B-survey at Eyri, 2026 (max biomass), Arnarlax ehf

Akvaplan-niva AS report:
APN 2026 67669.B01

B survey at Eyri 2026 (max biomass), Arnarlax ehf

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Customer	Arnarlax ehf
Contact person	Kristian Leander Gillebo Sormo

Summary

Sediment was recovered at all the 15 stations (100% soft bottom). The sediment consisted mainly of clay and often with some dead shell fragments and some dead black algae deposition. Valid sample was achieved in first attempt at all stations. Fauna was recorded to be present at all stations mainly in the form of polychaetes in additions to some shells. There were signs of out-gassing at one sampling station (St. 6). No smell of H_2S was recorded at nine stations, light smell at five and strong smell at one station. The substrate was light/grey colour at six stations and brown/black at nine stations. The consistency of the sediment was solid at all stations and grab was ¾ full or more at all stations. The were signs of faeces at five sampling stations and the bacteria *Beggiatoa* was observed at one station.

Based on the classification of sediment chemistry (pH/Eh) and the sensory assessment eleven stations received status 1 – "Very good", two stations received status 2 – "Good" and two stations received status 3 – "Bad" " (Figure 2). The stations with status "Good" and "Bad" were all placed at the northwestern part of the local impact zone. Overall, the index score for parameter III (sensory parameters) was somewhat higher or 0.98 compared with the index score for the parameter II (pH/Eh) 0.67.

In summary, the site receives overall the environmental status 1 - "Very good" (average group II-III index =0.82).

Approval

Snorri Gunnarsson
Project Manager

Kari E Justad
Digitally signed by Kari Elisabeth Justad
Date: 2026.08.18 08:38:58 +02'00'
Quality Control

Key information

Site details and license holder information			
Site name	Eyri	Site coordinates	65°34.723' N 23°58.675' V
County	Vesturbyggð	Municipality	Patreksfjörður
MTB (estimated max biomass)	4.524 tonnes	Operations Manager / Contact	Kristian Leander Gillemo Sormo
License holder / customer	Arnarlax ehf		

Production status on date of survey			
Biomass at site	4.100 tonnes	Total feed use	7.688 tonnes
Farmed species	Salmon	Total biomass produced	6.714 tonnes
Type/time of survey	Indicated with X	Comments	
Maximum organic load cf. chapter 7.9	☒		
Follow-up survey	☐		
Half maximum load	☐		
Pre-stock	☐		
Required by the state administrator - baseline survey	☐		
Other	☐		
Last fallowing period:	April 2023 – May 2024		

Results from B-survey in accordance with NS 9410:2016 (main results)			
Parameter group and index		Parameter group and status	
Gr. II. pH/Eh	0.67	Gr. II. pH/Eh	1
Gr. III. Sensory	0.98	Gr. III. Sensory	1
GR. II + III	0.82	GR. II+ III	1
Date of fieldwork	11.08 2026	Date of report	18.08 2026
Environmental status (NS 9410:2016):			**1**

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1 Introduction

The present survey was conducted by Akvaplan-niva AS on behalf of Arnarlax ehf in connection with the company's fish farming activities at the site Eyri in Patreksfjörður, Vesturbyggð municipality.

The purpose of a B-survey is to document the environmental status in the near zone of a fish farm by evaluating sediment condition (chemistry, sensory and presence/absence of fauna) in accordance with NS 9410:2016.

The B-survey is a tool for trend monitoring and allows to assess the status of organic enrichment beneath the net pens at different stages of the production cycle.

Figure 1 shows a map of the fjord system Patreksfjörður and Tálknafjörður where Eyri is located.

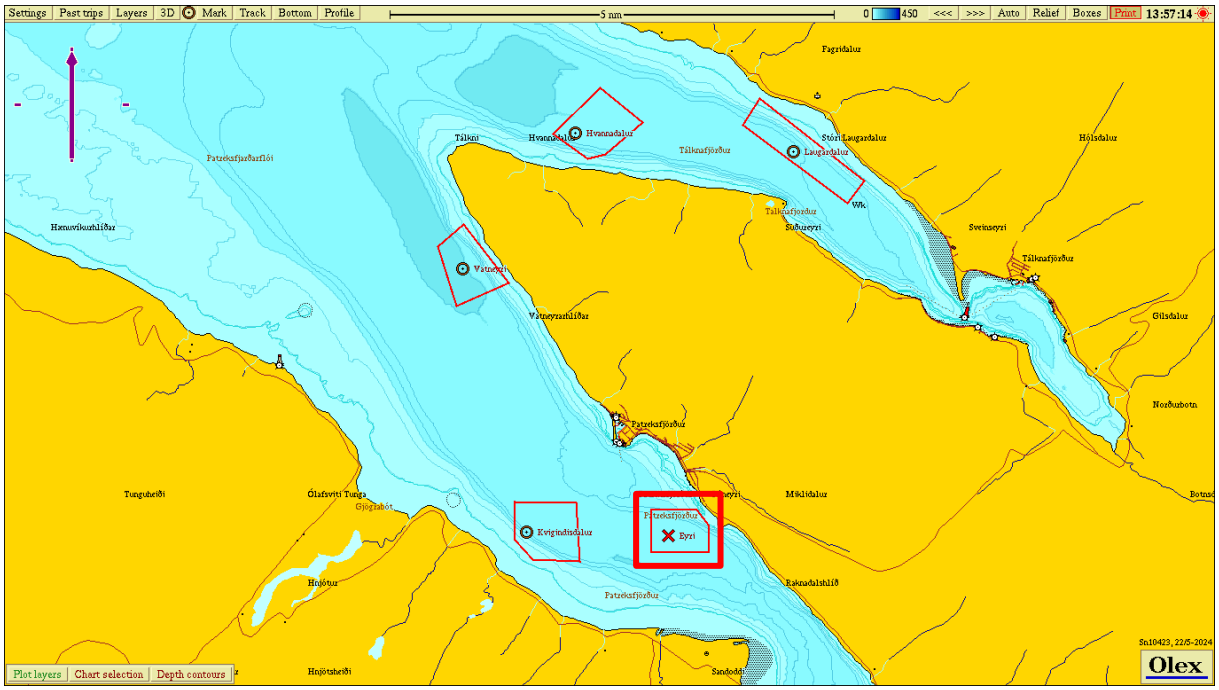


Figure 1. Overview map of Patreksfjörður where Eyri is marked with and X and red bold square. Other fish farming areas in the nearest vicinity are also shown.

2 Methods

Monitoring of the environmental impact of fish farming activities on the seabed is standardised and regulated. All fish farming sites that are in use must be regularly assessed. This B-survey follows guidelines and methods outlined in NS 9410:2016 and ISO 12878. The Icelandic Environment and Energy Agency (Umhverfis og orkustofnun) can also set specific requirements regarding frequency of surveys for different fish farming sites, which can overrule the above-mentioned standards.

The B survey is a trend monitoring tool with the focus on sediment condition (benthic impact) under and in the immediate vicinity of an aquaculture site. Sediment samples are taken using a grab (min. 250 cm^2). Sediment condition for each sample is assessed applying three indicators: sediment chemistry (pH and redox potential), sensory evaluation (gas bubbles; smell, texture, colour of substrate and thickness of deposited sludge) and the presence or absence of fauna. The performance of these indicators against predefined thresholds allows to categorise the site into four different environmental statuses (Table 1), which are used to determine subsequent sampling frequency. The number of sampling stations is based on the site's allocated MTB, here the estimated max biomass of the current generation i.e. 4.524 ton (Personal reference, Per Gunnar Hallan, 2026).

Table 1. Frequency of B-survey based on environmental status at site.

Environmental status at maximum organic load (near zone)	Monitoring frequency for B survey
1-very good	At the next maximum load
2-good	Pre-stock and again at maximum load
3-poor	Pre-stock If the survey prior to restocking / end of fallowing provides: Status 1 – survey should be carried out at next maximum load. Status 2 – survey should be carried out at half the maximum load and at the next maximum load. Status 3 – survey should be carried out at half the maximum load and at maximum load. Implementation of measures to reduce impact should be planned for the next production cycle. If any surveys show the environmental status to be 4 – "very poor", the site's environmental capacity has been exceeded.
4- very poor	Environmental capacity at site is exceeded. The authorities decide further measures.

The following equipment was used in this survey:
Grab: Van Veen grab (0.1 m^2)
Sieve 1 mm: Akvaplan-niva
pH meter: Electrode, YSI Professional Plus
Redox meter: Electrode, YSI Professional Plus
Position determination – GPS map 62s
Digital camera

3 Site, production and survey design

3.1 Site characteristics and production

The Eyri site is in Patreksfjörður, just outside of Patreksfjörður village and about 2 km southeast from Patreksfjörður harbour. The cages extend in a westward direction from land (270 degrees). The depth under cages ranges from about 52 - 55 m. The fish farm at the site is a 2x7 setup, total 14 cages each with 160 m circumference. During the last production cycle 12 cages were used.

The current generation is the third at the site.

Table 2 shows production and feed use for present and previous generations.

Table 2. Production and feed use for farm site Eyri. Data provided by customer.

Generation of fish (G)	Production (tonnes)	Feed use (tonnes)
Current generation to date of survey	6.714	7.688
Generation 2021- 2023	9.163	11.624
Generation 2018- 2020	5.143	7.177

3.2 Current and past surveys

Table 3 provides an overview on results and time of sampling for current and the last B-surveys at site.

Table 3. Present and previously conducted B-surveys at the site.

Date of sampling	Report number	Production status	Location condition
11.08.2026	APN 67669.B01 (current report)	Max biomass	1
23.04.2024	APN 65850.B01	Fallow period	1
18.11.2022	APN 64474.B01	Max biomass	2
28.05 2021	APN 63202.B01	Fallow period	1
05.03.2020	APN-61958.B02	Max biomass	1
17.05.2018	APN-60033.B01	B-pre survey	1

3.3 Hydrodynamic conditions

Measurement of dispersing current was done at the site in March – May 2020 measurements at 43 m depth. Dominating current (43 m) is in direction north by north-west (330 degrees; **Feil! Fant ikke referansekilden.**) with a smaller counter current in south by south-east direction. Average current speed is measured to be 5.0 cm/s. Highest current speed is measured to be 20.8 cm/s and 5.9 % of the measurements are < 1 cm/s (Gunnarsson, 2020b).

3.4 Survey design

Sampling stations were placed following an assessment of site configuration and local environmental conditions, i.e. bathymetry and hydrodynamics. An overview of the sampling stations can be found in Figure 2 with coordinates and depth provided in Table 4. The number of sampling stations were 15 according to guidance in ISO 12878 and NS 9410:2016. The placement of the sampling stations gives good coverage of the local impact zone of the fish farm. Sampling stations were placed to represent the environmental conditions within the near zone and cover thus both the deeper and shallower areas. The depth in the local impact zone is rather homogenous in the range from about 52-55 m. Samples were collected from depths ranging from 52-55 metres. The station placements are considered representative for an environmental survey of the farm's near-zone and in accordance with the requirements outlined in NS 9410:2016.

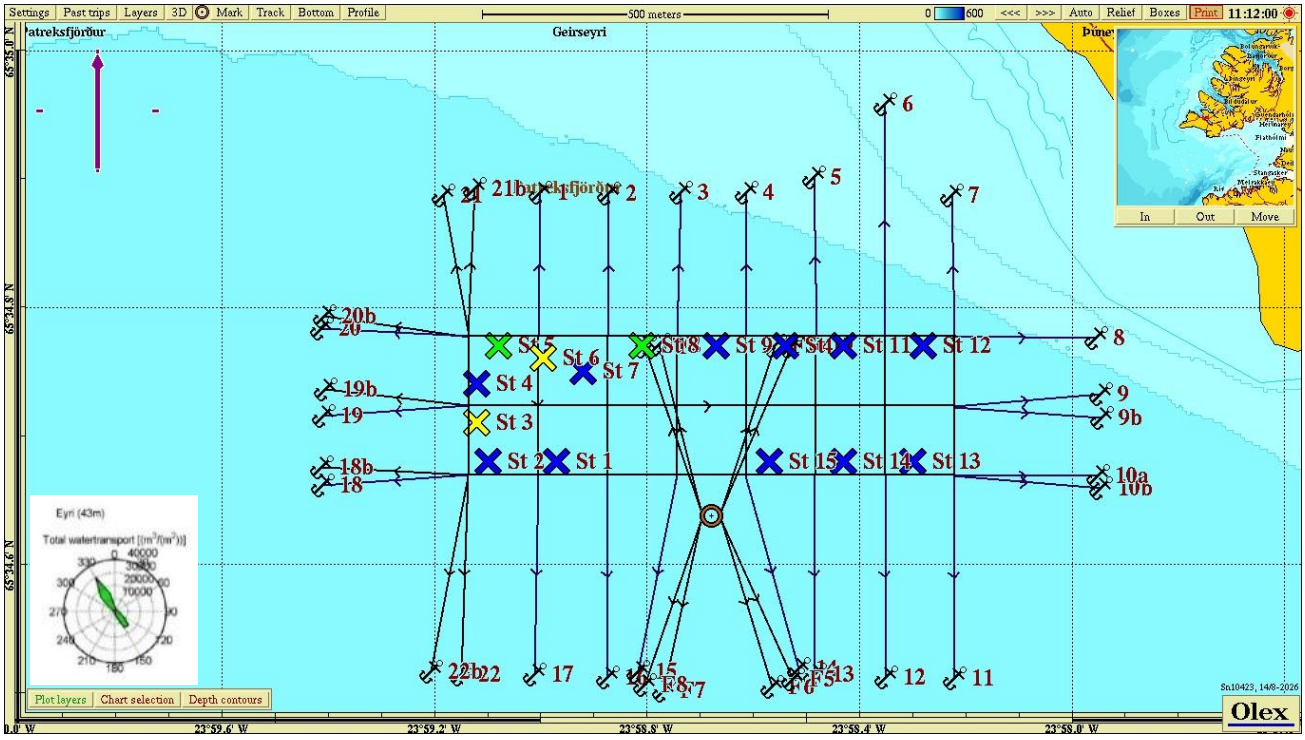


Figure 2. Overview map showing site configuration and local bathymetry at Eyri. Sampling stations are marked by crosses and colour coded to visualise the environmental status at the respective station following the classification outlined in NS 9410:2016, chapter 7.11 (1 = blue, 2 = green, 3 = yellow, 4 = red). The current rose in the left corner shows the direction of water transport of the dispersal current at 43 m depth (Gunnarsson, 2020b).

Table 4. Position and depth of the sampling stations of this survey.

Station number	Northing	Westing	Depth [m]
St 1	65°34,680	23°58,970	52
St 2	65°34,680	23°59,100	52
St 3	65°34,710	23°59,120	53
St 4	65°34,740	23°59,120	53
St 5	65°34,770	23°59,080	53
St 6	65°34,760	23°58,996	53
St 7	65°34,750	23°58,920	53
St 8	65°34,770	23°58,810	55

Station number	Northing	Westing	Depth [m]
St 9	65°34,770	23°58,670	55
St 10	65°34,770	23°58,540	55
St 11	65°34,770	23°58,410	55
St 12	65°34,770	23°58,280	53
St 13	65°34,680	23°58,300	53
St 14	65°34,680	23°58,430	53
St 15	65°34,680	23°58,570	52

4 Results

Classified survey results for the different parameter categories as well as the assigned environmental status of the site are shown in Table 5. The complete survey assessment form with results and classifications for each station can be found in the attachment.

Table 5. Results from the environmental assessment of the near zone of Eyri.

Parameter	Status
Group II parameters (pH/Eh)	1
Group III parameters (sensory)	1
Group II + III – parameters (mean)	1
Environmental status (site)	1

Sediment was recovered at all the 15 stations (100% soft bottom). The sediment consisted mainly of clay and often with some dead shell fragments and some dead black algae deposition. Valid sample was achieved in first attempt at all stations. Fauna was recorded to be present at all stations mainly in the form of polychaetes in additions to some shells. There were signs of out-gassing at one sampling station (St. 6). No smell of H_2S was recorded at nine stations, light smell at five and strong smell at one station. The substrate was light/grey colour at six stations and brown/black at nine stations. The consistency of the sediment was solid at all stations and grab was ¾ full or more at all stations. The were signs of faeces at five sampling stations and the bacteria *Beggiatoa* was observed at one station.

Based on the classification of sediment chemistry (pH/Eh) and the sensory assessment eleven stations received status 1 – "Very good", two stations received status 2 – "Good" and two stations received status 3 – "Bad" " (Figure 2). The stations with status "Good" and "Bad" were all placed at the northwestern part of the local impact zone. Overall, the index score for parameter III (sensory parameters) was somewhat higher or 0.98 compared with the index score for the parameter II (pH/Eh) 0.67.

In summary, the site receives overall the environmental status 1 - "Very good" (average group II-III index =0.82).

5 Summary

Applying the indicator thresholds and classification outlined in NS 9410:2016 it is shown that the site Eyri, receives overall site status of 1 – "Very good" at the time of this B survey (max biomass) sampling in the local impact zone. Samples were collected with a Van Veen grab at fifteen stations. Eleven stations received status 1 – "Very good", two stations received status 2 – "Good" and two stations received status 3 – "Bad".

In a previous B surveys carried out close to feeding peak at the site in November 2022 resulted in an environmental status 2 – "Good" (Gunnarsson, 2023) and the index score for both parameter II and III was higher (i.e. 1.10 and 1.57) than in the current survey. Also, in the 2022 survey of the total twenty sampling stations there were four stations with status 4 – "Very bad" contra none in the current study. This indicates somewhat higher organic load during farming of the 2021-2023 generation contra the current generations but production at the site was also higher for previous generation at the site (Table 2). In the 2022 survey, stations with reduced status were mainly located in the northern and western similar to current survey with reduced status stations mainly in northwestern part of the farm in line with the main spread current at the site. The results from the sampling at max biomass in July 2026 show that there has been some but less build-up of organic enrichment during farming of the present generation at the Eyri site compared to the previous one.

The site is given environmental status 1 – "Very good" following the criteria outlined in NS 9410:2016.

6 References

Forskrift om drift av akvakulturanlegg (akvakulturdriftsforskriften) §§ 35 og 36.

Gunnarsson, S., 2018. Eyri, Arnarlax hf. Forundersøkelse (B-undersøkelse), mai 2018. Akvaplan-niva AS report nr. 60033.01.

Gunnarsson, S., 2020a. Eyri, Arnarlax. B-bottom survey March 2020 (maximum biomass survey). Akvaplan-niva AS report nr. 61958.B02.

Gunnarsson, S. 2020b. Arnarlax hf. Eyri current measurement. 43 meters depth. Akvaplan-niva AS project nr. 62001.01.

Gunnarsson, S., 2022. Eyri, Arnarlax. B- survey, November 2022 (max biomass). Akvaplan-niva AS report nr. 64475.B01

Gunnarsson, S., 2024. B-survey at Eyri, April 2024 (fallow period), Arnarlax ehf. Akvaplan-niva AS report nr. 65850.B01

Gústavsson, A., 2021. Eyri, Arnarlax B-bottom survey, May 2021 (fallow period). Akvaplan-niva AS report nr. 63202.B01.

ISO 12878:2012. Environmental monitoring of the impacts from marine finfish farms on soft bottom.

ISO 5667-19:2004. Guidance on sampling of marine sediments.

Norsk Standard NS 9410:2016. Miljøovervåking av bunnpåvirkning fra marine akvakulturanlegg.

Personal reference. Per Gunnar Hallan, biological controller, Arnarlax 2026.

7 Attachments

7.1 Form (B.1 and B.2) NS 9410:2016

Sample scheme B.1

Company:	Arnarlax	Date:	11.08 2026
Site:	Eyri	Site no.:	-
Fieldworker:	Snorri Gunnarsson		

Gr	Parameter	Score	Sample number									
			1	2	3	4	5	6	7	8	9	10
	Bottom type: S (soft) or H (hard)		S	S	S	S	S	S	S	S	S	S
I	Organism > 1mm	Yes (0) No (1)	0	0	0	0	0	0	0	0	0	0
II	pH	pH	7,74	7,79	7,05	7,75	7,65	6,95	7,57	7,65	7,43	7,79
	Eh (mV)	ORP	37	58	-310	-33	-173	-279	-194	-218	-171	-20
		plus ref. value	237	258	-110	167	27	-79	6	-18	29	180
	pH/Eh	from figure	0	0	3	0	1	3	1	1	1	0
	Status station		1	1	3	1	1	3	1	1	1	1
			Buffer-temp	10,0 C		Sea temp	11,0 C		Sediment temp	10,0 C		
	pH sea	8,05	ORP sea	198,0 mV		Eh sea	398,0 mV		Reference electrode	200,0 mV		
III	Out-gassing	Yes (4) No (0)	0	0	0	0	0	4	0	0	0	0
	Colour	Light/grey (0)	0									
		Brown/black (2)		2	2	2	2	2	2	2	2	2
	Smell	None (0)				0			0		0	0
		Light (2)	2	2	2		2			2		
		Strong (4)						4				
	Consistency	Solid (0)	0	0	0	0	0	0	0	0	0	0
		Soft (2)										
		Aqueous (4)										
	Grab volume (v)	v < 1/4 (0)										
		1/4 < v < 3/4 (1)										
		v > 3/4 (2)	2	2	2	2	2	2	2	2	2	2
	Thickness of sludge (t)	t < 2 cm (0)	0	0	0	0	0		0	0	0	0
		2 < t < 8 cm (1)						1				
		t > 8 cm (2)										
		Sum	4,0	6,0	6,0	4,0	6,0	13,0	4,0	6,0	4,0	4,0
		Corrected (*0,22)	0,9	1,3	1,3	0,9	1,3	2,9	0,9	1,3	0,9	0,9
	Status station		1	2	2	1	2	3	1	2	1	1
	Average group II & III		0,4	0,7	2,2	0,4	1,2	2,9	0,9	1,2	0,9	0,4
	Status station		1	1	3	1	2	3	1	2	1	1

Grab ID	K3
pH / Eh ID	#25

page 1 of 4

Sample scheme B.1

Company:	**Arnarlax**	**Date:**	**11.08 2026**
Site:	**Eyri**	**Site no.:**	**-**
Fieldworker:	**Snorri Gunnarsson**		

Gr	Parameter	Score	Sample number 11	12	13	14	15	16	17	18	19	20	Index S%	H%
	Bottom type: S (soft) or H (hard)		S	S	S	S	S						100	0
I	Organism > 1mm	Yes (0) No (1)	0	0	0	0	0							
II	pH	pH	7,76	7,80	7,78	7,58	7,76							
	Eh (mV)	ORP	-90	-7	-3	9	6							
		plus ref. verdi	110	193	197	209	206							
	pH/Eh	from figure	0	0	0	0	0						0,67	
	Status station		1	1	1	1	1							
	Status group II		1	**Buffer temp**	10,0 C		**Sea temp**	11,0 C		**Sediment temp**	10,0 C			
	pH sea	8,05	**ORP sea**	198 mV		**Eh sea**	398 mV		**Reference electrode**		200 mV			
III	Out-gassing	Yes (4) No (0)	0	0	0	0	0							
	Colour	Light/grey (0)	0	0	0	0	0							
		Brown/black (2)												
	Smell	None (0)	0	0	0	0	0							
		Light (2)												
		Strong (4)												
	Consistency	Solid (0)	0	0	0	0	0							
		Soft (2)												
		Aqueous (4)												
	Grab volume (v)	v < 1/4 (0)												
		1/4 < v < 3/4 (1)												
		v > 3/4 (2)	2	2	2	2	2							
	Thickness of sludge (t)	t < 2 cm (0)	0	0	0	0	0							
		2 < t < 8 cm (1)												
		t > 8 cm (2)												
		Sum	2,0	2,0	2,0	2,0	2,0							
		Corrected (*0,22)	0,4	0,4	0,4	0,4	0,4						0,98	
		Status station	1	1	1	1	1							
		Status group III	1											
		Average group II & III	0,2	0,2	0,2	0,2	0,2						0,82	
		Status station	1	1	1	1	1							
		Status group II & III	1											

pH/Eh Corr.sum Index Average	**Status**
< 1,1	1
1,1 - <2,1	2
2,1 - <3,1	3
≥3,1	4

Status site: 1

Grab ID	K3
pH / Eh ID	#25

Sample scheme B.2

Company:	**Arnarlax**	**Date:**	**11.08 2026**
Site:	**Eyri**	**Site no.:**	**-**
Fieldworker:	**Snorri Gunnarsson**		

Sample number		1	2	3	4	5	6	7	8	9	10
Depth (m)		52	52	53	53	53	53	53	55	55	55
Number of grab deployments		1	1	1	1	1	1	1	1	1	1
Out-gassing (in sample)		No	No	No	No	No	Yes	No	No	No	No
Sediment type	**Clay**	X	X	X	X	X	X	X	X	X	X
	Silt										
	Sand										
	Gravel										
	Shellsand										
Bedrock											
Rocky bottom (cobbles, boulders)											
Echinodermata, count											
Crustaceans, count											
Molluscs, count				>50	>20	6					6
Polychaetes, count		>20	>50		>20	>20	6	2	5	>20	>50
Other organism, count											
Some shell fragments		X	X		X	X		X	X	X	X
Some dead algae (foss)					X				X	X	
Beggiatoa / bacteria mat				X							
Feed											
Faeces					X	X	X		X	X	
Comments											

Grab	**Area [m^2]**	0,1	**Grab ID**	K3

Sample scheme B.2

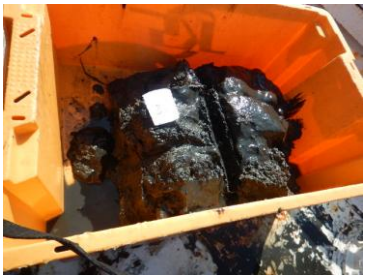
Company:	**Arnarlax**	**Date:**	**11.08 2026**
Site:	**Eyri**	**Site no.:**	**-**
Fieldworker:	**Snorri Gunnarsson**		

Sample number		11	12	13	14	15	16	17	18	19	20
Depth (m)		55	53	53	53	52					
Number of grab deployments		1	1	1	1	1					
Out-gassing (in sample)		No	No	No	No	No					
Sediment type	**Clay**	X	X	X	X	X					
	Silt										
	Sand										
	Gravel										
	Shellsand										
Bedrock											
Rocky bottom (cobbles, boulders)											
Echinodermata, count											
Crustaceans, count											
Molluscs, count				>50	>20	6					
Polychaetes, count		>20	>50		>20	>20					
Other organism, count											
Some shell fragments		X	X	X	X	X					
Some dead algae (foss)		X	X		X	X					
Beggiatoa / bacteria mat											
Feed											
Faeces											
Comments											

Grab	**Area [m^2]**	0,1	**Grab ID**	K3
Signature fieldworker:			

7.2 Images of samples at Eyri

St	*Image before sieving*	*Image after sieving*
St 1		
St 2		
St 3		
St 4		
St 5		

St 6		
St 7		
St 8		
St 9		
St 10		

St 11		
St 12		
St 13		
St 14		
St 15		

7.3 3D-bathymetry

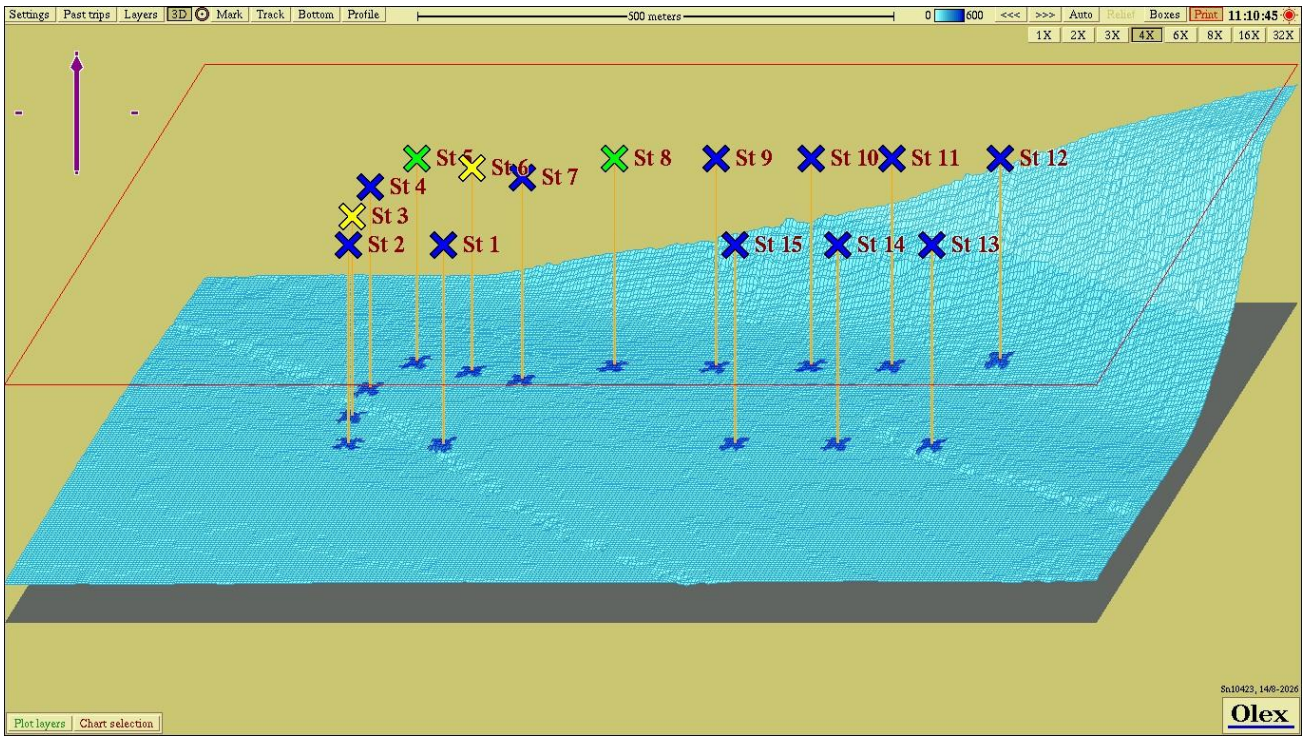


Figure 3. 3D-view of bathymetry at Eyri with stations as shown in Figure 2 and Table 4. The map is oriented towards north.