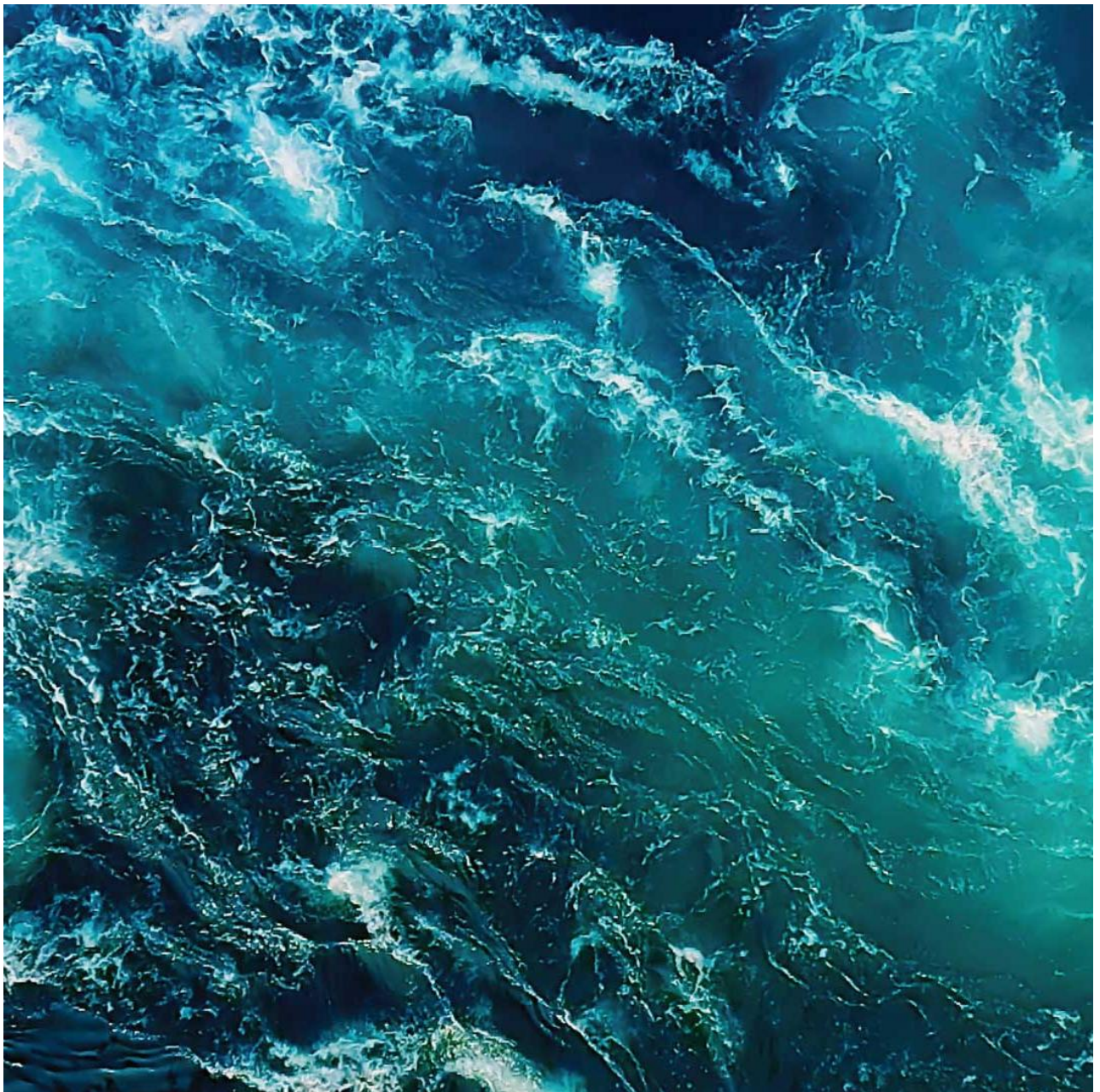


C-survey at Haganes, 2026

Arnarlax ehf

Akvaplan-niva AS Report: 2026 67560.01



Arnarlax ehf. C-Survey at Haganes, 2026.

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Summary

The results from the monitoring at the farming site Haganes in June 2026 showed that the sediment was loaded with organic carbon and the copper level in the sediment at C1 was elevated (83 mg/kg) and is categorized into environmental limit III or "upper limit of natural values". EMB concentration in the sediment at C4 was 440 ng/kg and thus exceeds the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is not fulfilling the "good status standard". The bottom sediments grain size was fine with a pelite ratio ranging from 72 to 85 %.

The redox measurements (pH/Eh) gave point 0 acc. Appendix D in NS 9410:2016 for all the sampling stations. The oxygen saturation in June was good in the whole water column with 77 % in the bottom water.

Load effect was recorded in the fauna at all stations with the faunal index nEQR below 0.6. The diversity index H' was ≤ 3 at the stations and ranged from 2.21 to 3.0. The NS 9410:2016-assessment of the community in the local impact zone (C1) showed environmental condition 2 (Good). A pollution indicator species was found among the most dominant species at C1, but not at the other stations. The fauna at all stations was dominated by tolerant and opportunistic species.

The results from the present survey in June 2026 compared to previous C survey at the Haganes in October 2024 (Mannvik & Gunnarsson, 2025) show that the diversity index H' is still low (≤ 3) at the stations. The pollution indicator *Capitella capitata* was found among the top ten at two stations in 2024 (C3 and C4) and one station in 2026 (C1). The faunal conditions were moderate at the stations in both surveys.

Approval



Project leader

Kamila Sztybor

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Quality control

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Preface

Akvaplan-niva carried out a type C (NS 9410:2016) environmental survey at the Haganes 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 Sztzybor	Akvaplan-niva	QA report, professional assessments, and interpretations.
Rune Palerud	Akvaplan-niva	Identification of bottom fauna (Crustaceans). Statistics.
Jesper Hansen	Akvaplan-niva	Identification of bottom fauna (Varia, Polychaeta and Mollusca).
Anne Tårånd Aasen	Akvaplan-niva	Hydrographical vertical profiles
Kristine H Sperre	Akvaplan-niva	Coordination of sorting of bottom fauna.
Lisa Torske	Akvaplan-niva	Coordination of geo-chemical analyses.

Akvaplan-niva would like to thank Arnarlax ehf and Kristian Leander Gillebo Sormo 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: Analyses of emamectin benzoate, hydrographical measurements and mapping of bottom topography (Olex).

1 Data Summary

Client information			
Report title:	C-Survey at Haganes, 2026.		
Report nr.	2026 67560.01	Site:	Haganes
Municipality:		Map Coordinates (construction):	65°40,469 N 23°32,762 V
MTB permitted (estimated max biomass next generation):	8.491 tonnes	Operations manager:	Kristian Leander Gillebo Sormo
Client:	Arnarlax ehf		

Biomass/production status at time of survey (09.06.2026)			
Fish group:	Salmon	Biomass on examination (t):	0
Feed input (t):	0	Tonnes of produced fish:	0
Type/time of survey			
Maximum biomass (t):		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 (Miljødirektoratet 2025)		Diversity index H' (Shannon-Wiener)	
Fauna C1 (impact zone)	0.451	Fauna C1 (impact zone)	3.00
Fauna C2	0.520	Fauna C2	2.67
Fauna C2alt	0.478	Fauna C2alt	2.21
Fauna C3	0.499	Fauna C3	2.55
Fauna C4 (deep area)	0.553	Fauna C4 (deep area)	2.96
Fauna C5	0.523	Fauna C5	2.67
Date fieldwork:	(09.06.2026)	Date of report:	07.09 2026
Notes to other results (sediment, pH/Eh, oxygen)			nTOC from 44.1 to 58.7 Copper 83 mg/kg at C1 Eh positive at all stations O ₂ -conditions were good throughout the water column.

2 Introduction

2.1 Background and aim of the study

On behalf of Arnarlax ehf, Akvaplan-niva completed a survey (type C) for the fish farming site at Haganes (Figure 1). The survey fulfils the requirements of an environmental study with reference to Chapter 5.0 in NS 9410:2016 which follows the methodology for C- study. The survey also fulfils the requirements for bottom surveys according to ISO 12878 and the requirements for environmental bottom surveys (according to Vöktunaráætlun). 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..

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 these same indexes with reference to Norwegian threshold values (national water type G/H 1-3; see chapter 7.2), 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 guidelines from Miljødirektoratet (2025).

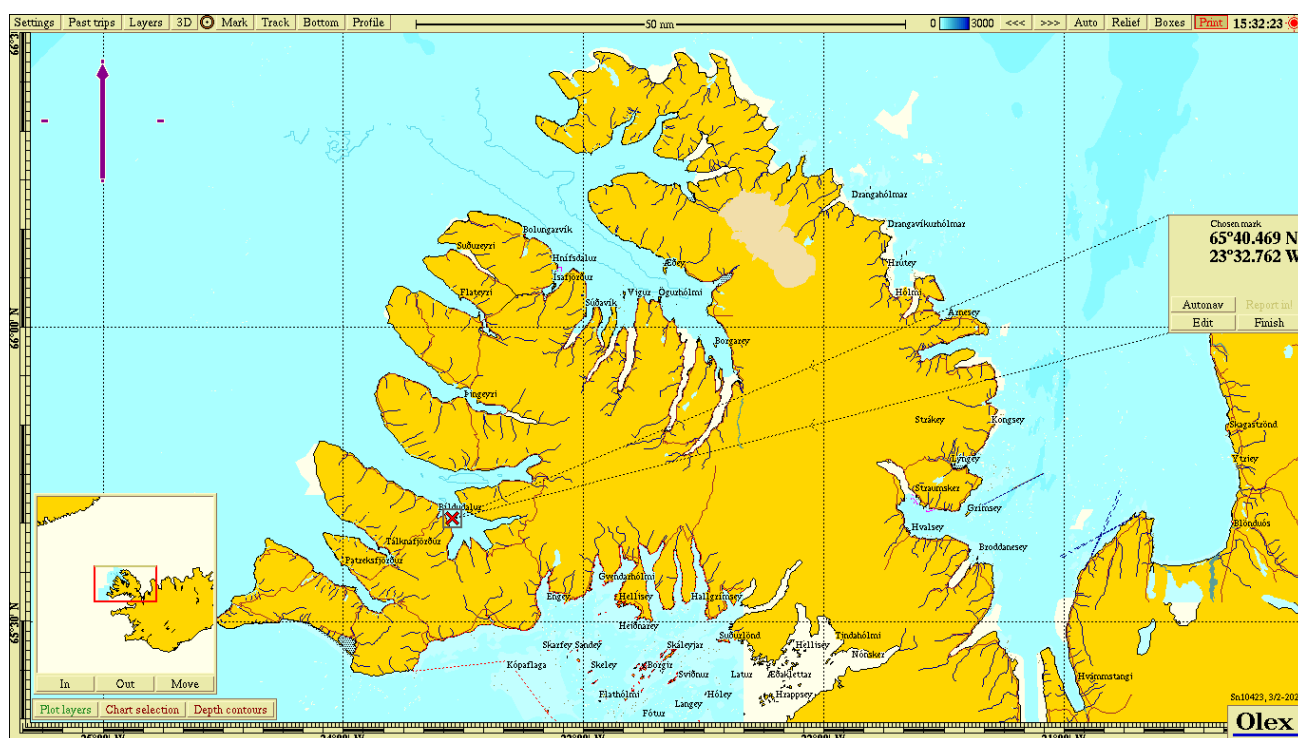


Figure 1 Overview of Westfjords with the farming site Haganes (red cross). The map coordinates for the midpoint of the farming site are given to the right.

2.2 Site operation and feed use

The Haganes site is located in the southern part of Arnarfjörður, approximately 1,4 nm southeast of the town of Bíldudalur. The installed frame is suited for up to 18 net-pens with a circumference of 160 m in a 2 x 9 configuration. The frame is positioned in eastern direction from land (80°) with depth below the cages ranging from 44 to 100 m. In 2023 the mooring and cages were moved within the fish farming area to extend further out into the fjord and turned on an axis in a more eastern direction only partly overlapping the previous farming site.

Previously there have been farmed three generations at the "old" Haganes site and one generation at the current installation.

In Iceland, the MTB (maximum allowed biomass) limit is not given 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 one 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 8.491 tonnes, used as MTB here ((Personal reference, Per Gunnar Hallan, 2026).

2.3 Previous surveys

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

Table 1: Previous C-surveys at Haganes.

Survey date	Report reference (author, year)	Production (tonnes)
31.10 2024	APN 66208.02 (Mannvik and Gunnarsson, 2025)	5.045
17.03 2023	APN 64910.02 (Mannvik and Gunnarsson, 2023)	0
21.06 2022	APN 64106.03 (Mannvik and Gunnarsson 2022)	5.092
11.06 2020	APN 62253.01 (Mannvik and Gunnarsson, 2020)	0
05.09 2018	APN 60528.01 (Mannvik and Gunnarsson, 2019)	2.985
27.06 2017	APN 8952.01 (Mannvik and Eriksen, 2018)	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*.
- Miljødirektoratet (2025). *Veileder for klassifisering av miljøtilstand i kyst- og ferskvann*.

Table 2: Survey program for the C-survey at Haganes, 2026. TOC = total organic carbon. GSA = grain size analysis sediment. TOM = total organic material. TN = total nitrogen. Cu = Copper. P = phosphorous. EMB = emamectin benzoate. pH/Eh = acidity and redox potential.

Station	Type analyses/parameters
C1 (local impact zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. Cu. P. pH/Eh.
C2 (transition zone outer)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. P. pH/Eh.
C2alt (transition zone outer)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. P. EMB. pH/Eh.
C3 (transition zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. P. pH/Eh.
C4 (transition zone, deep area)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. P. Hydrography/O ₂ . pH/Eh.
C5 (transition zone)	Quantitative analyses of bottom fauna. TOC. GSA, TOM. TN. P. pH/Eh.

Field work was completed on 09.06.2026.

Placement of stations and local conditions

The number of stations was calculated with reference to the sites estimated maximal standing biomass for the next generation which is 8.491 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. Four of the stations were placed in the direction of the main oceanic current measured at 56 m depth (Hermansen, 2020) south of the frame and two stations were placed in the opposite direction due to rather strong counter current at the site.

Table 3: Depth, distance between the nearest frame of the fish farm and sampling stations and coordinates for C-stations at Haganes, 2026.

Station	Depth, m	Distance from frame, m	Position	
			N	W
C1	99	25	65°40.424	23°32.307
C2	96	500	65°40.176	23°32.307
C2alt	98	500	65°40.810	23°32.628
C3	98	97	65°40.386	23°32.445
C4	97	298	65°40.280	23°32.381
C5	98	150	65°40.622	23°32.558

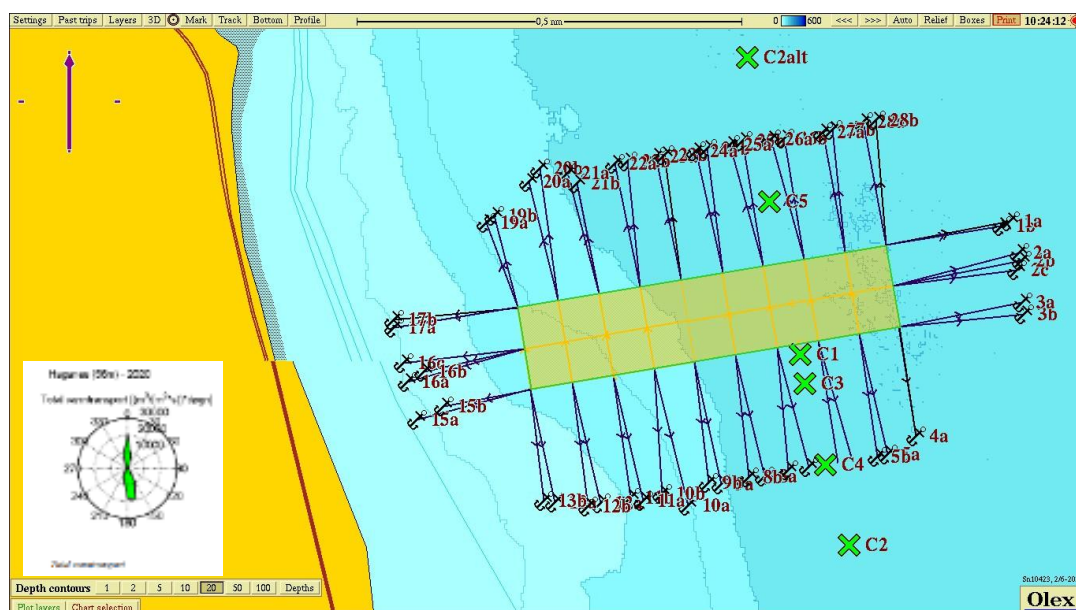


Figure 2. Map showing the sampling stations for the C-survey at Haganes, 2026. Current measurements used were from 56 m depth (Hermansen, 2020).

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 m² 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. Due to challenging circumstances with collecting grab samples due to soft bottom, grab samples with disturbed surface were accepted. Grab came full despite slowing down the decent speed last meters. 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 freeze drying, the amount of total nitrogen (TN) was quantified by electrochemical determination using Akvaplan-niva internal method that is based on NS-EN 16168:2012.

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 each fraction on a dry weight basis (Bale & Kenny, 2005).

After freeze drying, the content of total organic carbon (TOC) was determined by NDIR-detection in accordance with NS EN 17505:2022. 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 Phosphorus (P)

Following a pre-treatment, the samples were quantified according to ČSN 720116-1 (720116) where phosphorus pentoxide, P_2O_5 forms a phosphorus molybden-vanadium complex. 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.

3.3.8 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, and 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 m² van Veen grab. Due to challenging circumstances with collecting grab samples due to soft bottom, grab samples with disturbed surface were accepted. Grab came full despite slowing down the decent speed last meters. 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 (ES₁₀₀) – expected number of species pr. 100 individuals
- Pielou's evenness index (J)
- Sensitivities index (Ømfintlighet) (ISI₂₀₁₈), unsuitable at low individual/species number

- Sensitivity index (NSI_{2018})
- 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)

For the classification of fauna see Appendix 7.3.

4 Results

4.1 Hydrography and oxygen

The hydrographical profile for the deep station C4 measured in June 2026 is presented in Figure 3.

Temperature dropped from 9 °C at the surface to 2 °C in the bottom layer. Oxygen saturation was 105 % in the upper layer and 77 % in the bottom layer which indicate good oxygen conditions.

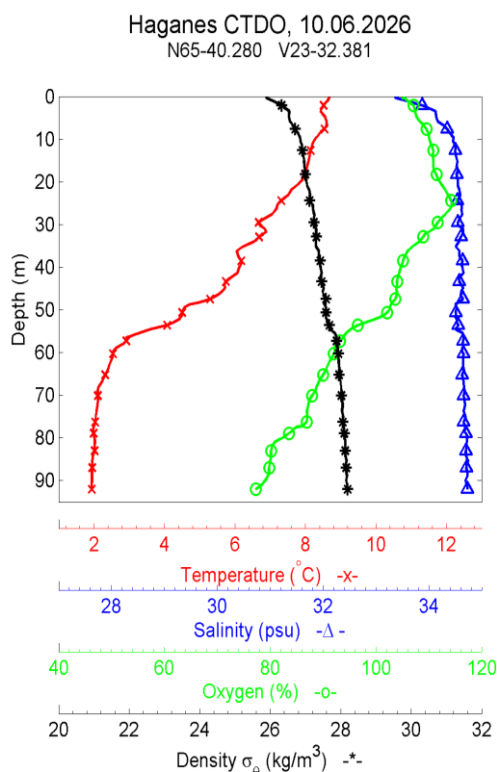


Figure 3. Vertical profiles. Temperature, salinity, density, and oxygen at C4 at Haganes, 2026.

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 12.9 to 13.3 %. TN-levels were low (2.7 – 3.2 mg/g) while the C/N-ratios were somewhat high at all stations. TOC was rather high at all stations and nTOC varied from 44.1 to 58.7. The bottom sediments grain size was fine with a pelite ratio ranging from 77.2 to 85.0 %.

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. Haganes, 2026.

St.	Sediment description	TOM	TOC	nTOC	TN	C/N	Pelite	pH/Eh
C1	Olive green mud.	13.1	55	58.7	2.7	20.3	77.2	7.6/293
C2	Olive green mud.	13.0	41	45.8	3.1	13.3	75.4	7.8/258
C2alt	Olive green mud.	13.2	42	44.2	3.0	14.0	85.0	7.8/259
C3	Olive green mud.	12.9	43	46.7	3.0	14.4	78.9	7.7//247
C4	Olive green mud.	13.3	42	45.2	3.0	14.2	84.8	7.7/264
C5	Olive green mud.	12.9	40	44.1	3.2	12.8	78.5	7.6/233

4.2.2 Copper

Level of copper in bottom sediment at C1 is shown in Table 5. The level of copper was 83 mg/kg or in the upper limit of natural values (limit III) according to environmental limits in Icelandic regulation nr. 796/199 (Regulation on prevention of water pollution nr. 796/1999).

Table 5. Copper (Cu), mg/kg DS. Haganes, 2026.

St.	Cu
C1	83

4.2.3 Emamectin benzoate

Concentration of emamectin benzoate in sediment at C4 is presented in Table 6. Station C4 is located 298 m from the cage edge and is thus placed outside the mixing zone (SEPA 2022).

EMB concentration was 440 ng/kg and thus exceeds the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is not fulfilling the "good status standard".

Table 6. Emamectin benzoate in the sediment at C4, ng/kg. Haganes, 2026.

St.	Emamectin benzoate
C4	440

4.2.4 Phosphorus

Levels of phosphorus in bottom sediments at Haganes are shown in Table 7. The level of phosphorus varied from 1700 (C3 and C4) to 3600 mg/kg (C1).

Table 7. Phosphorus (P), mg/kg DS. Haganes, 2026.

St.	P
C1	3600
C2	1800
C2alt	2300
C3	1700
C4	1700
C5	2000

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 8.

The number of individuals varied from 286 (C2alt) to 405 (C2) and number of species from 19 (C1) to 29 (C2). The diversity H' varied from 2.21 to 3.0. At all stations the overall index of nEQR was lower than 0.6. The nEQR values indicate moderate faunal condition at the stations. The AMBI-value varied from 2.817 to 3.593.

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 0.54 (C2alt) to 0.78 (C1) which indicates a somewhat uneven distribution at most of the stations.

Table 8. Number of species and individuals pr. 0,2 m². H' = Shannon-Wiener's diversity index. ES_{100} = Hurlberts diversity index. $NQI1$ = overall index (diversity and sensitivity). ISI_{2018} = sensitivity index. NSI = sensitivity index. J = Pielous evenness index. $AMBI$ = AZTI marine biotic index (part of $NQI1$). $nEQR$ = normalized EQR. C-stations at Haganes, 2026.

St.	C1	C2	C2alt	C3	C4	C5
Ant. ind.	347	405	286	367	372	369
Ant. arter	19	29	22	23	22	20
H'	3,00	2,67	2,21	2,55	2,96	2,67
ES_{100}	12,6	15,8	15,0	13,3	15,3	14,5
$NQI1$	0,538	0,602	0,560	0,587	0,617	0,581
ISI_{2018}	4,13	5,50	5,68	5,45	5,79	6,04
NSI	16,22	16,39	14,14	16,95	17,67	15,61
nEQR	0,451	0,520	0,478	0,499	0,553	0,523
AMBI	3.593	3.190	3.587	3.078	2.817	3.230
Pielou J	0.78	0.61	0.54	0.63	0.70	0.65

*) Colour marking according to Norwegian national water type G/H 1-3 (Miljødirektoratet, 2025).

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 2 "Good". The criteria for condition 1 are that there are at least 20 species/0.2 m² and that none of these are in numbers exceeding 65 % of the individuals (Table 9). There were 19 species registered at the station.

Table 9. Classification of the environmental status of the soft bottom fauna at station C1 at the Haganes, 2026.

Station	Site name	Num. species	Dominating taxa	Environmental condition-NS 9410
C1	Haganes	19	Prionospio steenstrupi. 21 %	2 - 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 (≤ 12 species) and stretched out in varying degrees towards higher classes. These did not give any clear indications of fauna condition.

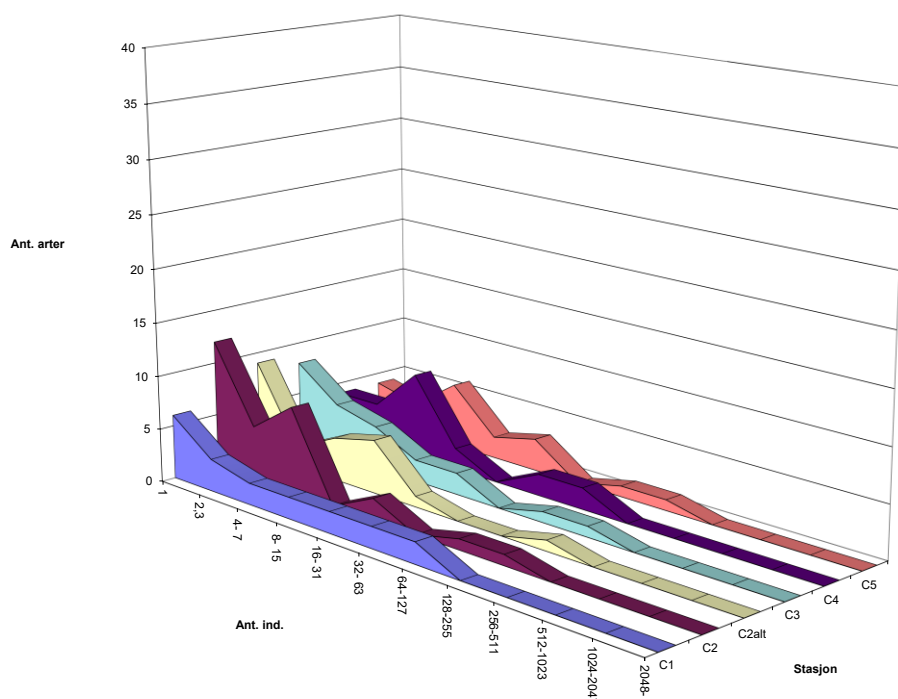


Figure 4. The soft bottom fauna shown as number of species against number of individuals pr. species in geometric classes. Haganes, 2026.

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 at most of the stations was more than 73 % similar while the fauna at C1 was 48 % similar to the other stations.

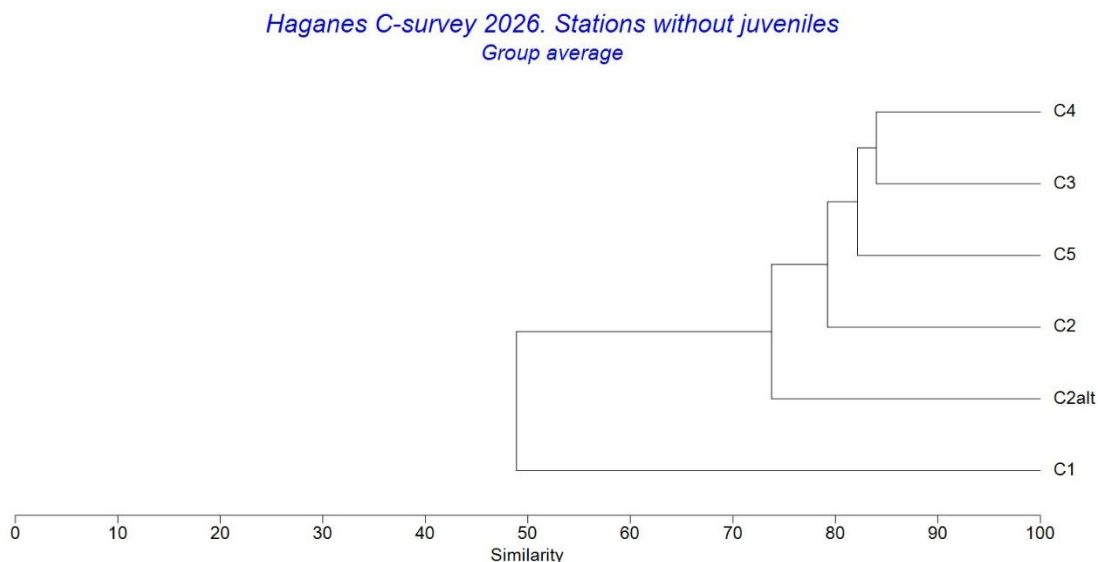


Figure 5. Cluster diagram for the soft bottom fauna at the C-stations at Haganes, 2026.

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 10.

In Borgersen *et al.* (2020) 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 C3 was dominated by the opportunistic bivalve *Thyasira sarsii* with 38 % of the individuals. The other most dominant species at the station were tolerant and opportunistic species.

At the other stations the fauna was dominated by the opportunistic polychaete *Prionospio steenstrupi* with between 21 and 64 % of the individuals. The other most dominant species at the stations were mainly tolerant and opportunistic species together with a pollution indicator species at C1.

Table 10. Number of individuals, cumulative percentage, and ecological group* for the ten most dominant species at the C stations. Haganes, 2026.

C1	EG	Ant. ind.	Kum.
Prionospio steenstrupi	IV	72	21 %
Ophelina acuminata	III	66	40 %
Mediomastus fragilis	IV	62	58 %
Capitella capitata	V	54	73 %
Macoma calcarea	III	25	80 %
Ampharete borealis	IV	16	85 %
Chaetozone setosa	IV	15	89 %
Thyasira sarsii	IV	15	94 %
Eteone flava/longa	III	6	95 %
Scalibregma inflatum	III	4	97 %
C2alt	EG	Ant. ind.	Kum.
Prionospio steenstrupi	IV	184	64 %
Thyasira sarsii	IV	16	69 %
Ennucula tenuis	III	15	75 %
Praxillella gracilis	III	13	79 %
Lumbrineris mixochaeta	IV	11	83 %
Leucon sp.	Ik	9	86 %
Nuculana pernula	I	8	89 %
Ampharete borealis	IV	4	90 %
Chaetozone setosa	IV	4	92 %
Nephtys ciliata	III	4	93 %
C4	EG	Ant. ind.	Kum.
Prionospio steenstrupi	IV	107	29 %
Thyasira sarsii	IV	104	57 %
Ampharete borealis	IV	39	67 %
Ennucula tenuis	III	39	77 %
Yoldia hyperborea	Ik	13	81 %
Mediomastus fragilis	IV	12	84 %
Galathowenia oculata	III	7	86 %
Leucon sp.	Ik	7	88 %
Nuculana pernula	I	7	90 %
Lumbrineris mixochaeta	IV	6	91 %
C2	EG	Ant. ind.	Kum.
Prionospio steenstrupi	IV	159	39 %
Thyasira sarsii	IV	124	70 %
Ennucula tenuis	III	27	77 %
Ampharete borealis	IV	26	83 %
Galathowenia oculata	III	7	85 %
Leucon sp.	Ik	7	86 %
Chaetozone setosa	IV	6	88 %
Yoldia hyperborea	Ik	6	89 %
Macoma calcarea	III	5	91 %
Nuculana pernula	I	5	92 %
C3	EG	Ant. ind.	Kum.
Thyasira sarsii	IV	138	38 %
Prionospio steenstrupi	IV	114	68 %
Ampharete borealis	IV	31	77 %
Ennucula tenuis	III	23	83 %
Chaetozone setosa	IV	10	86 %
Yoldia hyperborea	Ik	9	88 %
Leucon sp.	Ik	7	90 %
Macoma calcarea	III	5	92 %
Mediomastus fragilis	IV	4	93 %
Ophelina acuminata	III	4	94 %
C5	EG	Ant. ind.	Kum.
Prionospio steenstrupi	IV	173	47 %
Thyasira sarsii	IV	69	65 %
Ampharete borealis	IV	23	72 %
Ennucula tenuis	III	23	78 %
Yoldia hyperborea	Ik	19	83 %
Chaetozone setosa	IV	10	86 %
Ophelina acuminata	III	10	88 %
Leucon sp.	Ik	6	90 %
Lumbrineris mixochaeta	IV	6	92 %
Nuculana pernula	I	6	93 %

*Ecological groups: EG I = sensitive species. EG II = neutral species. EG III = tolerant species. EG IV = opportunistic species. EG V = pollution indicator species. From Borgersen et al., 2020. Ik = ecological group unknown.

5 Summary

The results from the monitoring at the farming site Haganes in June 2026 showed that the sediment was loaded with organic carbon and the copper level in the sediment at C1 was elevated (83 mg/kg) and is categorized into environmental limit III or "upper limit of natural values". EMB concentration in the sediment at C4 was 440 ng/kg and thus exceeds the defined concentration of 272 ng/kg for stations outside the mixing zone. Accordingly, the station is not fulfilling the "good status standard". The bottom sediments grain size was fine with a pelite ratio ranging from 72 to 85 %.

The redox measurements (pH/Eh) gave point 0 acc. Appendix D in NS 9410:2016 for all the sampling stations. The oxygen saturation in June was good in the whole water column with 77 % in the bottom water.

Load effect was recorded in the fauna at all stations with the faunal index nEQR below 0.6. The diversity index H' was ≤ 3 at the stations and ranged from 2.21 to 3.0. The NS 9410:2016-assessment of the community in the local impact zone (C1) showed environmental condition 2 (Good). A pollution indicator species was found among the most dominant species at C1, but not at the other stations. The fauna at all stations was dominated by tolerant and opportunistic species.

5.1 Comparison with previous survey

The results from the present survey in June 2026 compared to previous C survey at the Haganes in October 2024 (Mannvik & Gunnarsson, 2025) show that the diversity index H' is still low (≤ 3) at the stations. The pollution indicator *Capitella capitata* was found among the top ten at two stations in 2024 (C3 and C4) and one station in 2026 (C1). The faunal conditions were moderate at the stations in both surveys.

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7 Appendix (in Norwegian)

7.1 Stasjonsbeskrivelser

Prosjekt: 2026, Prosjekt nr, 67560, Haganes.

Feltarbeid: Snorri Gunnarsson (SGU)

Stasjon		C1	C2	C2alt	C3	C4	C5
Feltdato		09.06.2026	09.06.2026	09.06.2026	09.06.2026	09.06.2026	09.06.2026
Feltarbeider		SGU	SGU	SGU	SGU	SGU	SGU
Pos. WGS84	N	64°40,424	64°40,176	64°40,810	64°40,386	64°40,280	64°40,622
	V	23°32,462	23°32,307	23°32,628	23°32,445	23°32,381	23°32,558
Dyp (m)		99	96	98	98	97	98
Avstand (m)		99	96	98	98	97	98
CTDO						X	
Antall bomskudd		0,0,0	0,0,0	0,0,1	0,0,0	0,0,1	0,0,0
Prøvedybde* (cm)	1	0	0	0	0	0	0
	2	0	0	0	0	0	0
	3	0	0	0	0	0	0
Forstyrret overflate	1	Ja	Ja	Ja	Ja	Ja	Ja
	2	Ja	Ja	Ja	Ja	Ja	Ja
	3	Ja	Ja	Ja	Ja	Ja	Ja
pH		7,58	7,76	7,78	7,74	7,68	7,64
Eh		293	258	259	247	264	233
Bunndyr grabb 1		X	X	X	X	X	X
Bunndyr grabb 2		X	X	X	X	X	X
Konservert med (E/F)		F	F	F	F	F	F
Korn		X	X	X	X	X	X
TOM		X	X	X	X	X	X
TOC		X	X	X	X	X	X
TN		X	X	X	X	X	X
Metaller		X	X	X	X	X	X
Miljøfarlige stoffer							
Lusemidler					X		
Bilde før sikting		X	X	X	X	X	X
Kommentarer/ beskrivelse av prøve		Olive green mud	Olive green mud	Olive green mud	Olive green mud	Olive green mud	Olive green mud

7.2 Bunndyrsindekser og artslister

Diversitetsmål

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 (Clusteranalyse)

Variasjoner i faunaens fordelingsmønster over området beskrives ved å sammenligne faunasamfunnet på hver stasjon. Til dette brukes multivariate klassifikasjons- og ordinasjons-analyser.

Analysene i denne undersøkelsen ble utført ved hjelp av programpakken PRIMER. 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 kvadratrot-transformert. 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.

For å sammenligne prøvene 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).

Sensitivitet og tetthet

NSI (Norwegian Sensitivity Index; Rygg og Norling 2013) er utviklet med basis i norske faunadata og innført i 2012 og oppdatert i 2018 (Borgersen *m. fl.*, 2019). Hver art av i alt 583 arter er tilordnet en sensitivitetsverdi).

En prøves NSI-verdi beregnes ved gjennomsnittet av sensitivitetsverdiene av alle individene i prøven. Formelen for utregning er gitt ved:

$$NSI = \sum_i^s \left[\frac{N_i * NSI_i}{N_{NSI}} \right]$$

ISI₂₀₁₈ (Indicator Species Index; Rygg og Norling 2013) en sensitivitetsindeks. Grunnlaget for beregningen av ISI (Rygg 2002) ble utvidet og artsnomenklaturen standardisert i 2012 og oppdatert i 2018 (Borgersen *m. fl.*, 2019). Hver art er tilordnet en ømfintlighetsverdi. ISI er en kvalitativ indeks som tar hensyn til hvilke arter som er til stede, men ikke individtallet av dem. En prøves ISI-verdi beregnes ved gjennomsnittet av sensitivitetsverdiene av artene i prøven hvor ISI_i er ISI_{2018} verdien for arten i og S_{ISI} er antall arter tilordnet sensitivitetsverdier.

$$ISI = \sum_i^s \left[\frac{ISI_i}{S_{ISI}} \right]$$

AMBI (Azti Marine Biotic Index; Borja *m.fl.* 2000) er en sensitivitetsindeks (egentlig en toleranseindeks) der artene tilordnes en toleranseklasse (økologisk gruppe, EG). EG I = sensitive arter, EG II = "indifferente" arter, EG III = tolerante arter, EG IV = opportunistiske arter, EG V = forurensningsindikerende arter. I Norge brukes AMBI bare i kombinasjonsindeksen NQI1 og har derfor ingen egen klassifisering. AMBI er en kvantitativ indeks som tar hensyn til individtallet av artene.

$AMBI = (0 * EG I) + (1,5 * EG II) + (3 * EG III) + (4,5 * EG IV) + (6 * EG V)$ hvor EGI er andelen av individer som tilhører gruppe I, etc. Tallene angir toleranseverdiene.

Formelen for beregning av en prøves AMBI-verdi er gitt ved:

$$AMBI = \sum_i^s \left[\frac{N_i * AMBI_i}{N_{AMBI}} \right]$$

Sammensatt indeks

NQI1 (Norwegian Quality Index; Rygg 2006) inneholder indikatorer som omfatter sensitivitet (AMBI), og artsmangfold (S = antall, N = antall individer) i en prøve. NQI1 er interkalibrert mellom alle land som tilhører NEAGIG. NQI1 er gitt ved formelen:

$$NQI1 = \left[\left(0,5 * \left(1 - \frac{AMBI}{7} \right) + 0,5 * \left(\frac{\left[\frac{\ln(S)}{\ln(\ln(N))} \right]}{2,7} \right) * \left(\frac{N}{N+5} \right) \right] \right]$$

I prøver som har veldig lave individtall (færre enn seks), kan ikke NQI1 brukes. Det er i slike tilfeller mulig å bruke $N+2$ i stedet for N i formelen for å unngå uriktige indeksverdier (Rygg et al. 2011).

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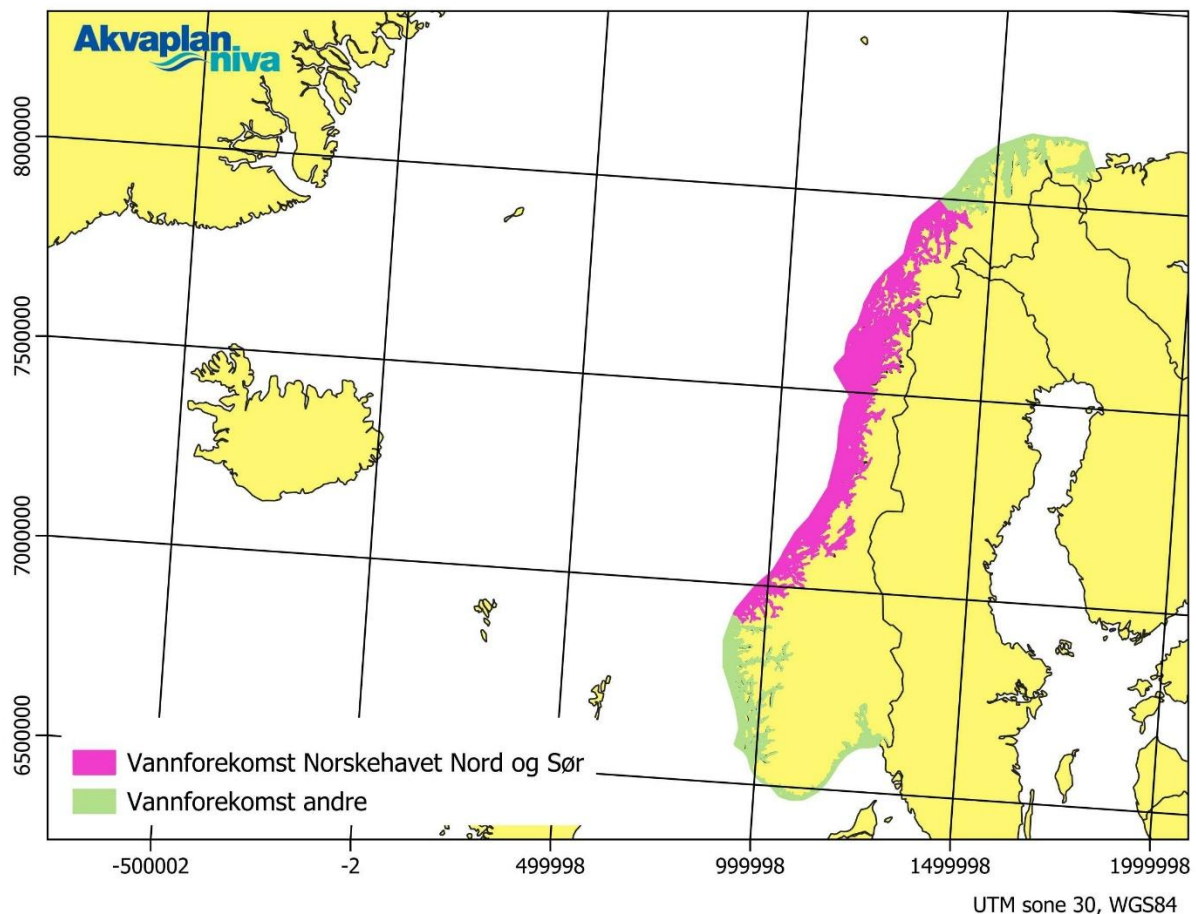
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7.3 Klassifisering av faunaindekser Island

Det er valgt å legge inn klassifisering av faunaindekser ved å bruke grenseverdier for Norskehavet Nord (vanntype G 1-3) og Norskehavet Sør (vanntype H 1-3).

Økologisk tilstandsklassifisering basert på observert verdi av indeks (Veileder fra Miljødirektoratet (2025), **vanntype G/H 1-3**).

Indeks	I Svært god "Very good"	II God "Good"	III Moderat "Moderate"	IV Dårlig "Poor"	V Svært dårlig "Bad"
NQI1	0,9-0,72	0,72-0,63	0,63-0,49	0,49-0,31	0,31-0
H'	5,5 - 3,7	3,7 - 2,9	2,9 - 1,8	1,8 - 0,9	0,9 - 0
ES ₁₀₀	46 - 23	23 - 16	16-9	9-5	5 - 0
ISI ₂₀₁₈	10,2 - 6,6	6,6 - 6	6 - 4,9	4,9 - 3,6	3,6 - 0
NSI ₂₀₁₈	34 - 29	29 - 23	23 - 17	17 - 11	11 - 0
nEQR	1,0 – 0,8	0,8 – 0,6	0,6 – 0,4	0,4 – 0,2	0,2 – 0,0



Kart som viser Island og Norge med vannforekomstene Norskehavet Nord og Norskehavet Sør.

7.4 Statistical results Haganes, 2026

Benthos indices per replicate

st.nr.	tot.	C1_0 1	C1_0 2	C2_0 1	C2_0 2	C2alt _01	C2alt _02	C3_0 1	C3_0 2	C4_0 1	C4_0 2	C5_0 1	C5_0 2
no. ind.	2146	165	182	229	176	153	133	223	144	199	173	192	177
no. spe.	43	12	18	19	23	16	18	21	13	18	19	19	16
Shannon-Wiener:		2,8	3,2	2,6	2,8	2,2	2,2	2,8	2,3	2,8	3,1	2,8	2,5
Pielou		0,79	0,76	0,60	0,61	0,55	0,53	0,63	0,63	0,67	0,74	0,66	0,63
ES100		11	14	14	17	14	16	15	11	14	16	15	14
SN		1,52	1,75	1,74	1,91	1,72	1,82	1,80	1,60	1,73	1,80	1,77	1,69
ISI-2018		4,42	3,84	5,42	5,58	5,48	5,88	5,72	5,17	5,73	5,84	5,92	6,16
AMBI		3,291	3,895	3,165	3,216	3,588	3,586	3,020	3,135	2,834	2,801	3,222	3,237
NQI1		0,54	0,54	0,59	0,61	0,55	0,57	0,61	0,56	0,61	0,62	0,59	0,57
NSI-2018		17,6	14,8	16,6	16,1	14,3	14,0	17,2	16,7	17,8	17,6	15,7	15,6

Geometrical classes

int.	C1	C2	C2alt	C3	C4	C5
1	6	12	9	8	4	4
2,3	3	5	2	5	4	3
4- 7	2	8	4	4	8	6
8- 15	2	0	5	2	2	2
16- 31	2	2	1	2	0	3
32- 63	2	0	0	0	2	0
64-127	2	1	0	1	2	1
128-255	0	1	1	1	0	1
256-511	0	0	0	0	0	0
512-1023	0	0	0	0	0	0
1024-2047	0	0	0	0	0	0
2048-	0	0	0	0	0	0

7.5 Species lists

Artsliste pr stasjon

Haganes C-survey 2026

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
Stasjonsnr.: C1								
ANNELIDA								
	Polychaeta							
		Spionida	Chaetozone setosa		5	10	-	15
			Prionospio steenstrupi		33	39	-	72
		Capitellida	Arenicola marina			1	-	1
			Capitella capitata		13	41	-	54
			Mediomastus fragilis		38	24	-	62
		Opheliida	Ophelina acuminata		39	27	-	66
			Scalibregma inflatum			4	-	4
		Phyllodocida	Bylgides groenlandicus			1	-	1
			Eteone flava/longa		2	4	-	6
		Eunicida	Scoletoma magnidentata			1	-	1
		Terebellida	Ampharete borealis		11	5	-	16
			Cistenides hyperborea		1	1	-	2
CRUSTACEA								
	Malacostraca							
		Amphipoda	Bathymedon obtusifrons			1	-	1
			Oedicerotidae indet.			1	-	1
			Paroedicerus sp.			1	-	1
			Protomedeia fasciata		2		-	2
MOLLUSCA								
	Bivalvia							
		Nuculoida	Ennucula tenuis		1	1	-	2
		Veneroida	Macoma calcarea		16	9	-	25
			Thyasira sarsii		4	11	-	15
Maksverdi:					39	41		72
Antall arter/taxa:					12	18		19
Sum antall individ:								347

Stasjonsnr.: C2

NEMERTINI

ANNELIDA								
	Polychaeta							
		Orbiniida	Nemertea indet.			4	-	4
		Spionida	Scoloplos armiger		1		-	1
			Chaetozone setosa		4	2	-	6
			Prionospio steenstrupi		86	73	-	159
		Capitellida	Mediomastus fragilis			1	-	1
			Praxillella gracilis		4	1	-	5
		Opheliida	Ophelina acuminata			2	-	2
		Phyllodocida	Bylgides groenlandicus			1	-	1
			Eteone flava/longa			1	-	1
			Nephtys ciliata		2	1	-	3
			Nephtys paradoxa			1	-	1

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum	
CRUSTACEA		Eunicida	Lumbrineris mixochaeta		2	1	-	3	
			Parougia nigridentata		2		-	2	
		Oweniida	Galathowenia oculata		3	4	-	7	
		Flabelligerida	Bradabyssa villosa		1		-	1	
		Terebellida	Ampharete borealis		13	13	-	26	
			Cistenides hyperborea		2		-	2	
			Laphania boeckii			1	-	1	
		Ostracoda							
			Ostracoda indet.			1	-	1	
		Malacostraca							
		Cumacea	Leucon sp.		3	4	-	7	
		Amphipoda	Bathymedon obtusifrons			1	-	1	
			Lysianassidae indet.		1		-	1	
			Oedicerotidae indet.		1		-	1	
MOLLUSCA									
	Prosobranchia								
	Neogastropoda								
		Curtitoma trevelliana			1	-	1		
	Bivalvia								
	Nuculoida								
		Ennucula tenuis		15	12	-	27		
		Nuculana pernula		4	1	-	5		
		Yoldia hyperborea		3	3	-	6		
	Veneroida								
		Macoma calcarea		3	2	-	5		
		Thyasira sarsii		79	45	-	124		
			Maksverdi:	86	73		159		
			Antall arter/taxa:	19	23		29		
			Sum antall individ:				405		

Stasjonsnr.: C2alt
NEMERTINI

ANNELEIDA			Nemertea indet.			1	-	1
		Polychaeta						
		Spionida	Chaetozone setosa		2	2	-	4
			Prionospio steenstrupi		97	87	-	184
		Capitellida	Praxillella gracilis		8	5	-	13
		Opheliida	Ophelina acuminata		2	1	-	3
		Phyllodocida	Eteone flava/longa		2		-	2
			Nephtys ciliata		1	3	-	4
		Eunicida	Lumbrineris mixochaeta		6	5	-	11
		Oweniida	Galathowenia oculata			1	-	1
		Terebellida	Ampharete borealis		2	2	-	4
			Laphania boeckii			1	-	1
			Melinna cristata			1	-	1
CRUSTACEA		Malacostraca						
		Cumacea	Eudorella sp.		1		-	1
		Amphipoda	Leucon sp.		4	5	-	9
			Bathymedon obtusifrons			1	-	1

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
MOLLUSCA			Westwoodilla caecula		1		-	1
		Prosobranchia						
		Neogastropoda						
			Curtitoma trevelliiana			1	-	1
		Bivalvia						
		Nuculoida						
			Ennucula tenuis		13	2	-	15
			Nuculana pernula		3	5	-	8
			Yoldia hyperborea		2	2	-	4
		Veneroida						
ECHINODERMATA			Macoma calcarea		1		-	1
			Thyasira sarsii		8	8	-	16
		Asteroidea						
			Asteroidea indet. juv.		2		-	2

Maksverdi: 97 87 184

Antall arter/taxa: 17 18 23

Sum antall individ: 288

Stasjonsnr.: C3

ANNELEIDA	Polychaeta	Spionida	Chaetozone setosa		9	1	-	10
			Prionospio steenstrupi		64	50	-	114
		Capitellida	Mediomastus fragilis		3	1	-	4
			Praxillella gracilis			1	-	1
		Opheliida	Ophelina acuminata		1	3	-	4
		Phyllodocida	Eteone flava/longa		3		-	3
			Nephtys ciliata		1		-	1
		Eunicida	Lumbrineris mixochaeta		2		-	2
			Parougia nigridentata		1		-	1
		Oweniida	Galathowenia oculata		3		-	3
			Ampharete borealis		24	7	-	31
		Terebellida	Cistenides hyperborea			1	-	1
			Laphania boeckii		3		-	3
	CRUSTACEA	Malacostraca						
		Cumacea	Leucon sp.		4	3	-	7
		Amphipoda	Bathymedon obtusifrons		1		-	1
			Oedicerotidae indet.		1		-	1
	MOLLUSCA	Prosobranchia						
		Neogastropoda	Curtitoma trevelliiana		1		-	1
		Bivalvia	Nuculoida					
			Ennucula tenuis		11	12	-	23
			Nuculana pernula		2	1	-	3
			Yoldia hyperborea		5	4	-	9
		Veneroida	Macoma calcarea		1	4	-	5
			Thyasira sarsii		82	56	-	138
	ECHINODERMATA	Asteroidea						
		Paxillosida	Ctenodiscus crispatus		1		-	1
	Ophiuroidea		Ophiuroidea indet. juv.		1		-	1

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
				Maksverdi:	82	56		138
				Antall arter/taxa:	22	13		24
				Sum antall individ:				368

Stasjonsnr.: C4

ANNELIDA

Polychaeta

Spionida

Chaetozone setosa
Prionospio steenstrupi

3 1 - 4
53 54 - 107

Capitellida

Mediomastus fragilis
Praxillella gracilis

6 6 - 12
2 3 - 5

Opheliida

Ophelina acuminata

1 4 - 5

Phyllodocida

Eteone flava/longa
Nephtys ciliata

4 - 4
1 - 1

Eunicida

Lumbrineris mixochaeta

3 3 - 6

Oweniida

Galathowenia oculata

1 6 - 7

Terebellida

Ampharete borealis
Ampharete finmarchica
Cistenides hyperborea
Laphania boeckii

13 26 - 39
2 - 2
1 1 - 2
1 - 1

CRUSTACEA

Malacostraca

Cumacea

Leucon sp.

3 4 - 7

Amphipoda

Bathymedon obtusifrons
Metopa sp.

1 - 1
2 - 2

MOLLUSCA

Bivalvia

Nuculoida

Ennucula tenuis
Nuculana pernula
Yoldia hyperborea

27 12 - 39
3 4 - 7
8 5 - 13

Mytiloida

Mytilus edulis juv.

1 - 1

Veneroida

Macoma calcarea
Thyasira gouldii
Thyasira sarsii

2 1 - 3
1 - 1
69 35 - 104

Maksverdi: 69 54 107

Antall arter/taxa: 18 20 23

Sum antall individ: 373

Stasjonsnr.: C5

ANNELIDA

Polychaeta

Spionida

Chaetozone setosa
Prionospio steenstrupi

5 5 - 10
89 84 - 173

Capitellida

Mediomastus fragilis
Praxillella gracilis

1 - 1
3 1 - 4

Opheliida

Ophelina acuminata

6 4 - 10

Phyllodocida

Eteone flava/longa
Nephtys ciliata

1 - 1
3 2 - 5

Eunicida

Lumbrineris mixochaeta
Parougia nigridentata

4 2 - 6
3 - 3

Rekke	Klasse	Orden	Art/Taxa	Replikat:	01	02	-	Sum
		Oweniida						
		Terebellida	Galathowenia oculata		1	1	-	2
			Ampharete borealis		14	9	-	23
			Cistenides hyperborea		1	3	-	4
			Laphania boeckii		1	1	-	2
CRUSTACEA								
	Malacostraca							
		Cumacea						
			Leucon sp.		4	2	-	6
MOLLUSCA								
	Bivalvia							
		Nuculoida						
			Ennucula tenuis		15	8	-	23
			Nuculana pernula		2	4	-	6
			Yoldia hyperborea		9	10	-	19
		Veneroida						
			Abra nitida		1		-	1
			Thyasira gouldii			1	-	1
			Thyasira sarsii		29	40	-	69
ECHINODERMATA								
	Asteroidea							
			Asteroidea indet. juv.			1	-	1
				Maksverdi:	89	84		173
				Antall arter/taxa:	19	17		21
				Sum antall individ:				370

7.6 Analytical report



ANALYSERAPPORT



Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Lab-id. P260098-01

Objekt	Prøvestasjon/ID	ASC-stasjon	FU-stasjon	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C1			67560 - Haganes C and B survey 2026	Agglomerering i øverste tre siktene i kornfordelingsanalysen.	2026-06-19

Analyseresultat						
Parameter	Resultat	Enhet	Analysedato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	55	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 17505:2023)	±8,2
TNb	2.7	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 16168:2012)	±0,48
nTOC ^a	58.7		2026-07-23	2026-07-23	Beregning etter Aure m.fl., 1993	
C/N - forhold	*20.3		2026-07-23	2026-07-23	Beregning TOC:TN	
TOM	13.1	% TS	2026-06-26	2026-06-26	Vekttap ved forbrenning, Intern metode basert på NS 4764 (1980)	±0.5
Vekt% ≥2 mm	6.6	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.8
Vekt% 1 mm - <2 mm	3.6	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.2
Vekt% 0.500 mm - <1 mm	1.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm - <0.500 mm	5.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.2
Vekt% 0.125 mm - <0.250 mm	2.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.063 mm - <0.125 mm	2.3	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% <0.063 mm	77.2	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±9.3
Pelitt	*77.2	wt% TS	2026-06-26	2026-07-02	Fraksjonen <0.063 mm	±9.3
Sand	*16.2	wt% TS	2026-06-26	2026-07-02	Summering av fraksjonene mellom 0.063 mm opptil 2 mm	±0.7
Grus	*6.6	wt% TS	2026-06-26	2026-07-02	Fraksjonen ≥2 mm	±0.8

^a Aure, J., Dahl, E., Green, N., Magnusson, J., Moy, F., Pedersen, A., Rygg, B & Walday, M., 1993. Langtidsovervåking av trofutviklingen i kystvannet langs Sør-Norge. Årsrapport 1990.

* = Ikke akkreditert resultat

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Analysereporten er digitalt undertegnet av:
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ANALYSERAPPORT

Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato:	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Lab-id. P260098-04

Objekt	Prøvestasjon/ID	ASC-stasjon	FU-stasjon	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C2			67560 - Haganes C and B survey 2026		2026-06-19

Analyseresultat						
Parameter	Resultat	Enhet	Analysedato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	41	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 17505:2023)	±6.2
TNb	3.1	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 16168:2012)	±0.56
nTOC ^a	45.8		2026-07-23	2026-07-23	Beregning etter Aure m.fl., 1993	
C/N - forhold	13.3		2026-07-23	2026-07-23	Beregning TOC:TN	
TOM	13.0	% TS	2026-06-26	2026-06-26	Vekttap ved forbrenning. Intern metode basert på NS 4764 (1980)	±0.5
Vekt% ≥2 mm	6.6	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.8
Vekt% 1 mm - <2 mm	5.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.3
Vekt% 0.500 mm - <1 mm	5.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.250 mm - <0.500 mm	3.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.125 mm - <0.250 mm	1.3	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.063 mm - <0.125 mm	1.4	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% <0.063 mm	75.4	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±9.1
Pelitt	75.4	wt% TS	2026-06-26	2026-07-02	Fraksjonen <0.063 mm	±9.1
Sand	18.0	wt% TS	2026-06-26	2026-07-02	Summering av fraksjonene mellom 0.063 mm opptil 2 mm	±0.7
Grus	6.6	wt% TS	2026-06-26	2026-07-02	Fraksjonen ≥2 mm	±0.8

^a Aure, J., Dahl, E., Green, N., Magnusson, J., Moy, F., Pedersen, A., Rygg, B. & Walday, M., 1993. Langtidsovervåking av trofikutviklingen i kystvannet langs Sør-Norge. Årsrapport 1990.

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ANALYSERAPPORT

Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato:	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Lab-id. P260098-07

Objekt	Prøvestasjon/ID	ASC-stasjon	FU-stasjon	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C2alt			67560 - Haganes C and B survey 2026		2026-06-19

Analyseresultat						
Parameter	Resultat	Enhet	Analysedato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	42	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 17505:2023)	±6.2
TNb	3.0	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 16168:2012)	±0.53
nTOC ^a	44.2		2026-07-23	2026-07-23	Beregning etter Aure m.fl., 1993	
C/N - forhold	14.0		2026-07-23	2026-07-23	Beregning TOC:TN	
TOM	13.2	% TS	2026-06-26	2026-06-26	Vekttap ved forbrenning. Intern metode basert på NS 4764 (1980)	±0.5
Vekt% ≥2 mm	6.1	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.7
Vekt% 1 mm - <2 mm	4.0	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.2
Vekt% 0.500 mm - <1 mm	2.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.250 mm - <0.500 mm	1.3	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm - <0.250 mm	0.3	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm - <0.125 mm	0.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% <0.063 mm	85.0	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±10.2
Pelitt	85.0	wt% TS	2026-06-26	2026-07-02	Fraksjonen <0.063 mm	±10.2
Sand	9.0	wt% TS	2026-06-26	2026-07-02	Summering av fraksjonene mellom 0.063 mm opptil 2 mm	±0.4
Grus	6.1	wt% TS	2026-06-26	2026-07-02	Fraksjonen ≥2 mm	±0.7

^a Aure, J., Dahl, E., Green, N., Magnusson, J., Moy, F., Pedersen, A., Rygg, B. & Walday, M., 1993. Langtidsovervåking av trofutviklingen i kystvannet langs Sør-Norge. Årsrapport 1990.

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ANALYSERAPPORT

Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato:	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Lab-id. P260098-10

Objekt	Prøvestasjon/ID	ASC-stasjon	FU-stasjon	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C3			67560 - Haganes C and B survey 2026	Agglomerering i øverste tre siktene i kornfordelingsanalysen.	2026-06-19

Analyseresultat						
Parameter	Resultat	Enhet	Analysedato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	43	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 17505:2023)	±6.4
TNb	3.0	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 16168:2012)	±0.54
nTOC ^a	46.7		2026-07-23	2026-07-23	Beregning etter Aure m.fl., 1993	
C/N - forhold	*14.4		2026-07-23	2026-07-23	Beregning TOC:TN	
TOM	12.9	% TS	2026-06-26	2026-06-26	Vekttap ved forbrenning. Intern metode basert på NS 4764 (1980)	±0.5
Vekt% ≥2 mm	9.4	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±1.2
Vekt% 1 mm - <2 mm	4.6	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.2
Vekt% 0.500 mm - <1 mm	3.1	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.250 mm - <0.500 mm	1.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm - <0.250 mm	0.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm - <0.125 mm	1.7	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% <0.063 mm	78.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±9.5
Pelitt	*78.9	wt% TS	2026-06-26	2026-07-02	Fraksjonen <0.063 mm	±9.5
Sand	*11.7	wt% TS	2026-06-26	2026-07-02	Summering av fraksjonene mellom 0.063 mm opptil 2 mm	±0.5
Grus	*9.4	wt% TS	2026-06-26	2026-07-02	Fraksjonen ≥2 mm	±1.2
Emamectinbenzoat ^b	*440	ng/kg TS	2026-07-03	2026-07-03	Intern metode LC-MS/MS	±110

^a Aure, J., Dahl, E., Green, N., Magnusson, J., Moy, F., Pedersen, A., Rygg, B. & Walday, M., 1993. Langtidsovervåking av trofuviklingen i kystvannet langs Sør-Norge. Årsrapport 1990.

^b Prøvingen er utført av eksternt laboratorium, NIVA Norsk institutt for vannforskning.

* = Ikke akkreditert resultat

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NO 937 375 158 MVA

Analysereporten er digitalt undertegnet av:
Oda Sofie Bye Wilhelmsen

obw@akvaplan.niva.no

Side 4 av 7

ANALYSERAPPORT

Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato:	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Lab-id. P260098-13

Objekt	Prøvestasjon/ID	ASC-stasjon	FU-stasjon	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C4			67560 - Haganes C and B survey 2026	Agglomerering i øverste tre siktene i kornfordelingsanalysen.	2026-06-19

Analyseresultat						
Parameter	Resultat	Enhet	Analysedato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	42	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 17505:2023)	±6.4
TNb	3.0	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 16168:2012)	±0.54
nTOC ^a	45.2		2026-07-23	2026-07-23	Beregning etter Aure m.fl., 1993	
C/N - forhold	*14.2		2026-07-23	2026-07-23	Beregning TOC:TN	
TOM	13.3	% TS	2026-06-26	2026-06-26	Vekttap ved forbrenning. Intern metode basert på NS 4764 (1980)	±0.5
Vekt% ≥2 mm	5.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.7
Vekt% 1 mm - <2 mm	4.1	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.2
Vekt% 0.500 mm - <1 mm	2.7	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% 0.250 mm - <0.500 mm	1.1	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm - <0.250 mm	0.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm - <0.125 mm	1.4	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% <0.063 mm	84.8	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±10.2
Pelitt	*84.8	wt% TS	2026-06-26	2026-07-02	Fraksjonen <0.063 mm	±10.2
Sand	*9.7	wt% TS	2026-06-26	2026-07-02	Summering av fraksjonene mellom 0.063 mm opptil 2 mm	±0.4
Grus	*5.5	wt% TS	2026-06-26	2026-07-02	Fraksjonen ≥2 mm	±0.7

^a Aure, J., Dahl, E., Green, N., Magnusson, J., Moy, F., Pedersen, A., Rygg, B & Walday, M., 1993. Langtidsovervåking av trofutviklingen i kystvannet langs Sør-Norge. Årsrapport 1990.

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ANALYSERAPPORT

Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato:	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Lab-id. P260098-16

Objekt	Prøvestasjon/ID	ASC-stasjon	FU-stasjon	Prosjektnr. og prosjektnavn	Notering	Mottatt lab
Sediment	C5			67560 - Haganes C and B survey 2026	Agglomerering i øverste tre siktene i kornfordelingsanalysen.	2026-06-19

Analyseresultat						
Parameter	Resultat	Enhet	Analysedato start	Analysedato slutt	Standard	Måleusikkerhet
TOC	40	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 17505:2023)	±6.0
TNb	3.2	mg/g TS	2026-07-13	2026-07-20	Intern metode (NS-EN 16168:2012)	±0.57
nTOC ^a	44.1		2026-07-23	2026-07-23	Beregning etter Aure m.fl., 1993	
C/N - forhold	*12.8		2026-07-23	2026-07-23	Beregning TOC:TN	
TOM	12.9	% TS	2026-06-26	2026-06-26	Vekttap ved forbrenning. Intern metode basert på NS 4764 (1980)	±0.5
Vekt% ≥2 mm	15.1	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±1.9
Vekt% 1 mm - <2 mm	3.7	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.2
Vekt% 0.500 mm - <1 mm	1.1	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.250 mm - <0.500 mm	0.3	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.125 mm - <0.250 mm	0.2	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.0
Vekt% 0.063 mm - <0.125 mm	0.9	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±0.1
Vekt% <0.063 mm	78.5	wt% TS	2026-06-26	2026-07-02	Intern metode (Bale/Kenny 2005)	±9.4
Pelitt	*78.5	wt% TS	2026-06-26	2026-07-02	Fraksjonen <0.063 mm	±9.4
Sand	*6.3	wt% TS	2026-06-26	2026-07-02	Summering av fraksjonene mellom 0.063 mm opptil 2 mm	±0.3
Grus	*15.1	wt% TS	2026-06-26	2026-07-02	Fraksjonen ≥2 mm	±1.9

^a Aure, J., Dahl, E., Green, N., Magnusson, J., Moy, F., Pedersen, A., Rygg, B & Walday, M., 1993. Langtidsovervåking av trofutviklingen i kystvannet langs Sør-Norge. Årsrapport 1990.

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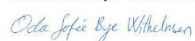
ANALYSERAPPORT

Kunde:	Arnarlax	Rapport nr.:	P260098
Kundemerking:	Haganes	Revisjon:	2
Kontaktperson:		Rapportdato	2026-08-14
Prosjektnr.:	67560	Ankomst dato:	2026-06-19

Analyseansvarlig:

Oda Sofie Bye Wilhelmsen

Signatur:



Oda Sofie Bye Wilhelmsen

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

* = Ikke akkreditert resultat

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ANALYSERAPPORT

Ordrenummer	: NO2617044	Side	: 1 av 4
Kunde	: Akvaplan Niva AS	Prosjekt	: 67560 Haganes
Kontakt	: Lisa Torske	Prosjektnummer	: 67560 Haganes
Adresse	: Framsenteret 9296 Tromsø Norge	Prøvetaker	: Kunde
Epost	: lit@akvaplan.niva.no	Sted	: ---
Telefon	: ---	Dato prøvemottak	: 2026-07-03 10:14
COC nummer	: NO202600009335	Analysedato	: 2026-07-03
Tilbuds- nummer	: OF221729	Dokumentdato	: 2026-07-10 12:28
		Antall prøver mottatt	: 6
		Antall prøver til analyse	: 6

Om rapporten

Detaljer og anmerkninger om analysemetoder er gitt på slutten av rapporten.

Denne rapporten overstyrer tidligere rapport(er) med samme ordrenummer Resultater gjelder innleverte prøver slik de var ved innleveringstidspunktet. Alle resultater i denne rapporten har blitt kontrollert og godkjent før utsendelse.

Denne rapporten får kun gjengis i sin helhet, om ikke utførende laboratorium på forhånd har skriftlig godkjent annet. Resultater gjelder bare de analyserte prøvene.

Hvis prøvetakingstidspunktet ikke er angitt, prøvetakingstidspunktet vil bli default 00:00 på prøvetakingsdatoen. Hvis datoen ikke er angitt, blir default dato satt til dato for prøvemottak angitt i klammer uten tidspunkt.

Underskrivere	Posisjon
Torgeir Rødsand	DAGLIG LEDER

Laboratorium	: ALS Laboratory Group Norway AS	Nettside	: www.alsglobal.no
Adresse	: Drammensveien 264 0283 Oslo Norge	Epost	: info.on@alsglobal.com
		Telefon	: ---

Dokumentdato : 2026-07-10 12:28
Side : 2 av 4
Ordrenummer : NO2617044
Kunde : Akvaplan Niva AS



Analyseresultater

Submatriks: **SEDIMENT**

Kundes prøvenavn

P260098-01 C1
KUN Cu + Tot P

Prøvenummer lab

NO2617044001

Kundes prøvetakingsdato

2026-06-10 09:49

Parameter	Resultat	MU	Enhet	LOR	Analysedato	Metode	Utf. lab	Acc. Key
Tørrstoff								
Tørrstoff ved 105 grader	26.9	± 4.04	%	0.1	2026-07-03	S-8MET (5583)	DK	a ulev
Totale elementer/metaller								
Cu (Kopper)	83	± 24.90	mg/kg TS	1	2026-07-03	S-8MET (5583)	DK	a ulev
P (Fosfor)	3600	± 540.00	mg/kg TS	50	2026-07-03	S-P (7902.19)	DK	a ulev
Fysikalsk								
Tørrstoff ved 105 grader	26.9	----	%	0.1	2026-07-10	S-DRY (7905.03)	DK	a ulev

Submatriks: **SEDIMENT**

Kundes prøvenavn

P260098-04 C2
Tot P

Prøvenummer lab

NO2617044002

Kundes prøvetakingsdato

2026-06-10 09:49

Parameter	Resultat	MU	Enhet	LOR	Analysedato	Metode	Utf. lab	Acc. Key
Totale elementer/metaller								
P (Fosfor)	1800	± 270.00	mg/kg TS	50	2026-07-03	S-P (7902.19)	DK	a ulev
Fysikalsk								
Tørrstoff ved 105 grader	32.0	----	%	0.1	2026-07-10	S-DRY (7905.03)	DK	a ulev

Submatriks: **SEDIMENT**

Kundes prøvenavn

P260098-07 C2alt
Tot P

Prøvenummer lab

NO2617044003

Kundes prøvetakingsdato

2026-06-10 09:49

Parameter	Resultat	MU	Enhet	LOR	Analysedato	Metode	Utf. lab	Acc. Key
Totale elementer/metaller								
P (Fosfor)	2300	± 345.00	mg/kg TS	50	2026-07-03	S-P (7902.19)	DK	a ulev
Fysikalsk								
Tørrstoff ved 105 grader	31.4	----	%	0.1	2026-07-10	S-DRY (7905.03)	DK	a ulev

Dokumentdato : 2026-07-10 12:28
Side : 3 av 4
Ordrenummer : NO2617044
Kunde : Akvaplan Niva AS



Submatriks: SEDIMENT				Kundes prøvenavn		P260098-10 C3		
				Provenummer lab		Tot P		
				Kundes prøvetakingsdato		NO2617044004		
						2026-06-10 09:49		
Parameter	Resultat	MU	Enhet	LOR	Analysedato	Metode	Utf. lab	Acc.Key
Totale elementer/metaller								
P (Fosfor)	1700	± 255.00	mg/kg TS	50	2026-07-03	S-P (7902.19)	DK	a ulev
Fysikalsk								
Tørrestoff ved 105 grader	34.1	----	%	0.1	2026-07-10	S-DRY (7905.03)	DK	a ulev

Submatriks: SEDIMENT				Kundes prøvenavn		P260098-13 C4		
				Provenummer lab		Tot P		
				Kundes prøvetakingsdato		NO2617044005		
						2026-06-10 09:49		
Parameter	Resultat	MU	Enhet	LOR	Analysedato	Metode	Utf. lab	Acc.Key
Totale elementer/metaller								
P (Fosfor)	1700	± 255.00	mg/kg TS	50	2026-07-03	S-P (7902.19)	DK	a ulev
Fysikalsk								
Tørrestoff ved 105 grader	32.8	----	%	0.1	2026-07-10	S-DRY (7905.03)	DK	a ulev

Submatriks: SEDIMENT				Kundes prøvenavn		P260098-16 C5		
				Provenummer lab		Tot P		
				Kundes prøvetakingsdato		NO2617044006		
						2026-06-10 09:49		
Parameter	Resultat	MU	Enhet	LOR	Analysedato	Metode	Utf. lab	Acc.Key
Totale elementer/metaller								
P (Fosfor)	2000	± 300.00	mg/kg TS	50	2026-07-03	S-P (7902.19)	DK	a ulev
Fysikalsk								
Tørrestoff ved 105 grader	33.0	----	%	0.1	2026-07-10	S-DRY (7905.03)	DK	a ulev

Dette er slutten av analyseresultatdelen av analysesertifikatet

Kort oppsummering av metoder

Analysemetoder	Metodebeskrivelser
S-8MET (5583)	T u n g m e t a l l e r i j o r d v e d I C P . Metode: DS/EN ISO 15587-2+DS/EN ISO 22036 (Hg ved DS DS/EN ISO 15587-2+DS/EN 16175-1). PCB: In-house metode + DS/EN ISO 18475, mod.
S-DRY (7905.03)	Metode: DS 204, tørket ved 105°C. Målesikkerhet: 15%.
S-P (7902.19)	Fosfor (total) i jordl. Metode: DS/EN ISO 15587-2 + DS/EN ISO 22036. MU: 15%



Noter: LOR = Rapporteringsgrenser representerer standard rapporteringsgrenser for de respektive parameterne for hver metode. Merk at rapporteringsgrensen kan bli påvirket av f.eks nødvendig fortynning grunnet matriksinterferens eller ved for lite prøvemateriale
MU = Måleusikkerhet
a = A etter utøvende laboratorium angir akkreditert analyse gjort av ALS Laboratory Norway AS
a ulev = A ulev etter utøvende laboratorium angir akkreditert analyse gjort av underleverandør
* = Stjerne før resultat angir ikke-akkreditert analyse.
HT* = Holding Time Breach - Resultatet er rapportert uakkreditert siden tidssensitiv periode for denne analysen, i henhold til metodestandard, har blitt overskredet. Dette kan påvirke analyseresultatet.
NAU = Ikke autorisert (! påvente av resultat)
< betyr mindre enn
> betyr mer enn
n.a. – ikke aktuelt
n.d. – Ikke påvist

Måleusikkerhet:

Måleusikkerhet skal være tilgjengelig for akkrediterte metoder. For visse analyser der dette ikke oppgis i rapporten, vil dette oppgis ved henvendelse til laboratoriet.

Måleusikkerheten angis som en utvidet måleusikkerhet (etter definisjon i "Evaluation of measurement data - Guide to the expression of uncertainty in measurement", JCGM 100:2008 Corrected version 2010) beregnet med en dekningsfaktor på 2 noe som gir et konfidensintervall på om lag 95%.

Måleusikkerhet fra underleverandører angis som en utvidet usikkerhet beregnet med dekningsfaktor 2. For ytterligere informasjon, kontakt laboratoriet.

Utførende lab

	Utførende lab
DK	Analysene er utført av: ALS Denmark A/S, Bakkegårdsvej 406A Humlebæk