ASC Survey

Glímeyri in Berufjörður

Survey at maximum biomass

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DNV-IS-007
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Title	ASC survey at maximum biomass - Glímeyri, Berufjörður		
Date	04 November 2025	**Report No.**	DNV-IS-007
Biological status	Maximum biomass	**Company**	Kaldvík hf.
Location	Glímeyri, Berufjörður	**Type**	Sea cages
Biomass (tonnes)	3,582	**No. of cages**	2x8 (16 cages, 160 m circumference)
Contact	Erlendur Gíslason	**Head of station**	Arnór Magnússon | S. 844 0771
Main findings according to ASC and NS 9410:2016 (Íslenskur útdráttur)	**Redox (ORP/Eh):** Níu af tíu stöðvum sýna jákvætt Eh (SHE) við hámarks lífmassa. Aðeins stöð B2 (Eh = -0.4 mV) uppfyllir ekki ASC kröfu 2.1.1. Stöðvar B1, A1, A2 og A3 eru á mörkum (+0.6 til +5.6 mV). pH: 7.20-7.67. Engar bakteríur greindust. Fóðurleifar við stöð B1. **Kopar (Cu):** Öll kopargildi (57.8-66.4 mg/kg DW) eru yfir ASC-viðmiðinu 34 mg/kg DW. ASC krafa 4.7.4 er EKKI uppfyllt í neinu sýni. **Botnfána (H'):** Shannon-Wiener H' > 3.0 uppfyllt á ytri stöðvum Y1 (3.87), Y2 (3.46), Y3 (3.22) og V1 (3.46). ASC krafa 2.1.2 uppfyllt. Stöðvar A2 og B2 sýna mjög slæmt NQI1 grabbverdi (<0.15) með yfirgnæfingu Capitella capitata. **Súlfíð:** Öll stöðvar undir greiningarmörkum (<1.5 mg/L). ASC krafa 2.1.1 uppfyllt á súlfíð-viðmiðinu í öllum stöðvum.		
Report date	04 Nov 2025 (sampling) / March 2026 (report)		
Author	Dr. Þorleifur Ágústsson		

Útdráttur

Kaldvík hf. fól DNV að framkvæma umhverfisrannsókn af gerðinni ASC við Glímeyri í Berufirði. Könnunin var framkvæmd við hámarks lífmassa 4. nóvember 2025, skv. stöðlum ASC og NS 9410:2016. Lífmassi á sýnatökudegi var 3.582 tonn.

Redox-mælingar (ORP/Eh)

ORP-gildi voru mæld með YSI tæki (AgCl/KCl 3.5M viðmiðunarelektrót) og leiðrétt um +199.6 mV til SHE-kvarða (ORP SHE = ORP mælt + 199.6 mV).

Níu af tíu sýnatökustöðvum sýna jákvætt Eh (SHE) og uppfylla ASC kröfu 2.1.1 (Eh > 0 mV). Aðeins stöð B2 (Eh = -0.4 mV) uppfyllir hana ekki. Stöðvar B1 (+0.6 mV), A1 (+5.6 mV), A2 (+1.6 mV) og A3 (+0.6 mV) eru á mörkum. pH-gildi eru öll innan eðlilegs sviðs (7.20-7.67). Engar bakteríur greindust í neinni stöð. Fóðurleifar greindust við stöð B1.

Botnset á AZE-stöðvum (A1-A3, B1-B2) er svart með mild rotnunarlykt, sem bendir til súrefnisleysis undir búrum. Ytri stöðvar (Y1-Y3) og viðmiðunarstöðvar (V1, V2) sýna mun betra ástand.

> *Súlfíð (ALS Scandinavia AB, pöntunarnúmer ST2550347, í gegnum Syni ehf.): Allar stöðvar undir greiningarmörkum (<1.5 mg/L, þ.e. <47 µMol/L), vel undir ASC 2.1.1 varamörkum 1500 µMol/L. ASC krafa 2.1.1 er því uppfyllt á súlfíð-viðmiðinu á öllum stöðvum.*

Kopar í botnseti

Öll kopargildi eru yfir ASC-viðmiðinu 34 mg/kg DW (57.8-66.4 mg/kg DW). Lykilathugunin er að viðmiðunarstöðvarnar V1 (59.8 mg/kg) og V2 (57.8 mg/kg), sem eru 500-850 m frá búrunum og eiga að endurspegla óáhrifaðar bakgrunnsaðstæður, eru einnig yfir viðmiðinu.

Þetta er ekki einsdæmi. Við Svarthamarsvík í Berufirði var kopar 53.5-57.0 mg/kg DW við hámarks lífmassa í apríl 2025 (DNV, BA 2025-025) - þetta er flokkur II skv. reglugerð 796/1999 (lág gildi, >75% allra sýna mæld á Íslandi) - en þó yfir ASC-viðmiðinu. Við Vatneyri í Patreksfjörður (Akvaplan-niva, skýrsla 2025 66911.03, janúar 2026) var kopar yfir 34 mg/kg DW á öllum stöðvum þ.m.t. þremur sérstakar viðmiðunarstöðvum (32-49 mg/kg DW). Egilsson o.fl. (1999) söfnuðu saman þjóðlegt gagnasafn um mengandi efni í íslenskum sjósetri og sýna að gildi á þessu bili eru lág til miðlungs á landsvísu.

Jarðfræðileg skýring: Ísland er eina landið á Norðurslóðum þar sem allur jarðvegur er basaltbergur af Mid-Atlantic Ridge uppruna. Meðalgildi kopars í basalti er um 87 mg/kg (Vinogradov, 1962; Kabata-Pendias, 2011) - mun hærra en í granítt (10 mg/kg) eða meginlandsskorpu. Fyrir meðalbasalt af miðhafshrygg (MORB), sem er grunngerð íslensks basalts, eru dæmigerð kopargildi 70-75 mg/kg (Doe, 1994; Sinton og Fryer, 1994). Efnaleg veðrun þessa basalts leysir kopar út í sjóinn og botnsedimenti. Valgarður gagnagrunnurinn (Scott o.fl., 2023) staðfestir að íslenski basaltinn er auðgaður með grunnmálmum. Rannsóknir á botnseti í Berufirði (Watts o.fl., 2025) sýna að setlag í austuríslenzkum fjörðum er að mestu marínleg uppruna og ber jarðefnafræðileg einkenni basaltjarðvegsins.

Sérstök athugasemd: Kaldvík hf. notar ENGIN koparsamböndin í net eða sem antifouling efni við Glímeyri. Kopar-antifouling efni eru þekkt uppspretta koparmengunar við laxeldis í Noregi og Skotlandi. Sú staðreynd að kopar er yfir viðmiðunarmörkum þrátt fyrir að engin slík efni séu notuð - og að viðmiðunarstöðvar fjarri búrunum séu líka yfir mörkum - styrkir enn frekar niðurstaðana um náttúruleg bakgrunnsgildi.

Niðurstaða og ráðlegging: ASC-krafan 34 mg/kg DW var þróuð með hliðsjón af norskum aðstæðum þar sem grunnmálmgildi í sjósetri eru mun lægri vegna gránítísks og metamorfísk berggrunds. Bein beitingu þessarar norsku viðmiðunar á íslenskar stöðvar er vísindafræðilega gölluð. Mælt er eindregið með forlegri bakgrunnsgreiningu með auðgunarþáttargreiningu (Cu/Al eða Cu/Ti) til að ákvarða staðbundin viðmiðunargildi og meta raunverulegan áhrif eldisins á kopar í botnseti.

Súlfít og súlfíð eru undir mörkum (<500 mg/kg DW og <1.5 mg/L) í öllum stöðvum. TOC-gildi eru á bilinu 0.98-4.80% DW; hæsta gildi er í stöð A3 (4.80% DW). Heildarnitur (TN) sýnir hæsta gildi í stöð A3 (52.1 mg/L), sem er í samræmi við mikið lífrænt álag.

Botnfána og fjölbreytni

Shannon-Wiener fjölbreytnisvísitalan (H') er yfir ASC-viðmiðinu H' > 3.0 á öllum ytri stöðvum (Y1=3.87, Y2=3.46, Y3=3.22) og viðmiðunarstöð V1 (H'=3.46). ASC krafa 2.1.2 er uppfyllt á öllum þessum stöðvum.

Innan AZE (A1-A3, B1-B2) uppfylla stöðvar A1 (16 taxa, 239 einstaklingar), A2 (3 taxa, 2.119 einstaklingar) og B2 (7 taxa, 985 einstaklingar) ASC kröfu 2.1.3 (>=2 macrofaunal taxa, >100 einstaklingar/m2). Stöðvar A3 (13 taxa, 64 einstaklingar) og B1 (7 taxa, 15 einstaklingar) uppfylla hana ekki vegna lágs einstaklingafjölda.

Stöðvar A2 og B2 sýna mjög slæmt ekólógískt ástand (NQI1 grabbverdi <0.15) með yfirgnæfingu Capitella capitata (NSI-flokkur 5, mengunarvísir). Ytri stöðvar Y1-Y3 og V1 sýna gott til mjög gott ástand (grabbverdi 0.62-0.74).

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Preface

Kaldvík hf. commissioned DNV to conduct an ASC environmental survey at Glímeyri in Berufjörður. The survey was conducted at maximum biomass in accordance with the ASC standard and NS 9410:2016. The survey includes pH/redox measurements (Eh), oceanographic investigations, geochemical analyses, and analysis of the benthic fauna at the fish farming site.

Accreditation information:

The survey was conducted by DNV AS Iceland. Fauna analysis was carried out by DNV Aquaculture and Ocean Health AS (Thomas Hansen, Jolanta Ziliukiene), accredited under Test 252: P21. Chemical analyses were performed by ALS Scandinavia AB (order number ST2550347).

1 Summary

1.1 Summary of ASC results

Nine out of ten sampling stations show positive ORP (Eh) values (SHE) at maximum biomass, meaning ASC requirement 2.1.1 (Eh > 0 mV) is met at those stations. Station B2 (Eh = -0.4 mV) falls marginally below zero and does not technically meet the requirement. Stations B1, A1, A2 and A3 are borderline (+0.6 to +5.6 mV).

Table 1. Overview of results. Green = met; Yellow = borderline / uncertain; Red = not met.

Index	ASC requirement	Y1	Y2	Y3	A1	A2	A3	B1	B2	V1	V2
2.1.1	Eh > 0 mV (SHE)	+54.6 ✓	+50.6 ✓	+24.6 ✓	+5.6 ✓	+1.6 ✓	+0.6 ✓	+0.6 ✓	-0.4 ✗	+144.6 ✓	+131.6 ✓
2.1.2	Shannon-Wiener H' > 3.0 (outside AZE)	3.87 ✓	3.46 ✓	3.22 ✓	–	–	–	–	–	3.46 ✓	4.35 ✓
2.1.3	>=2 macrofaunal taxa, >100 ind/m2 (AZE)	–	–	–	16sp,239ind ✓	3sp,2119ind ✓	13sp,64ind ⚠	7sp,15ind ✗	7sp,985ind ✓	–	–
4.7.4	Copper < 34 mg/kg DW	66.4 ✗	63.8 ✗	59.2 ✗	65.9 ✗	60 ✗	60.5 ✗	61.2 ✗	64.1 ✗	59.8 ✗	57.8 ✗

Table 1b. Reference values for Shannon-Wiener (H') (Molvær et al., 1997; Iversen and Sandøy, 2018).

I – Very good	II – Good	III – Moderate	IV – Poor
>4	4–3	2–1	<1

1.2 Results and assessment

Overall picture: Glímeyri shows considerable signs of organic enrichment at maximum biomass. Sediment at and below the cages (A1-A3, B1-B2) is black with mild sulphurous odour, indicating reducing conditions. ORP values at all AZE stations are very close to zero (+0.6 to +5.6 mV). Outer stations (Y1-Y3) and reference stations (V1, V2) show considerably better conditions.

Copper: All copper values significantly exceed the ASC threshold of 34 mg/kg DW (range: 57.8-66.4 mg/kg). Critically, reference stations V1 (59.8 mg/kg) and V2 (57.8 mg/kg), located 500-850 m from the cages, also substantially exceed the threshold. This pattern is consistent with data from other Icelandic ASC surveys: Svarthamarsvík in Berufjörður recorded 53.5-57.0 mg/kg DW in April 2025 (DNV, BA 2025-025), and Vatneyri in Patreksfjörður recorded 32-49 mg/kg DW (Akvaplan-niva, 2025). Iceland is composed almost entirely of basalt, which is naturally enriched in copper (50-150 mg/kg; Taylor and McLennan, 1985). Chemical weathering of these basaltic rocks releases copper into fjord sediments, resulting in naturally elevated background concentrations across Icelandic coastal areas. The exceedance of ASC criterion 4.7.4 at Glímeyri cannot therefore be attributed solely to aquaculture. A formal geochemical background assessment with enrichment factor analysis is strongly recommended before any ASC compliance determination is made.

> *Sulphide (ALS Scandinavia AB, order no. ST2550347, via Syni ehf.): All stations below detection limit (<1.5 mg/L, i.e. <47 µMol/L), well below the ASC 2.1.1 alternative threshold of 1500 µMol/L. ASC requirement 2.1.1 is therefore also met on the sulphide criterion at all stations.*

2 Introduction

2.1 Background

DNV / Blár Akur has conducted an ASC survey at maximum biomass at Glímeyri in Berufjörður, Iceland, on behalf of Kaldvík hf. The survey was conducted in accordance with the Aquaculture Stewardship Council (ASC standard) and NS 9410:2016.

Classification or reference values specific to this type of survey have not been developed by Icelandic authorities. Results are presented with reference to Norwegian classification guidelines, noting that some indices (such as NSI) were developed for Norwegian conditions.

2.2 Site operations

Glímeyri is in full production (B-Glimeyri). Sampling was conducted at maximum biomass on 4 November 2025. Biomass at time of sampling was 3,582 tonnes (closing biomass). Feed consumption in the period: 22.8 tonnes. The site operates 16 cages in a 2×8 arrangement, each with a circumference of 160 m.

Table 3. Production data for Glímeyri, Berufjörður.

Production period	Biomass at survey (tonnes)	Feed consumption (tonnes)
25.08.2023 – 04.03.2026	3,582	22.8 (period)

2.3 Previous surveys

No previous ASC or environmental surveys have been carried out at Glímeyri prior to this survey.

2.4 ASC survey plan

The selection of parameters, location of sampling stations, and other criteria are based on the ASC standard and NS 9410:2016. Sampling was conducted on 4 November 2025.

Table 4. ASC survey plan. TOC = total organic carbon. TN = total nitrogen. Cu = copper. ORP/pH = oxidation-reduction potential and acidity.

Station	Description	Parameters
B1	Cage corner, west	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
B2	Cage corner, east	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
A1	25 m upstream, NE	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
A2	25 m downstream, SW	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
A3	25 m crosscurrent, W	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
Y1	55 m upstream, NE	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
Y2	55 m downstream, SW	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
Y3	55 m crosscurrent, W	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
V1	Reference station, downstream	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis
V2	Reference station 2, downstream	Cu, sulphite, sulphide, TN, TOC, dry matter, ORP, pH, fauna analysis

Emamectin benzoate (EMB): Not measured at this site. Kaldvík hf. does not use any medicinal treatments at Glímeyri. No EMB analysis is therefore required under the ASC standard.

Anti-foulant compounds: No copper-based anti-foulants or net treatments are used at Glímeyri. This is an important distinction when interpreting copper results in section 3.1.2 - the elevated copper concentrations observed in sediments cannot be attributed to anti-foulant use and are consistent with geogenic background sources.

2.5 Location of ASC stations and AZE

The ASC standard permits a site-specific AZE. The AZE was calculated based on current velocity measurements (Fiskeldi Austfjarða, 2017) according to:

AZE = (pi x r2) x Ks x Kd x Kb

where r = radius (25 m within AZE, 55 m outside AZE), Ks = current correction factor (1.0-1.5), Kd = depth correction factor (0.8-1.2), Kb = topography correction factor (0.9-1.1).

Table 5. Coordinates, depth and distance of sampling stations from cages at Glímeyri.

Station	Depth (m)	Distance	Latitude (N)	Longitude (W)	Location
B1	61.2	0 m	64°43.542'	14°23.496'W	Cage corner, west
B2	58.2	0 m	64°43.759'	14°23.725'W	Cage corner, east
A1	58.2	25 m	64°43.781'	14°23.743'W	25 m upstream, NE
A2	61.1	25 m	64°43.534'	14°23.464'W	25 m downstream, SW
A3	69.0	25 m	64°43.609'	14°23.463'W	25 m crosscurrent, W
Y1	61.1	55 m	64°43.818'	14°23.746'W	55 m upstream, NE
Y2	53.1	55 m	64°43.439'	14°23.415'W	55 m downstream, SW
Y3	62.2	55 m	64°43.629'	14°23.404'W	55 m crosscurrent, W
V1	66.3	[TBC] m	64°44.305'	14°23.731'W	Reference station, downstream
V2	59.1	[TBC] m	64°43.125'	14°23.090'W	Reference station 2, downstream

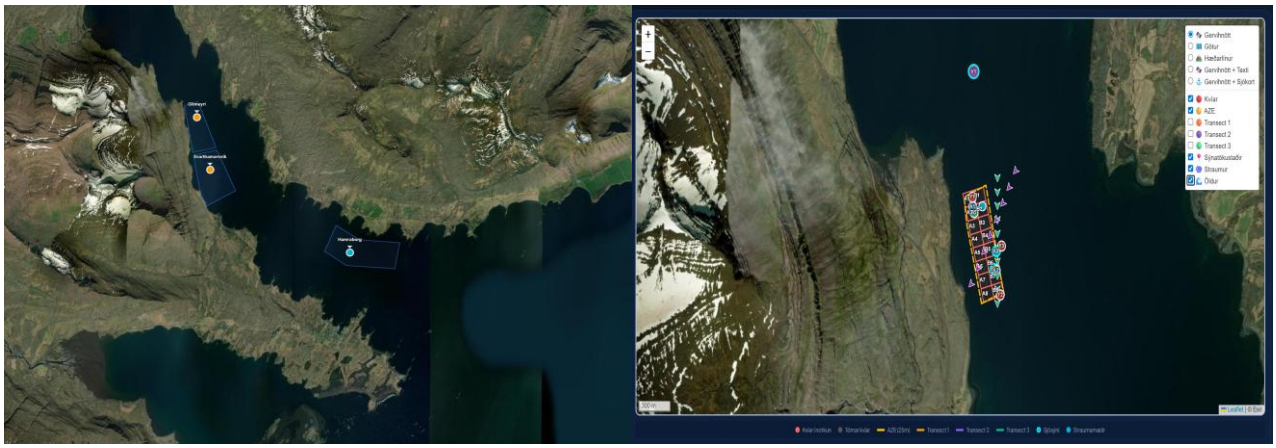

Figure 1. Location of ASC sampling stations at Glímeyri, Berufjörður. Station colours: red = cage corners (B), blue = within AZE (A), yellow = outside AZE (Y), purple = reference stations (V). Dashed yellow line = AZE boundary.

3 ASC Survey – Glímeyri

3.1 Results

3.1.1 Sediment and redox measurements (Eh)

Table 6 shows sediment descriptions and redox measurement results, measured on 4 November 2025 at maximum biomass. Eh values are calculated with a correction of +199.6 mV (YSI AgCl/KCl 3.5M reference electrode at 25°C) to give values on the SHE (Standard Hydrogen Electrode) scale.

Station B2 shows negative Eh (-0.4 mV) and technically does not meet ASC requirement 2.1.1. Stations B1, A1, A2 and A3 are borderline (+0.6 to +5.6 mV). Black sediment and mild sulphurous odour at all AZE stations are consistent with significant organic loading below the cages.

Table 6. Sediment description and redox measurements (Eh). ASC stations Glímeyri, November 2025. ORP SHE = ORP measured (YSI) + 199.6 mV. Yellow = borderline (0-5 mV).

Station	Role	ORP measured mV	ORP SHE mV	pH	HTI	Odour	Colour / Description	Bact.
B1	Cage corner (W)	-199	**+0.6**	7.25	2.3	Mild sulphur	Black. Thick mud, feed residues	NO
B2	Cage corner (E)	-200	**-0.4**	7.3	2.9	Mild sulphur	Black. Thick mud	NO
A1	Within AZE	-194	**+5.6**	7.25	2.2	Mild sulphur	Black. Thick mud	NO
A2	Within AZE	-198	**+1.6**	7.23	2.9	Mild sulphur	Black. Thick mud	NO
A3	Within AZE	-199	**+0.6**	7.26	2.6	Mild sulphur	Black. Thick mud	NO
Y1	Outside AZE	-145	**+54.6**	7.35	2.9	None	Grey-brown. Fine mud	NO
Y2	Outside AZE	-149	**+50.6**	7.2	2.7	None	Black. Fine mud	NO
Y3	Outside AZE	-175	**+24.6**	7.56	3.7	None	Grey-brown. Fine mud	NO
V1	Reference st.	-55	**+144.6**	7.67	2.9	None	Grey-black. Fine mud	NO
V2	Reference st. 2	-68	**+131.6**	7.64	2.9	None	Light brown. Mud with shell debris	NO

HTI (Havsbunn Tilstandsindeks / Seabed Condition Index): class 1 = very good, 2 = good, 3 = moderate, 4 = poor. HTI values at Glímeyri are generally class 2-3.

3.1.2 Copper in sediment

3.1.2a Results

Copper values (ALS Scandinavia AB, December 2025, order no. ST2550347) are presented in Table 6. All ten stations exceed the ASC criterion 4.7.4 threshold of 34 mg/kg dry weight. Values range from 57.8 mg/kg DW (V2, reference station 2) to 66.4 mg/kg DW (Y1, outer AZE). The critical observation is that reference stations V1 (59.8 mg/kg DW) and V2 (57.8 mg/kg DW), situated 500-850 m from the cage structures, also substantially exceed the 34 mg/kg DW threshold. These reference stations are positioned to represent unimpacted baseline conditions. Their elevated copper values therefore cannot be attributed to direct aquaculture impact.

3.1.2b Evidence for naturally elevated copper background in Icelandic fjords

The exceedance of the ASC threshold at reference stations is not unique to Glímeyri. A consistent pattern of elevated copper concentrations has been documented across multiple Icelandic aquaculture sites in recent years, strongly suggesting that elevated background copper is a characteristic feature of Icelandic coastal marine sediments:

(1) Svarthamarsvík, Berufjörður (DNV, BA 2025-025): The ASC survey at maximum biomass in April 2025 recorded copper values of 53.5-57.0 mg/kg DW across all stations. The Icelandic Environmental Agency (Umhverfisstofnun) classifies this range as Category II - Low Values under Regulation nr. 796/1999, denoting the lower 75th percentile of all copper measurements in Icelandic waters - yet these values still exceed the ASC threshold of 34 mg/kg DW.

A further critical point: Kaldvík hf. does not use any copper-based anti-foulant compounds or net treatments at Glímeyri. Anti-foulants are a well-documented source of elevated copper in sediments at salmon farms in Norway and Scotland (Solberg et al., 2002; Brooks and Mahnken, 2003; Holan et al., 2019). The fact that no anti-foulants are used at Glímeyri yet copper values still exceed the ASC threshold - including at reference stations remote from the cages - provides particularly strong evidence that the elevated copper concentrations are of geogenic origin rather than aquaculture-related.

(2) Vatneyri, Patreksfjörður, Vestfjords (Mannvik and Gunnarsson, Akvaplan-niva AS, Report 2025 66911.03, January 2026): The ASC survey at maximum biomass in October 2025 found copper above 34 mg/kg DW at virtually all stations, including dedicated reference stations Cu1, Cu2 and Cu3 which recorded values of 37/36, 42/39 and 41/47 mg/kg DW respectively (two replicates per station). Only one replicate at one station (ASC3) was below the threshold. The report notes that copper levels were high and above 34 mg/kg at all stations. Patreksfjörður is located in the Westfjords, a geologically distinct region from Berufjörður in East Iceland, yet the same pattern of threshold exceedance is observed.

(3) Egilsson et al. (1999) compiled the first national dataset of contaminant measurements in Icelandic marine waters and sediments. This reference work, which underpins the classification system in Regulation 796/1999, documents that copper values in the range 30-70 mg/kg DW represent low to moderate background values in Icelandic coastal sediments. The fact that the ASC threshold of 34 mg/kg DW falls within what Icelandic authorities classify as low background values illustrates the fundamental mismatch between the ASC criterion - developed primarily for Norwegian conditions - and Icelandic geochemical baselines.

3.1.2c Geological explanation

Iceland is entirely composed of volcanic rocks formed at the mid-Atlantic ridge and associated mantle plume, making it unique among North Atlantic nations in having a 100% basaltic geological substrate. Basalt is characteristically enriched in copper relative to other common rock types: the average copper content of basalt is approximately 87 mg/kg, compared to 30 mg/kg in granodiorites and 10 mg/kg in granites (Vinogradov, 1962; as compiled in Kabata-Pendias, 2011). For mid-ocean ridge basalts (MORB) specifically - the dominant rock type underpinning Iceland - average copper values of 70-75 mg/kg have been reported (Doe, 1994; Sinton and Fryer, 1994), with primitive MORB at Mg#70 approaching 100 mg/kg Cu. Icelandic basalts, representing a mixture of MORB-type tholeiites and ocean island basalt (OIB), have copper contents broadly in this range.

The geochemical database Valgarður (Scott et al., 2023; Earth System Science Data, 15, 1165-1195) compiles data from 1,166 Icelandic rock samples and confirms that Icelandic tholeiitic and transitional basalts contain significant concentrations of base metals including copper. Research on basalt weathering in Iceland (Bayon et al., 2019, Geochimica et Cosmochimica Acta) demonstrates that rivers draining Icelandic basaltic catchments transport high concentrations of dissolved and particulate copper to coastal waters. Sedimentological research specifically in Berufjörður (Watts et al., 2025, Estuaries and Coasts) documents that sediment in East Iceland fjords is primarily derived from the marine water column and the surrounding basaltic watershed, with limited terrestrial organic input. This confirms that fjord sediments in Berufjörður carry the geochemical signature of their basaltic source rocks, including naturally elevated copper.

Research on dissolved metals in Icelandic waters further supports this picture. Kremling and Petersen (1977, Meteor Forschungsergebnisse) documented elevated concentrations of zinc, cadmium, copper and iron in seawater of the Iceland-Faroe Ridge area, consistent with geogenic input from Icelandic basaltic substrates. The behaviour of metals in deep Icelandic geothermal fluids (Gaudiosi et al., 2022, Scientific Reports) confirms that copper is actively mobilised from basaltic rocks during water-rock interaction throughout Iceland, contributing to elevated dissolved copper fluxes to the marine environment.

3.1.2d Implications for ASC criterion 4.7.4

The ASC Salmon Standard criterion 4.7.4 (copper < 34 mg/kg DW) was developed with reference to Norwegian environmental conditions and the Norwegian classification system (NS 9410:2016). Norway is predominantly composed of granitic and metamorphic rocks with much lower natural copper background values than Iceland. The direct application of this Norwegian-derived threshold to Icelandic sites is therefore scientifically questionable. The consistent exceedance of the threshold at reference stations across multiple Icelandic fjords, coupled with the classification of these same values as Category I-II (Very Low to Low) under Iceland's own national regulation (Regulation 796/1999), strongly indicates that the ASC threshold does not reflect Icelandic baseline conditions.

The ASC Salmon Standard and its Audit Manual acknowledge that locally elevated background concentrations of copper can occur and should be taken into account during audits. A formal geochemical background assessment is strongly recommended prior to any ASC compliance determination for Glímeyri. Such an assessment should include: (i) analysis of multiple reference stations at increasing distances from the farm and in comparable undisturbed habitats; (ii) geochemical normalisation using a lithogenic reference element (e.g., aluminium or titanium, which are immobile during weathering) to calculate enrichment factors (EF = [Cu/Al]sample / [Cu/Al]background); and (iii) comparison with Icelandic national baseline data (Regulation 796/1999; Egilsson et al., 1999). If enrichment factors at cage stations are not significantly elevated relative to reference stations, this would provide strong evidence that the copper exceedance reflects natural background rather than aquaculture impact.

> *Summary - Copper across Icelandic ASC sites (all exceeding 34 mg/kg DW threshold): Glímeyri, Berufjörður (2025): 57.8-66.4 mg/kg DW (this report) Svarthamarsvík, Berufjörður (2025, DNV BA 2025-025): 53.5-57.0 mg/kg DW = Category II under Reg. 796/1999 Vatneyri, Patreksfjörður (2025, Akvaplan-niva 2025 66911.03): 32-49 mg/kg DW at all stations incl. reference For context: average copper in basalt = 87 mg/kg (Vinogradov, 1962); MORB average = 70-75 mg/kg (Doe, 1994)*

3.1.3 TN, TOC, sulphite and sulphide in sediment

Sulphite and sulphide are all below limits at all stations: sulphite <500 mg/kg DW and sulphide <1.5 mg/L (<47 µMol/L), well below the ASC 2.1.1 alternative threshold of 1500 µMol/L (ALS Scandinavia AB, order no. ST2550347, analysed via Syni ehf., December 2025). TOC values range from 0.98 to 4.80% DW; the highest value is at station A3 (4.80% DW). Total nitrogen (TN) shows variable values; station A3 shows the highest value (52.1 mg/L), consistent with elevated organic loading.

Table 7. Sediment chemical analyses (ALS Scandinavia AB, December 2025). Red = above ASC threshold; Green = below limit.

Parameter	Unit	Y1	Y2	Y3	A1	A2	A3	B1	B2	V1	V2
Copper (Cu)	mg/kg DW	66.4 ✗	63.8 ✗	59.2 ✗	65.9 ✗	60 ✗	60.5 ✗	61.2 ✗	64.1 ✗	59.8 ✗	57.8 ✗
TOC	% DW	1.94	1.74	2.56	1.53	1.96	4.8	1.46	1.79	1.58	0.98
Total Nitrogen (TN)	mg/L	13.8	11.8	19.7	6	15.4	52.1	4.41	11.7	6.96	7.38
Sulphite	mg/kg DW	<500 ✓	<500 ✓	<500 ✓	<500 ✓	<500 ✓	<500 ✓	<500 ✓	<500 ✓	<500 ✓	<500 ✓
Sulphide	mg/L	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓	<1.5 ✓

3.1.4 Seawater samples

Seawater samples were collected on 10 January 2026 and analysed by ALS Scandinavia AB (order no. ST2601916). Table 7 shows the results.

Table 8. Chemical analyses of seawater samples (ALS, February 2026).

Parameter	Unit	321-1	321-2	321-3
Sampling date		10.01.2026	10.01.2026	10.01.2026
Nitrite + Nitrate as N	mg/L	<0.150	<0.150	<0.150
Total Phosphorus as P	mg/L	<0.030	<0.030	<0.030
Nitrate as N	mg/L	0.12	0.11	0.098
Total Organic Carbon (TOC)	mg/L	1.53	1.66	0.85
Total Nitrogen (TN)	mg/L	0.22	0.25	0.28

3.2 Species diversity and Shannon-Wiener diversity index (H')

Fauna analysis was conducted by DNV Aquaculture and Ocean Health AS. Table 8 shows an overview of faunal indices at all stations. Stations A2 and B2 show very poor ecological status (grab value < 0.15) dominated by Capitella capitata (NSI sensitivity group 5, pollution indicator). Outer stations (Y1-Y3) and V1 show good ecological status.

Table 9. Overview of faunal indices. NQI1 class: Very good (>=0.72), Good (0.63-0.72), Moderate (0.49-0.63), Poor (0.31-0.49), Very poor (<0.31).

Index	A1	A2	A3	B1	B2	Y1	Y2	Y3	V1	V2
S (no. of species)	16	3	13	7	7	25	22	21	33	50
N (no. of individuals)	239	2119	64	15	985	117	177	213	705	617
NQI1	0.421	0.172	0.613	0.593	0.26	0.713	0.684	0.66	0.737	0.747
H' (Shannon-Wiener)	1.465	0.05	3.122	2.005	0.154	3.866	3.464	3.224	3.455	4.351
ES100	11.707	1.446	NA	NA	2.349	24.359	17.638	15.905	16.548	30.221
ISI	5.461	3.715	4.687	5.333	3.815	3.808	5.799	5.266	6.812	6.533
NSI	8.217	5.519	14.54	20.875	5.635	20.725	19.295	19.002	20.49	23.278
Grab value (nEQR)	0.38	0.103	0.51	0.513	0.132	0.655	0.673	0.621	0.739	0.809

Stations A3 and B1 have N < 100 individuals and do not meet ASC requirement 2.1.3 for >100 ind/m2, despite having >=2 taxa. V2 has two replicate grabs (V2.1 and V2.2, see Appendix I); values in Table 9 are averages (NQI1=0.747, H'=4.35, grab=0.809 - Very Good).

Copper: All stations exceed the ASC threshold of 34 mg/kg DW. However, reference stations V1 (59.8 mg/kg) and V2 (57.8 mg/kg), located far from the cages, also exceed this threshold. Background copper concentrations in Berufjörður are naturally elevated, likely due to the local geology of the fjord. A formal background assessment is recommended to establish site-specific baseline values for copper.

3.2.1 ASC assessment of benthic communities

Outer stations (outside AZE, Y1-Y3): Shannon-Wiener H' exceeds the ASC threshold of 3.0 at all three stations (Y1=3.87, Y2=3.46, Y3=3.22). ASC requirement 2.1.2 is met.

Inner stations (within AZE, A1-A3, B1-B2): The requirement is >=2 macrofaunal taxa and >100 individuals/m2. Stations A1 (16 taxa, 239 ind.), A2 (3 taxa, 2,119 ind.) and B2 (7 taxa, 985 ind.) meet the requirement. Stations A3 (13 taxa, 64 ind.) and B1 (7 taxa, 15 ind.) do not meet it due to low individual counts.

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5 Appendix I – Statistical results of fauna samples

1 Methods

Fauna samples were sorted and identified by personnel from Laboratories Norway, DNV Aquaculture and Ocean Health AS (Table 1.1).

The calculation of species diversity (ES100) was performed using the statistical software R (4.4.2). The sensitivity index AMBI (a component of NQI1) was calculated using the software package AMBI (version 6.0, AZTI-Tecnalia). All other calculations were carried out using Microsoft Excel. The Shannon-Wiener diversity index (H') and the Evenness index (J) were calculated according to Shannon & Weaver (1949) and the Norwegian National Guidelines for Water Classification (https://www.vannportalen.no/veiledere/klassifiseringsveileder). The ISI and NSI indices, AMBI, and the NQI1 index were calculated following the Norwegian National Guidelines for Water Classification (https://www.vannportalen.no/veiledere/klassifiseringsveileder; Appendix).

Table 1.1 Work performed and accreditation

Supplier	Work	Personnel	Accredited work
DNV Aquaculture and Ocean Health AS	Preliminary sorting of fauna	Jolanta Ziliukiene	Yes, (Test 252: P21)
DNV Aquaculture and Ocean Health AS	Species identification	Thomas Hansen	Yes, (Test 252: P21)

2 Results

2.1 A1

Table 2.1.1 Ten most common species at A1, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Species	NSI-group	Number of specimens	Percentage (%)
Capitella capitata	5	188	78,7
Ennucula tenuis	3	12	5,0
Eteone flava/longa	3	10	4,2
Macoma calcarea	3	5	2,1
Jassa sp.		4	1,7
Circeis spirillum		4	1,7
Chaetozone setosa complex	4	4	1,7
Nephtys ciliata	3	2	0,8
Onchidorididae		2	0,8
Yoldia hyperborea		2	0,8
Other species	-	6	2,5

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.1.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$).
The average of the nEQR $\bar{G}$ values represents the grab value for the station.
The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	A1-1	nEQR $\bar{G}$
S	16	
N	239	
NQI1	0,421	0,323
H'	1,465	0,366
J	0,366	
H'max	4,000	
ES100	11,707	0,548
ISI	5,461	0,512
NSI	8,217	0,149
Grabbverdi		0,380

2.2 A2

Table 2.2.1 All occurring species at A2, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Capitella capitata	5	2 108	99,5
Eteone flava/longa	3	9	0,4
Ophryotrocha lobifera		2	0,1

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.2.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	A2-1	nEQR $\bar{G}$
S	3	
N	2119	
NQI1	0,172	0,111
H'	0,050	0,013
J	0,032	
H'max	1,585	
ES100	1,446	0,072
ISI	3,715	0,218
NSI	5,519	0,100
Grabbverdi		0,103

2.3 A3

Table 2.3.1 Ten most common species at A3, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Capitella capitata	5	19	29,7
Yoldia hyperborea		9	14,1
Macoma calcarea	3	7	10,9
Ennucula tenuis	3	6	9,4
Philinissima denticulata		6	9,4
Galathowenia oculata	3	6	9,4
Sternaspis islandica		3	4,7
Cossura pygodactylata		2	3,1
Euchone papillosa	4	2	3,1
Ciliatocardium ciliatum		1	1,6
Øvrige arter	-	3	4,7

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.3.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	A3-1	nEQR $\bar{G}$
S	13	
N	64	
NQI1	0,613	0,575
H'	3,122	0,778
J	0,844	
H'max	3,700	
ES100	NA	
ISI	4,687	0,367
NSI	14,540	0,318
Grabbverdi		0,510

2.4 B1

Table 2.4.1 All occurring species at B1, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Ophryotrocha lobifera		9	60,0
Holothuroidea (damaged)		1	6,7
Capitella capitata	5	1	6,7
Jassa sp.		1	6,7
Galathowenia oculata	3	1	6,7
Amphitrite cirrata	1	1	6,7
Ennucula tenuis	3	1	6,7

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.4.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	B1-1	nEQR $\bar{G}$
S	7	
N	15	
NQI1	0,593	0,547
H'	2,005	0,490
J	0,714	
H'max	2,807	
ES100	NA	
ISI	5,333	0,487
NSI	20,875	0,529
Grabbverdi		0,513

2.5 B2

Table 2.5.1 All occurring species at B2, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Capitella capitata	5	969	98,4
Eteone flava/longa	3	8	0,8
Ophryotrocha lobifera		3	0,3
Galathowenia oculata	3	2	0,2
Yoldia hyperborea		1	0,1
Ennucula tenuis	3	1	0,1
Sternaspis islandica		1	0,1

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.5.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	B2-1	nEQR $\bar{G}$
S	7	
N	985	
NQI1	0,260	0,168
H'	0,154	0,038
J	0,055	
H'max	2,807	
ES100	2,349	0,117
ISI	3,815	0,233
NSI	5,635	0,102
Grabbverdi		0,132

2.6 V1

Table 2.6.1 Ten most common species at V1, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Galathowenia oculata	3	188	26,7
Ciliatocardium ciliatum		93	13,2
Ennucula tenuis	3	83	11,8
Prionospio steenstrupi	4	72	10,2
Yoldia hyperborea		66	9,4
Sternaspis islandica		60	8,5
Retusa obtusa		31	4,4
Nephtys ciliata	3	23	3,3
Axinopsida orbiculata		20	2,8
Euchone papillosa	4	11	1,6
Øvrige arter	-	58	8,2

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.6.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	V1-1	nEQR $\bar{G}$
S	33	
N	705	
NQI1	0,737	0,819
H'	3,455	0,832
J	0,685	
H'max	5,044	
ES100	16,548	0,718
ISI	6,812	0,812
NSI	20,490	0,516
Grabbverdi		0,739

2.7 V2.1

Table 2.7.1 Ten most common species at V2.1, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Ampharete petersenae		89	26,2
Levinsenia gracilis	2	41	12,1
Leitoscoloplos mammosus	4	30	8,8
Philomedes globosus	1	27	7,9
Pholoe assimilis	2	24	7,1
Capitella capitata	5	15	4,4
Macoma calcarea	3	13	3,8
Terebellides sp.	2	9	2,6
Nemertea	3	8	2,4
Chaetozone sp.	3	6	1,8
Øvrige arter	-	78	22,9

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.7.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	V2.1-1	nEQR $\bar{G}$
S	53	
N	340	
NQI1	0,744	0,827
H'	4,166	0,921
J	0,727	
H'max	5,728	
ES100	28,366	0,894
ISI	6,900	0,817
NSI	23,389	0,616
Grabbverdi		0,815

2.8 V2.2

Table 2.8.1 Ten most common species at V2.2, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Ampharete petersenae		47	17,0
Leitoscoloplos mammosus	4	35	12,6
Levinsenia gracilis	2	29	10,5
Philomedes globosus	1	19	6,9
Capitella capitata	5	13	4,7
Pholoe assimilis	2	12	4,3
Terebellides sp.	2	11	4,0
Thyasira gouldii	3	9	3,2
Macoma calcarea	3	9	3,2
Tridonta elliptica	1	7	2,5
Øvrige arter	-	86	31,0

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.8.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	V2.2-1	nEQR $\bar{G}$
S	48	
N	277	
NQI1	0,749	0,833
H'	4,535	0,967
J	0,812	
H'max	5,585	
ES100	32,075	0,931
ISI	6,165	0,676
NSI	23,166	0,607
Grabbverdi		0,803

2.9 Y1

Table 2.9.1 Ten most common species at Y1, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Ennucula tenuis	3	22	18,8
Galathowenia oculata	3	20	17,1
Macoma calcarea	3	14	12,0
Yoldia hyperborea		8	6,8
Eteone flava/longa	3	7	6,0
Prionospio steenstrupi	4	7	6,0
Chaetozone setosa kompleks	4	5	4,3
Caprellidae		4	3,4
Capitella capitata	5	4	3,4
Spio limicola	2	4	3,4
Øvrige arter	-	22	18,8

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.9.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	Y1-1	nEQR $\bar{G}$
S	25	
N	117	
NQI1	0,713	0,784
H'	3,866	0,883
J	0,832	
H'max	4,644	
ES100	24,359	0,854
ISI	3,808	0,232
NSI	20,725	0,524
Grabbverdi		0,655

2.10 Y2

Table 2.10.1 Ten most common species at Y2, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Galathowenia oculata	3	35	19,8
Caprellidae		31	17,5
Euchone papillosa	4	23	13,0
Sternaspis islandica		22	12,4
Prionospio steenstrupi	4	16	9,0
Chaetozone setosa kompleks	4	15	8,5
Ennucula tenuis	3	5	2,8
Yoldia hyperborea		5	2,8
Nephtys ciliata	3	4	2,3
Spio limicola	2	4	2,3
Øvrige arter	-	17	9,6

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.10.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	Y2-1	nEQR $\bar{G}$
S	22	
N	177	
NQI1	0,684	0,720
H'	3,464	0,833
J	0,777	
H'max	4,459	
ES100	17,638	0,755
ISI	5,799	0,580
NSI	19,295	0,476
Grabbverdi		0,673

2.11 Y3

Table 2.11.1 Ten most common species at Y3, listed by number of individuals and percentage, along with color coding for the NSI group of the respective species. Cells without background color indicate that the species has not been assigned to an NSI group.

Art	NSI-gruppe	Antall individer	Prosent (%)
Prionospio steenstrupi	4	45	21,1
Galathowenia oculata	3	44	20,7
Ennucula tenuis	3	39	18,3
Sternaspis islandica		26	12,2
Yoldia hyperborea		14	6,6
Chaetozone setosa kompleks	4	13	6,1
Nephtys ciliata	3	6	2,8
Eteone flava/longa	3	4	1,9
Axinopsida orbiculata		3	1,4
Macoma calcarea	3	3	1,4
Øvrige arter	-	16	7,5

Forurensningssensitiv (NSI-1)	Forurensningsnøytral (NSI-2)	Forurensningstolerant (NSI-3)	Forurensningstolerant og opportunistisk (NSI-4)	Forurensnings-indikerende (NSI-5)

Table 2.11.2 Fauna results from grab sample 1, including species and individual counts, as well as indexes for each grab. Key indices (NQI1, H', ES100, ISI, and NSI) are normalized to an ecological value (nEQR $\bar{G}$). The average of the nEQR $\bar{G}$ values represents the grab value for the station. The colors indicate the ecological status category of each index value (according to tables A1.2.1–A1.2.2).

Indeks	Y3-1	nEQR $\bar{G}$
S	21	
N	213	
NQI1	0,660	0,668
H'	3,224	0,803
J	0,734	
H'max	4,392	
ES100	15,905	0,697
ISI	5,266	0,473
NSI	19,002	0,467
Grabbverdi		0,621

6 Appendix II – Taxonomy

Species list for benthic fauna. Names marked in red are taxa that have been identified (and in some cases quantified) but are not used in the statistical analyses (i.e., Foraminifera, Bryozoa, Porifera, Cirripedia, colonial Cnidaria, Nematoda, and pelagic species, cf. NS-EN ISO 16665:2013). The symbol "X" indicates that the species or taxon has been observed but not quantified.

TAXA	NSI (EG)	A1-1	A2-1	A3-1	B1-1	B2-1	V1-1	V2.1-1	V2.2-1	Y1-1	Y2-1	Y3-1
Ampharete petersenae								89	47			1
Axinopsida orbiculata							20	4		2		3
Bathymedon sp.							2	2				
Boreotrophon cf. clavatus								1				
Ciliatocardium ciliatum				1			93	4	4			
Circeis spirillum		4										
Cladobranchia							1					
Cossura pygodactylata				2						1		1
Euchone incolor								1				
Jassa sp.		4			1					1		
Megamoera dentata									2			
Moelleria costulata								4	2			
Pagurus sp.									1			
Philinissima denticulata				6						1		1
Pionosyllis compacta								1	1			
Proclea sp.								1	1			
Solariella obscura								1	1			
Strongylocentrotus sp.								1				
Tridonta elliptica	1							3	7			
Tridonta montagui	1							3	4			
Ampharete borealis	4						1				1	
Amphitrite cirrata	1				1							
Aphelochaeta sp.	2							3				
Capitella capitata	5	188	2108	19	1	969		15	13	4	1	
Chaetozone setosa kompleks	4	4						3	5	5	15	13
Chaetozone sp.	3							6	2			
Cirratulus cirratus	4							1				
Dipolydora sp.		1								2	1	
Eteone flava/longa	3	10	9			8	5		5	7	3	4
Euchone papillosa	4			2			11	1			23	
Galathowenia oculata	3	1		6	1	2	188	1	3	20	35	44
Gattyana amondseni	2							3	1			
Goniada maculata	2						1					
Harmothoe imbricata	2	1					1					
Harmothoe mariannae	1										1	
Laphania boecki	2						1	1				
Leitoscoloplos mammosus	4							30	35		1	
Levinsenia gracilis	2							41	29	1		
Lumbrineris mixochaeta	4						5					
Maldane sarsi	4							3	2			
Mediomastus fragilis	4							1		1		
Neoamphitrite groenlandica								1	1			
Nephtys ciliata	3	2		1			23	1	2	3	4	6
Nephtys hystricis	1								1			
Nephtys pente	2							3				
Ophryotrocha lobifera			2		9	3						

Pholoe assimilis	2			1			5	24	12		1	3
Pholoe baltica	2									2		
Polynoidae									1	2		
Polyphysia crassa	4						1					
Praxillella gracilis	3						2	1	1			1
Prionospio steenstrupi	4						72	3	2	7	16	45
Scalibregma inflatum	3							1	1			
Scoletoma fragilis	2							1	2			2
Scoloplos armiger	3						2		4			
Spio limicola	2	1					4			4	4	2
Sternaspis islandica				3		1	60	3	3	1	22	26
Syllis cornuta	3							1	1			
Terebellides sp.	2							9	11			
Trochochaeta multisetosa	4										1	
Tubificoides benedii	4									1		
Bivalvia (fragment)				1								
Crenella decussata	1							1	3			
Ennucula tenuis	3	12		6	1	1	83	3	2	22	5	39
Macoma calcarea	3	5		7			6	13	9	14	2	3
Mya sp.											1	2
Mytilus edulis		3				3	1			1		
Nuculana pernula	1						5	1	3			
Thyasira gouldii	3								9	2	3	1
Yoldia hyperborea		2		9		1	66	1		8	5	14
Ariadnaria borealis	1							1				
Curtitoma trevelliana												1
Lacuna vincta		2					2		1	1		
Lepeta caeca	1							1	2			
Onchidorididae		2								1		
Retusa obtusa							31	4	5			
Stenosemus albus									2			
Chaetoderma nitidulum	2						1					
Caprellidae		7	3	1	10	16						
Caprellidae									1	4	31	
Dulichia sp.							2					
Kroyera carinata							1	3	4			
Lysianassoidea	1										1	
Photidae								1				
Stenothoidae									1			
Tmetonyx sp.								1				
Brachydiastylis resima	1							1				
Diastylis sp.								1				
Eudorella emarginata	3						5		1			
Leucon sp.							1		1			
Philomedes globosus	1							27	19			
Euphausiacea						2	2					
Astropecten irregularis												1
Ophiuroidea (Juvenile)									2	1		
Amphipholis squamata	1								1			
Ophiura sp.	2						1					
Echinoidea (Juvenile)							4					
Holothuroidea (damaged)					1							
Ascidiacea		1										

Nematoda								30	6	1	1	1
Nemertea	3						1	8	6			
Priapulus caudatus	3	1						1				
Foraminifera							150	20	20	3		30
Cirripedia		X	X	X	X	X		X				
Bryozoa		X	X	X	X	X	X	X		X	X	X
Hydrozoa		X	X		X	X	X		X	X	X	