocten affinis			1	-	1
				Maksverdi:	54	123		170
				Antall arter/taxa:	40	33		46
				Sum antall individ:				768

Stasjonsnr.: C3

NEMERTINI

			Nemertea indet.		2		-	2
ANNELIDA								
	Polychaeta							
		Orbiniida						
			Levinsenia gracilis		23	16	-	39
			Scoloplos armiger			1	-	1
		Cossurida						
			Cossura longocirrata			2	-	2
		Spionida						
			Chaetozone sp.		1	3	-	4
			Prionospio steenstrupi		2	5	-	7
			Spio armata			1	-	1
			Spio limicola		3	3	-	6
		Capitellida						
			Maldane sarsi		1	1	-	2
			Mediomastus fragilis			1	-	1
			Praxillella gracilis		6	1	-	7
			Praxillella praetermissa		24	6	-	30
		Opheliida						
			Ophelina acuminata		1		-	1
		Phyllodocida						
			Bylgides groenlandicus			2	-	2
			Eteone flava/longa		2	5	-	7
			Nephtys ciliata		6	6	-	12
			Phyllodoce groenlandica		1		-	1
			Polynoidae indet.		1		-	1
			Syllis cornuta		1		-	1
		Sternaspida						
			Sternaspis scutata		8	4	-	12
		Oweniida						
			Galathowenia oculata		24	29	-	53
			Myriochele malmgreni/olgae			1	-	1
			Owenia sp.		8	17	-	25
		Terebellida						
			Ampharete borealis		7	12	-	19
			Lagis koreni		1		-	1
		Sabellida						
			Euchone sp.		18	18	-	36
CRUSTACEA								
	Malacostraca							
		Cumacea						
			Campylaspis sp.			1	-	1
			Eudorella sp.		1	1	-	2
			Leucon sp.		10	6	-	16
		Amphipoda						
			Bathymedon obtusifrons			1	-	1
			Dulichiiidae indet.			1	-	1
			Lysianassidae indet.		3	1	-	4
			Oedicerotidae indet.		1		-	1
		Decapoda						
			Brachyura indet. juv.			1	-	1
MOLLUSCA								
	Bivalvia							

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
		Nuculoidea	Ennucula tenuis		83	130	-	213
			Nuculana pernula		6	5	-	11
			Yoldia hyperborea		2	2	-	4
		Veneroidea	Abra nitida		14	9	-	23
			Abra prismatica		1	-	-	1
			Arctica islandica		-	1	-	1
			Axinopsida orbiculata		8	4	-	12
			Thyasira gouldii		3	5	-	8
			Thyasira sarsii		13	7	-	20
		Myoidea	Mya pseudoarenaria		1	-	-	1
ECHINODERMATA		Ophiuroidea						
		Ophiurida	Ophiocten affinis		3	2	-	5
			Ophiuroidea indet. juv.		-	1	-	1
			Maksverdi:		83	130	-	213
			Antall arter/taxa:		34	37	-	46
			Sum antall individ:				-	601

Stasjonsnr.: C4

NEMERTINI

			Nemertea indet.		1	-	-	1
ANNELIDA		Polychaeta						
		Orbiniida	Levinsenia gracilis		35	45	-	80
			Scoloplos armiger		1	-	-	1
		Cossurida	Cossura longocirrata		-	1	-	1
		Spionida	Chaetozone sp.		3	3	-	6
			Laonice cirrata		-	1	-	1
			Prionospio steenstrupi		2	5	-	7
			Spio armata		-	1	-	1
			Spio decorata		-	3	-	3
			Spio limicola		4	6	-	10
		Capitellida	Maldane sarsi		5	7	-	12
			Mediomastus fragilis		1	1	-	2
			Praxillella gracilis		4	3	-	7
			Praxillella praetermissa		9	19	-	28
		Phyllodocida	Eteone flava/longa		3	6	-	9
			Microphthalmus scelkowi		-	1	-	1
			Nephtys ciliata		5	5	-	10
			Nephtys sp.		-	1	-	1
			Pholoe baltica		-	2	-	2
			Syllis cornuta		-	1	-	1
		Eunicida	Dorvilleidae indet.		-	1	-	1
			Scoletoma fragilis		-	1	-	1
		Sternaspida	Sternaspis scutata		5	35	-	40
		Oweniida	Galathowenia oculata		39	50	-	89
			Myriochele malmgreni/olgae		3	10	-	13
			Owenia sp.		37	41	-	78
		Terebellida	Ampharete borealis		9	4	-	13
			Ampharete lindstroemi		2	-	-	2
			Ampharetidae indet.		-	1	-	1
			Lagis koreni		-	3	-	3
		Sabellida	Euchone sp.		16	22	-	38

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
CRUSTACEA	Malacostraca	Cumacea	Campylaspis sp.			1	-	1
			Eudorella sp.		2	5	-	7
			Leucon sp.		7	10	-	17
		Amphipoda	Bathymedon obtusifrons		3	1	-	4
			Lysianassidae indet.		1	2	-	3
			Oedicerotidae indet.		1	2	-	3
MOLLUSCA	Prosobranchia	Mesogastropoda	Euspira pallida			2	-	2
	Opisthobranchia	Cephalaspidea	Retusa obtusa		1		-	1
	Bivalvia	Nuculoidea	Ennucula tenuis		90	105	-	195
			Nuculana pernula		13	6	-	19
			Yoldia hyperborea		1	4	-	5
		Mytiloidea	Mytilus edulis			1	-	1
		Veneroidea	Abra nitida		9	7	-	16
			Arctica islandica			1	-	1
			Astarte montagui			1	-	1
			Axinopsida orbiculata		7	10	-	17
			Macoma calcarea			1	-	1
			Thyasira gouldii		6	3	-	9
			Thyasira sarsii		10	9	-	19
ECHINODERMATA	Asteroidea		Asteroidea indet. juv.			1	-	1
	Ophiuroidea	Ophiurida	Ophiocten affinis		2	2	-	4
				Maksverdi:	90	105		195
				Antall arter/taxa:	33	48		52
				Sum antall individ:				790

Stasjonsnr.: C5

PLATYHELMINTHES

NEMERTINI			Platyhelminthes indet.		1		-	1
SIPUNCULIDA			Nemertea indet.		1	2	-	3
ANNELIDA	Polychaeta		Phascolion strombus		1		-	1
		Orbiniida	Levinsenia gracilis		15	37	-	52
			Scoloplos armiger		1	1	-	2
		Cossurida	Cossura longocirrata			1	-	1
		Spionida	Chaetozone sp.			1	-	1
			Dipolydora coeca		2	1	-	3
			Prionospio steenstrupi		3	5	-	8
			Spio decorata		1	4	-	5
			Spio limicola		4	3	-	7
			Spiophanes kroyeri			2	-	2

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
		Capitellida	Maldane sarsi		4	3	-	7
			Mediomastus fragilis			1	-	1
			Praxillella gracilis		5	5	-	10
			Praxillella praetermissa		10	7	-	17
		Phyllodocida	Eteone flava/longa		4	4	-	8
			Nephtys ciliata		10	4	-	14
			Pholoe assimilis		1		-	1
			Pholoe baltica		1	2	-	3
			Phyllodoce groenlandica		1	1	-	2
			Polynoidae indet.		3		-	3
			Syllis cornuta		1	1	-	2
		Eunicida	Scoletoma fragilis		1		-	1
		Sternaspida	Sternaspis scutata		14	30	-	44
		Oweniida	Galathowenia oculata		42	36	-	78
			Myriochele malmgreni/olgae		28	22	-	50
			Owenia sp.		58	52	-	110
		Terebellida	Ampharete borealis		14	7	-	21
			Ampharete lindstroemi			1	-	1
			Lagis koreni			1	-	1
		Sabellida	Euchone sp.		17	21	-	38
CRUSTACEA	Malacostraca	Cumacea	Eudorella sp.		6		-	6
			Leucon sp.		8	15	-	23
		Amphipoda	Bathymedon obtusifrons		1	3	-	4
			Lysianassidae indet.			2	-	2
			Oedicerotidae indet.			2	-	2
MOLLUSCA	Prosobranchia	Mesogastropoda	Euspira montagui			1	-	1
	Opisthobranchia	Cephalaspidea	Retusa obtusa		1	2	-	3
	Bivalvia	Nuculoidea	Ennucula tenuis		137	120	-	257
			Nuculana pernula		13	1	-	14
			Yoldia hyperborea		4		-	4
		Veneroidea	Abra nitida		13	4	-	17
			Arctica islandica		2		-	2
			Axinopsida orbiculata		13	15	-	28
			Thyasira gouldii		3	4	-	7
			Thyasira sarsii		12	9	-	21
ECHINODERMATA	Ophiuroidea	Ophiurida	Ophiocten affinis			1	-	1
			Ophiuroidea indet. juv.		2	7	-	9
				Maksverdi:	137	120		257
				Antall arter/taxa:	39	41		49
				Sum antall individ:				899
Stasjonsnr.:	C6							
PLATYHELMINTHES								
NEMERTINI			Platyhelminthes indet.			1	-	1

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
ECHIURIDA			Nemertea indet.		2	1	-	3
ANNELIDA			Echiurus echiurus			1	-	1
	Polychaeta							
		Orbiniida						
		Spionida	Levinsenia gracilis		65	69	-	134
			Chaetozone sp.			2	-	2
			Dipolydora coeca		2		-	2
			Prionospio steenstrupi		5		-	5
			Spio decorata		1		-	1
			Spio limicola		4	5	-	9
		Capitellida						
			Maldane sarsi		5	2	-	7
			Maldanidae indet.		1		-	1
			Mediomastus fragilis		5	6	-	11
			Praxillella gracilis		6	9	-	15
			Praxillella praetermissa		11	7	-	18
			Rhodine loveni		1		-	1
		Phyllodocida						
			Bylgides groenlandicus			1	-	1
			Eteone barbata		1		-	1
			Eteone flava/longa			2	-	2
			Nephtys ciliata		5	4	-	9
			Polynoidea indet.			1	-	1
			Syllis cornuta		1	2	-	3
		Sternaspida						
			Sternaspis scutata		8	24	-	32
		Oweniida						
			Galathowenia oculata		42	35	-	77
			Myriochele malmgreni/olgae		27	22	-	49
			Owenia sp.		45	53	-	98
		Terebellida						
			Ampharete borealis		1	2	-	3
			Lagis koreni		1		-	1
			Laphania boeckii			2	-	2
		Sabellida						
			Euchone sp.		3	12	-	15
CRUSTACEA								
	Malacostraca							
		Cumacea						
			Eudorella sp.		1	3	-	4
			Leucon sp.		11	11	-	22
		Amphipoda						
			Bathymedon obtusifrons		1		-	1
			Lysianassidae indet.		4	2	-	6
			Oedicerotidae indet.		1	2	-	3
		Isopoda						
			Pleurogonium spinosissimum			1	-	1
		Decapoda						
			Brachyura indet. juv.			1	-	1
MOLLUSCA								
	Caudofoveata							
			Caudofoveata indet.			1	-	1
	Prosobranchia							
		Mesogastropoda						
			Euspira pallida			1	-	1
	Opisthobranchia							
		Cephalaspidea						
			Retusa obtusa		1	1	-	2
	Bivalvia							
		Nuculoida						
			Ennucula tenuis		88	118	-	206
			Nuculana pernula		7	10	-	17
			Yoldia hyperborea			2	-	2
		Veneroida						
			Abra nitida		2	10	-	12



Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
			Arctica islandica		2	-		2
			Axinopsida orbiculata		12	4	-	16
			Kurtiella bidentata			1	-	1
			Thyasira gouldii		5	5	-	10
			Thyasira sarsii		6	10	-	16
ECHINODERMATA								
	Ophiuroidea							
		Ophiurida						
			Ophiocten affinis			1	-	1
			Ophiura albida		1	-		1
			Ophiuroidea indet. juv.		2	4	-	6
			Maksverdi:		88	118		206
			Antall arter/taxa:		37	41		51
			Sum antall individ:					837

## 7.4 Analytical report



### ANALYSERAPPORT

Kunde: Arctic Sea Farm / Arctic Fish  
Kundemerking: Eyrarhlid 2  
Kontaktperson:  
Prosjektnr.: 65177

Rapport nr.: P230153  
Rapportdato: 2023-11-13  
Ankomst dato: 2023-09-01

Lab-id. P230153-01

Objekt	Prøvestasjon/ID	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C1	65177 - Eyrarhlid 2 C and B survey at fallow period 2023		2023-08-28

Analyseresultat						
Parameter	Resultat	Enhet	Analyse dato start	Analyse dato slutt	Standard	Måleusikkerhet
TOC	19	mg/g TS	2023-09-18	2023-09-20	Intern metode (DIN EN 17505:2022)	±1.9
TNb	3.3	mg/g TS	2023-09-18	2023-09-20	Intern metode (NS-EN 16168:2012)	±1.0
nTOC	24.9	mg/g TS	2023-10-24	2023-10-24	Veileder 02:2018	
C/N - forhold	6.0		2023-09-25	2023-09-25		
TOM	7.9	% TS	2023-10-16	2023-10-19	Intern metode	±0.4
Vekt% 2 mm	3.1	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 1 mm	0.3	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.500 mm	0.5	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm	1.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm	5.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm	18.8	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% < 0.063 mm	69.5	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.5
Pelitt	69.5	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.5
Sand	27.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.2
Grus	3.1	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Kobber (Cu) <sup>a</sup>	41.1	mg/kg TS	2023-09-22	2023-09-22	Intern metode	

<sup>a</sup> Prøvingen er utført av eksternt laboratorium, ALS Laboratory Group

\* = Ikke akkreditert resultat

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Side 1 av 7

## ANALYSERAPPORT

Kunde: Arctic Sea Farm / Arctic Fish  
 Kundemerking: Eyrarhlid 2  
 Kontaktperson:  
 Prosjektnr.: 65177

Rapport nr.: P230153  
 Rapportdato: 2023-11-13  
 Ankomst dato: 2023-09-01

Lab-id. P230153-02

Objekt	Prøvestasjon/ID	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C2	65177 - Eyrarhlid 2 C and B survey at fallow period 2023		2023-08-28

Analyseresultat						
Parameter	Resultat	Enhet	Analyse dato start	Analyse dato slutt	Standard	Måleusikkerhet
TOC	23	mg/g TS	2023-09-18	2023-09-20	Intern metode (DIN EN 17505:2022)	±2.3
TNb	4.0	mg/g TS	2023-09-18	2023-09-20	Intern metode (NS-EN 16168:2012)	±1.2
nTOC	26.5	mg/g TS	2023-10-24	2023-10-24	Veileder 02:2018	
C/N - forhold	5.7		2023-09-25	2023-09-25		
TOM	8.9	% TS	2023-10-16	2023-10-19	Intern metode	±0.4
Vekt% 2 mm	0.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 1 mm	0.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.500 mm	0.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm	1.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm	4.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm	12.6	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% < 0.063 mm	80.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±4.0
Pelitt	80.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±4.0
Sand	19.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Grus	0.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0

\* = Ikke akkreditert resultat

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Side 2 av 7

## ANALYSERAPPORT

Kunde: Arctic Sea Farm / Arctic Fish  
 Kundemerking: Eyrarhlid 2  
 Kontaktperson:  
 Prosjektnr.: 65177

Rapport nr.: P230153  
 Rapportdato: 2023-11-13  
 Ankomst dato: 2023-09-01

Lab-id. P230153-03

Objekt	Prøvestasjon/ID	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C3	65177 - Eyrarhlid 2 C and B survey at fallow period 2023		2023-08-28

Analyseresultat						
Parameter	Resultat	Enhet	Analyse dato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	21	mg/g TS	2023-09-18	2023-09-20	Intern metode (DIN EN 17505:2022)	±2.1
TNb	3.8	mg/g TS	2023-09-18	2023-09-20	Intern metode (NS-EN 16168:2012)	±1.1
nTOC	26.2	mg/g TS	2023-10-24	2023-10-24	Veileder 02:2018	
C/N - forhold	5.4		2023-09-25	2023-09-25		
TOM	8.5	% TS	2023-10-16	2023-10-19	Intern metode	±0.4
Vekt% 2 mm	1.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 1 mm	0.3	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.500 mm	0.6	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm	3.7	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm	6.7	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm	17.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% < 0.063 mm	69.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.5
Pelitt	69.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.5
Sand	28.6	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.2
Grus	1.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Emamectinbenzoat <sup>b</sup>	*<50	ng/kg TS	2023-10-09	2023-10-09	Intern metode	

<sup>b</sup> Prøvingen er utført av eksternt laboratorium, NIVA

\* = Ikke akkreditert resultat

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## ANALYSERAPPORT

Kunde: Arctic Sea Farm / Arctic Fish  
 Kundemerking: Eyrarhlid 2  
 Kontaktperson:  
 Prosjektnr.: 65177

Rapport nr.: P230153  
 Rapportdato: 2023-11-13  
 Ankomst dato: 2023-09-01

Lab-id. P230153-04

Objekt	Prøvestasjon/ID	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C4	65177 - Eyrarhlid 2 C and B survey at fallow period 2023		2023-08-28

Analyseresultat						
Parameter	Resultat	Enhet	Analyse dato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	24	mg/g TS	2023-09-18	2023-09-20	Intern metode (DIN EN 17505:2022)	±2.4
TNb	5.0	mg/g TS	2023-09-18	2023-09-20	Intern metode (NS-EN 16168:2012)	±1.5
nTOC	29.1	mg/g TS	2023-10-24	2023-10-24	Veileder 02:2018	
C/N - forhold	4.8		2023-09-25	2023-09-25		
TOM	8.8	% TS	2023-10-16	2023-10-19	Intern metode	±0.4
Vekt% 2 mm	0.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 1 mm	0.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.500 mm	0.8	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm	3.1	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm	7.8	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm	15.6	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% < 0.063 mm	72.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.6
Pelitt	72.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.6
Sand	27.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.2
Grus	0.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0

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## ANALYSERAPPORT

Kunde: Arctic Sea Farm / Arctic Fish  
 Kundemerking: Eyrarhlid 2  
 Kontaktperson:  
 Prosjektnr.: 65177

Rapport nr.: P230153  
 Rapportdato: 2023-11-13  
 Ankomst dato: 2023-09-01

Lab-id. P230153-05

Objekt	Prøvestasjon/ID	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C5	65177 - Eyrarhlid 2 C and B survey at fallow period 2023		2023-08-28

Analyseresultat						
Parameter	Resultat	Enhet	Analyse dato start	Analyse dato slutt	Standard	Måleusikkerhet
TOC	22	mg/g TS	2023-09-18	2023-09-20	Intern metode (DIN EN 17505:2022)	±2.2
TNb	4.4	mg/g TS	2023-09-18	2023-09-20	Intern metode (NS-EN 16168:2012)	±1.3
nTOC	25.4	mg/g TS	2023-10-24	2023-10-24	Veileder 02:2018	
C/N - forhold	4.9		2023-09-25	2023-09-25		
TOM	8.2	% TS	2023-10-16	2023-10-19	Intern metode	±0.4
Vekt% 2 mm	0.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 1 mm	0.3	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.500 mm	0.5	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm	1.8	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm	4.0	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm	13.3	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% < 0.063 mm	79.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±4.0
Pelitt	79.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±4.0
Sand	19.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Grus	0.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0

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## ANALYSERAPPORT

Kunde: Arctic Sea Farm / Arctic Fish  
 Kundemerking: Eyrarhlid 2  
 Kontaktperson:  
 Prosjektnr.: 65177

Rapport nr.: P230153  
 Rapportdato: 2023-11-13  
 Ankomst dato: 2023-09-01

Lab-id. P230153-06

Objekt	Prøvestasjon/ID	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C6	65177 - Eyrarhlid 2 C and B survey at fallow period 2023		2023-08-28

Analyseresultat						
Parameter	Resultat	Enhet	Analyse dato start	Analyse dato slutt	Standard	Måleusikkerhet
TOC	22	mg/g TS	2023-09-18	2023-09-20	Intern metode (DIN EN 17505:2022)	±2.2
TNb	4.4	mg/g TS	2023-09-18	2023-09-20	Intern metode (NS-EN 16168:2012)	±1.3
nTOC	25.6	mg/g TS	2023-10-24	2023-10-24	Veileder 02:2018	
C/N - forhold	5.0		2023-09-25	2023-09-25		
TOM	8.8	% TS	2023-10-16	2023-10-19	Intern metode	±0.4
Vekt% 2 mm	0.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 1 mm	0.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.500 mm	0.3	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm	1.7	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm	5.3	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm	13.9	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% < 0.063 mm	78.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.9
Pelitt	78.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±3.9
Sand	21.4	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.1
Grus	0.2	wt% TS	2023-10-16	2023-10-23	Intern metode (Bale/Kenny 2005)	±0.0

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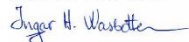
Kunde: Arctic Sea Farm / Arctic Fish  
Kundemerking: Eyrarhlid 2  
Kontaktperson:  
Prosjektnr.: 65177

Rapport nr.: P230153  
Rapportdato: 2023-11-13  
Ankomst dato: 2023-09-01

## Analyseansvarlig:

Ingar H. Wasbotten

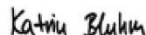
## Signatur:



Katrín Bluhm

## Underskriftsberettiget:

## Signatur:



*Analysene gjelder bare for de prøver som er testet. De oppgitte analyseresultat omfatter ikke feil som måtte følge av prøvetagningen, inhomogenitet eller andre forhold som kan ha påvirket prøven før den ble mottatt av laboratoriet. Rapporten får kun kopieres i sin helhet og uten noen form for endringer. En eventuell klage skal leveres laboratoriet senest en måned etter mottak av analyseresultat. Nærmere informasjon om analysemetodene (måleusikkerhet, metodeprinsipp etc.) fås ved henvendelse til Akvaplan-Niva AS*

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