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Working Group on International Pelagic Surveys (WGIPS)

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and

Working Group on Widely Distributed Stocks (WGWIDE)

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**INTERNATIONAL ECOSYSTEM SURVEY IN NORDIC SEA (IESNS)
in April - May 2026**

Post-cruise meeting on Teams, 16-18 June 2026

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Executive summary

- The sea temperature in 2026 was generally above the long-term mean (1995-2021) in the Norwegian Sea.
- The 2026 indices of zooplankton biomass in the surveyed area showed little change from the 2025 levels, except in the western parts of the deep basins (Norwegian Basin and Lofoten Basin, west), where a significant increase in biomass was observed.
- The total biomass estimate of Norwegian spring-spawning herring (NSSH) in the Norwegian Sea was 4.2 million tonnes, which is a 16% increase from the 2025 survey estimate. The estimate of total number of NSSH was 22.2 billion, which is 8% higher than in the 2025 survey. The survey followed the pre-planned protocol, and the survey group recommends using the abundance estimates in the analytical assessment.
- The 2022-year class of NSSH was the biggest in the survey in numbers (33%) while the 2021-year class was biggest in biomass (26%).
- The biomass of blue whiting measured in the 2026 survey increased by 17% from last year's survey and 53% in terms of numbers. The measured population is dominated by one- and two-year old fish, and the 2024- and 2025-year classes appeared strong in the survey.

Introduction

In April-May 2026, four research vessels and one chartered commercial vessel participated in the International Ecosystem Survey in the Nordic Seas (IESNS); R/V Dana, Denmark (joint EU survey by Denmark, Germany, Ireland, The Netherlands and Sweden), R/V Jákup Sverri, Faroe Islands, R/V Þórunn Þórðardóttir, Iceland, R/V G.O. Sars, Norway and M/S Resolute, United Kingdom (UK). The Barents Sea was covered by Russia in May 2026, but no data was exchanged at the time of the post-cruise meeting. The aim of the survey was to cover the whole distribution area of Norwegian Spring-spawning herring with the objective of estimating the total abundance of the stock, in addition to collect data on plankton and hydrographical conditions in the area. Although the survey does not contain the entire stock of blue whiting, abundance is estimated for the surveyed part of the population (these estimates might be used as indices of juvenile abundance in future stock assessments). The survey was initiated by the Faroes, Iceland, Norway and Russia in 1995. Since 1997 the EU has also participated (except 2002 and 2003) and from 2004 onwards the survey has been more integrated into an ecosystem survey.

This report represents analyses of data from this international survey in 2026 that are stored in the PGNAPES database and the ICES acoustic database, and supported by national survey reports from some survey participants (Dana: Cruise Report R/V Dana Cruise 05/2026, Þórunn Þórðardóttir: Þ5-2026 Cruise Report, Bjarnason, 2026, Jákup Sverri, cruise report 2618, Homrum, 2026 and IESNS-UK 2026 Survey Report).

Material and methods

Coordination of the survey was done during the WGIPS meeting in January 2026 and by correspondence. Planning of the acoustic transects, hydrographic stations and plankton stations were carried out by using the functions `TransectDesign` and `StationsAlongTransectDesign` in `Stox 4.2.0` (see <https://stoxproject.github.io/StoX/>). The function `TransectDesign` generates the survey plan (transect lines) in a cartesian coordinate system and transforms the positions to the geographical coordinate system (longitude, latitude) using the azimuthal equal distance projection, which ensures uniform coverage. Figure 1 shows the planned acoustic transects and hydrographic and plankton stations in each stratum. Only parallel transects were used this year, however, because the transects follow great circles they appear bended in a Mercator projection. The participating vessels together with their effective survey periods are listed in the table below:

Vessel	Institute	Survey period
Dana	DTU Aqua - National Institute of Natural Resources, Denmark	27/04-21/05
G.O. Sars	Institute of Marine Research, Bergen, Norway	30/04-28/05
Jákup Sverri	Faroe Marine Research Institute, Faroe Islands	30/04-12/05
Þórunn Þórðardóttir	Marine and Freshwater Research Institute, Iceland	27/04-14/05
Resolute	CEFAS, United Kingdom	28/04-10/05

Figure 2 shows the cruise tracks and strata, Figure 3 the hydrographic and WP11 plankton stations, Figure 4 the Macroplankton trawl and Multinet stations and Figure 5 the pelagic trawl stations. Survey effort by each vessel is detailed in the table below. Daily contacts were maintained between the vessels during the survey, primarily through electronic mail. The temporal progression of the survey is shown in Figure 6.

Survey effort by vessel for the International ecosystem survey in the Nordic Seas in April - May 2026.

Vessel	Effective survey period	Effective acoustic cruise track (nm)	Trawl stations	Ctd stations	Aged fish (HER)	Length fish (HER)	Plankton stations
Dana	1/5-20/5	1828	24	29	444	1262	29
Jákup Sverri	30/4-/5	1030	15	19	307	1206	18
Þórunn Þórðardóttir	29/4-11/5	2200	9	26	246	1022	25
G.O. Sars	1/5-26/5	4257	28	63	246	640	59
Resolute	28/4-10/5	945	15	16	373	770	16

This year, occasional periods of inclement weather were encountered by the different survey vessels. It prevented occasional trawling operations, and a few CTD and WP2 deployments were cancelled. However, overall, it did not adversely affect the core survey deliverables. In

addition, some changes were made to the survey coverage plan. Two transects were cut short and the northernmost transect was skipped in stratum 3 (there were very few fish-like marks in these areas), and the three northernmost transects in stratum four were extended to the west due to excess survey time.

Acoustic data were collected with scientific echosounders using 38 kHz frequency. Transducers were calibrated with the standard sphere calibration (Foote *et al.*, 1987) prior to the survey. Salient acoustic settings are summarized in the text table below.

Acoustic instruments and settings for the primary frequency (boldface).

	Dana	G. O. Sars	Þórunn Þórðardóttir	Jákup Sverri	Resolute
Echo sounder	Simrad EK60	Simrad EK80	Simrad EK80	Simrad EK80	Simrad EK80
Frequency (kHz)	38	38, 18, 70, 120, 200, 333	38, 18, 70, 120, 200, 333	18, 38, 70, 120, 200, 333	38, 200
Primary transducer	ES38BP	ES 38-7	ES38-7	ES38-7	ES38-7
Transducer installation	Towed body	Drop keel	Drop keel	Drop keel	Hull-mounted
Transducer depth (m)	2-5	6	7	6-9	6
Upper integration limit (m)	10	15	12	15	15
Absorption coeff. (dB/km)	10.3	10.0	10.6	10.4	10.1
Pulse length (ms)	1.024	1.024	1.024	1.024	1.024
Band width (kHz)	2.425	2.43	2.425	3.06	2.425
Transmitter power (W)	2000	2000	2000	2000	2000
Angle sensitivity (dB)	21.9	21.9	18	21.9	18
2-way beam angle (dB)	-20.5	-20.7	-20.3	-20.4	-20.7
Sv Transducer gain (dB)					
Ts Transducer gain (dB)	25.41	26.16	27.05	26.88	26.59
SA correction (dB)	-0.57	-0.01	-0.01	-0.03	-0.073
3 dB beam width (dg)					
alongship:	6.82	6.54	6.44	6.43	6.33
athw. ship:	6.84	6.47	6.61	6.43	6.48
Maximum range (m)	500	500	500	500	500
Post processing software	LSSS	LSSS	LSSS	LSSS	Echoview

All participants except UK used the same post-processing software (LSSS). The UK data were scrutinized and processed using Echoview. Scrutinization was carried out according to an agreement at the PGNAPES scrutinizing workshop in Bergen in February 2009 (ICES 2009), and “Notes from acoustic Scrutinizing workshop in relation to the IESNS”, Reykjavík 3.-5. March 2015 (Annex 4 in ICES 2015). Generally, acoustic recordings were scrutinized daily by

a scientist experienced in viewing echograms. This involved species identification and partitioning using catch information, school characteristics, and frequency response. All vessels used a large or medium-sized pelagic trawl as the main tool for biological sampling. The salient properties of the trawls, plankton nets and hydrographic equipment are as follows:

	Dana	G.O. Sars	Pórunn Pórðardóttir	Jákup Sverri	Resolute
<u>Trawl dimensions</u>					
Circumference (m)	410	496	416	832	972
Vertical opening (m)	20-35	25-30	10-14	30-40	30-50
Mesh size in codend (mm)	42	24	20	45	20
Typical towing speed (kn)	3.5-4.5	3.0-4.5	2.7-4.3	3.4-4.6	3.5-4.5
<u>Plankton sampling</u>					
Sampling net	WP2	WP2	WP2	WP2	WP2
Standard sampling depth (m)	200	200	200	200	200
<u>Hydrographic sampling</u>					
CTD unit	SBE911	SBE911	SBE911	SBE911	SAIV SD208
Standard sampling depth (m)	1000	1000	1000	1000	1000

Catches from trawl hauls were sorted and weighed; fish were identified to species level, when possible, and other taxa to higher taxonomic levels. A subsample of herring, blue whiting and mackerel were sexed, aged, and measured for length and weight, and their maturity status was estimated using established methods. An additional sample of fish was measured for length. For the Norwegian, Icelandic and Faroese vessel, a smaller subsample of stomachs was collected for further analyses on land. As part of ongoing stock identity research, herring and, this year also blue whiting genetic samples were collected. Salient biological sampling protocols for trawl catches are listed in the table below.

	Species	Dana	G.O. Sars	Pórunn Pórðardóttir	Jákup Sverri	Resolute
Length measurements	Herring	200-300	100	200	100-150	100
	Blue whiting	200-300	100	100	100-150	100
	Mackerel	100	100	50	100-150	100
	Other fish sp.	50	30	30	30-100	30
Weighed, sexed and maturity determination	Herring	50	25-30	50	100-150*	50
	Blue whiting	30	30	75	100-150*	50
	Mackerel	0	25	50	100-150*	50
	Other fish sp.	0	0	0	30-100*	0
Otoliths/scales collected	Herring	50	25-30	50	25-50	50
	Blue whiting	30	30	25	25-50	50
	Mackerel	0	25	50	25-50	50
	Other fish sp.	0	0	0	0	0
Stomach sampling	Herring	0	10	10	5	0

	Blue whiting	0	10	10	5	0
	Mackerel	0	10	10	5	0
	Other fish sp.	0	0	0	0	0
Genetic samples	Herring	50	25-30	50	30	50
	Blue whiting	30	30	25	30	50

* Only fish that are aged are being sexed and maturity determined.

Processed acoustic data were analysed using the StoX software package (version 4.2.0) which has been used for many years now for WGIPS coordinated surveys. A description of StoX can be found in Johnsen et al. (2019) and here: <https://www.hi.no/en/hi/forskning/projects/stox>. Estimation of abundance from acoustic surveys with StoX is carried out according to the stratified transect design model developed by Jolly and Hampton (1990). This method requires pre-defined strata, and the survey area in the Norwegian Sea was therefore split into 4 strata with pre-defined acoustic transects. Within each stratum, parallel transects with equal distances were used. The distance between transects was based on available survey time, and the starting point of the first transect in each stratum was randomized. This approach allows for robust statistical analyses of uncertainty of the acoustic estimates. The strata and transects used in StoX are shown in Figure 2. Generally, and in accordance with most WGIPS coordinated surveys, all trawl stations within a given stratum with catches of the target species (either blue whiting or herring) were assigned to all transects within the stratum, and the length distributions were weighted equally within the stratum.

The following target strength (TS)-to-fish length (L) relationships were used:

Blue whiting: $TS = 20.0 \log(L) - 65.2 \text{ dB}$ (ICES 2012)

Herring: $TS = 20.0 \log(L) - 71.9 \text{ dB}$ (Foote et al. 1987)

The target strength for herring is the one traditionally used while this target strength for blue whiting was first applied in 2012 (ICES 2012).

The hydrographical and plankton stations by survey are shown in Figure 3. Hydrographic data were collected using a SBE 911 CTD. Maximum sampling depth was 1000 m.

Zooplankton was sampled by WP2 nets on all vessels, according to the standard procedure for the surveys. Mesh sizes were 180 or 200 μm . The net was hauled vertically from 200 m to the surface or from the bottom whenever bottom depth was less than 200 m. Samples were split in two, and one half was preserved in formalin while the other half was dried and weighed. The samples for dry weight were size fractionated before drying by sieving the samples through 2000 μm and 1000 μm sieves, giving the size fractions 180/200 – 1000 μm , 1000 – 2000 μm , and > 2000 μm . Data are presented as total mg dry weight per m^2 . For the zooplankton distribution map, all stations are presented. For the time series, stations in the Norwegian Sea delimited to the different sub-areas have been included. Estimates of the statistical distribution of the zooplankton biomass indices are done by simple bootstrapping by re-sampling with replacement.

Results and Discussion

Hydrography

The temperature distributions in the ocean, averaged over selected depth intervals; 0-50 m, 50-200 m, and 200-500 m, are shown in Figures 7a-c. The temperatures in the surface layer (0-50 m) ranged from below 0°C in the Greenland Sea to 9-10°C in the southern part of the Norwegian Sea (Figure 7a). The Arctic front was encountered south of 65°N east of Iceland extending eastwards towards about 2°W where it turned north-eastwards to 65°N and then almost straight northwards. The front sharpened and had a more eastern location with depths. Further to west at about 8°W, another front runs northward to Jan Mayen, the Jan Mayen Front, that was most distinct in the upper 200 m. The warmer North Atlantic water formed a broad tongue that stretched far northwards along the Norwegian coast with temperatures about 7 °C to south of the Bear Island at 74°N in the surface layer.

Relative to the long-term mean, from 1995 to 2021, the temperature anomalies in the upper 0-50 m of the Norwegian Sea were generally positive except for an area northeast of the Faroes. Highest temperature anomalies were at the western part of the region, including the Greenland and Iceland Sea, where temperatures reached up to 1,5°C above average. At the entrance to the Barents Sea the temperatures were 1°C above average. Northeast of the Faroes, the area had negative temperature anomalies reaching 2°C below the long-term mean (Figure 7a).

At 50-200 m depth, the anomaly patterns largely mirrored those at the surface. The Norwegian Sea was in general warmer than average except for the area northeast of the Faroes consistent with surface observations. In the Iceland and Greenland Sea, positive anomalies reached 2°C above the long-term mean. In the area northeast of the Faroes, temperatures were 2° lower than average, exhibiting similar anomalies to the surface layer (Figure 7b).

In the 200-500 m layer, the temperature anomaly patterns were still broadly consistent with shallower depths, but a larger area in the southern Norwegian Sea was colder than average with largest negative values east of the Faroes. The eastern part of the southern Norwegian Sea was still warmer than average with maximum values 1,5°C above average. In the northern Norwegian Sea, there were areas with both colder and warmer areas than average. The Greenland Sea was warmer than average with temperatures reaching up to 1°C above the long-term-mean. The warming observed in the eastern Norwegian Sea and Iceland and Greenland Sea at the shallower depths was less pronounced at these greater depths (Figure 7c).

Overall, the warming above 200 m in the eastern Norwegian Sea suggests a warmer inflowing Atlantic Water, while the cooling northeast of the Faroes and in the southern Norwegian Sea suggests an increased influence of the Arctic Water from the west into the Norwegian Sea.

Two main features of the circulation in the Norwegian Sea, where the herring stock is grazing, are the Norwegian Atlantic Current (NWAC) and the East Icelandic Current (EIC). The NWAC

with its offshoots forms the northern limb of the North Atlantic current system and carries relatively warm and salty water from the North Atlantic into the Nordic Seas. The EIC, on the other hand, carries Arctic waters. This water largely derives from the East Greenland Current, but to a varying extent, some of its waters may also have been formed in the Iceland and Greenland Seas. The EIC flows into the southwestern Norwegian Sea where its waters subduct under the Atlantic waters to form an intermediate Arctic layer. While such a layer has long been known in the area north of the Faroes and in the Faroe-Shetland Channel, it is in the last four decades a similar layer has been observed all over the Norwegian Sea. Also, in periods this layer has been less well-defined.

This circulation pattern creates a water mass structure with warm Atlantic Water in the eastern part of the area and more Arctic conditions in the western part. The NWAC is rather narrow in the southern Norwegian Sea, but when meeting the Vøring Plateau off Mid Norway it is deflected westward. The western branch of the NWAC reaches the area of Jan Mayen at about 71°N. Further northward in the Lofoten Basin the lateral extent of the Atlantic water gradually narrows again, apparently under topographic influence of the mid-ocean ridge. It has been shown that atmospheric forcing largely controls the distribution of the water masses in the Nordic Seas. Hence, the lateral extent of the NWAC, and consequently the position of the Arctic Front, that separates the warm North Atlantic waters from the cold Arctic waters, is correlated with the large-scale distribution of the atmospheric sea level pressure. The local air-sea heat flux in addition influences the upper layer and it is found that it can explain about half of the year-to-year variability of the ocean heat content in the Norwegian Sea.

Zooplankton

The zooplankton biomass (mg dry weight m⁻²) distribution in the upper 200 m in 2026 is shown in Figure 8. Sampling stations covered Atlantic water, Arctic water, and the Arctic frontal zone. The biomass was evenly distributed between water masses and larger geographical areas, while spots with higher zooplankton biomass were found especially in the eastern part along the Norwegian continental shelf. The southernmost area, an area in the central Norwegian Sea, and the entrance to the Barents Sea seems to have lower amounts of zooplankton.

Figure 9a) shows new sub-areas that have been developed in the ICES group WGINOR, based on bottom-topography, water-mass distribution, and geographical variations in annual primary production. The stations were evenly distributed within the sub-areas, but the Iceland Sea polygon was not fully covered. The Greenland Sea polygon is normally not covered at the IESNS survey, but partly at the IESSNS survey. Some stations were located outside the sub-areas.

Figure 9b) shows the zooplankton time series indices for the six sub-areas covered. The highest average biomass in 2026 was found in the western Lofoten Basin, with ~ 10.9 g dry weight m⁻². The lowest biomass was found in the Norwegian continental shelf (6.3 g dry weight m⁻²). The

Iceland Sea, which in 2025 had highest biomass, showed this year second lowest. The western part of the Norwegian- and Lofoten Basins had a significant increase in zooplankton biomass compared with 2025, while all the other sub-areas showed no change from the level last year. The zooplankton biomass indices for the Norwegian Sea and adjacent areas in May have been estimated since 1995. All sub-areas had a high biomass period until mid-2000, and a lower period thereafter. The long-term decrease has been most pronounced in the Iceland Sea and the western part of the Norwegian Basin. The low-biomass period after 2010 has been relatively stable, but with interannual variations. The average biomass in this lower period has also been relatively similar for the entire investigated area, varying between 8.8 and 7.6 g dry weight m⁻² among the different sub-areas.

The reasons for the changes in zooplankton biomass are not obvious. The period with lower zooplankton biomass coincides with higher-than-average heat content in the Norwegian Sea (ICES, 2025) and reduced inflow of Arctic water into the southwestern Norwegian Sea (Kristiansen et al., 2019; Skagseth et al., 2022). Timing effects, such as match/mismatch with the phytoplankton bloom, can also affect the zooplankton abundance. Changes in the timing of seasonal development can also result in zooplankton being sampled in different successional phases from year to year, which will affect the biomass. The high biomass of pelagic fish feeding on zooplankton has been suggested to be one of the main causes for the reduction in zooplankton biomass. However, carnivorous zooplankton and not pelagic fish may be the main predators of zooplankton in the Norwegian Sea (Skjoldal et al., 2004), and we do not have good data on the development of the carnivorous zooplankton stocks.

Norwegian spring-spawning herring

Survey coverage in the Norwegian Sea was considered adequate in 2026, and it is recommended that the results from IESNS 2026 can be used for assessment purpose. The zero-line was believed to be reached for NSS herring. In the northeastern part of the survey area, relatively high densities of herring were observed on the eastern part of several transects, along the coast of northern Norway. This was predominantly 4-5-year-old herring. The transect ends are, however, in shallow waters, close to the coast and it can be assumed that only minor quantities of herring would be distributed east of the transect ends here. To check this on several of these transects, the vessels investigated areas east of the transect ends and no acoustic observations of herring were recorded there.

High abundance of herring was observed in the southwestern part and the northeastern part of the survey area (Figure 10). This is a commonly observed pattern in this survey where older fish are distributed in the west while the younger fish are found closer to the nursery areas in the Barents Sea (Figure 11).

Four-year-old herring (2022-year class) was the most abundant year class in terms of numbers (33%), followed by five-year old (2021-year class, 28%) and ten-year-old (2016-year class, 15%) based on StoX bootstrap estimates for the Norwegian Sea (Table 1). In terms of biomass,

however, the 2021-year class was the largest (26%), while the 2022-year class (22%) and the 2016-year-class (22%) were at the same level.

Uncertainty estimates for numbers at age based on bootstrapping within StoX are shown in Figure 13 and Table 1. The relative standard error (CV) is 17% for the total biomass and 20% for the total numbers estimate. The relative standard error for abundance for the dominating age groups is between 19% and 37% (Figure 13) while there is a typical pattern of higher values for the youngest age classes.

The total estimate of herring in the Norwegian Sea from the 2026 survey was 22.2 billion in number and the biomass was 4.2 million tonnes. The biomass estimate is about 16% higher than the 2025 survey estimate and the estimated number of individuals is about 8% higher than in 2025. The biomass estimate decreased significantly from 2009 to 2012 and has since then been rather stable with similar confidence intervals (Figure 14), but the trend has been downwards the last few years until the lowest biomass occurred in 2025.

Since 2015 an increased awareness has been raised around the age reading of herring. It appeared that the age distributions from the different participants some years showed differences and the older specimens appear to have uncertain ages. An age-reading workshop was held in Bergen 17.-19. April 2023 (WKARNSSH2, ICES 2023). This workshop was based on otoliths and scales collected in 2021 and subsequently exchanged between the participating countries. The conclusion from the workshop was that the agreement in age reading was at an acceptable level (ICES 2023), although there were some differences between readings of scales and otoliths particularly for older individuals. No issues directly related to age reading were identified and the guidelines were therefore not updated. The workshop also concluded that stock mixing is a minor issue when it comes to age reading. Regular age-reading exchanges and subsequent workshops are recommended and given the current age-composition in the catches the survey group recommends an exchange in 2028.

Some differences in age distributions from different vessels within same strata were noted in this year's survey, particularly in strata 1 and 3 (Figure 15). It is not thought that this is due to differences in age reading however, but rather to be an effect of the vessels covering different areas within the strata and the distribution of age classes is not spatially uniform within each stratum (Figure 11).

Recently, concerns have been raised by the survey group (WGIPS) for the International ecosystem surveys in the Nordic Seas (IESNS and IESSNS) on mixing issues between Norwegian spring-spawning herring and other herring stocks (e.g. Icelandic summer-spawning, Faroese autumn-spawning, Norwegian summer-spawning and North Sea type autumn-spawning herring) occurring in some of the fringe regions in the Norwegian Sea. Currently, fixed cut lines are being used by the survey group to exclude herring of presumed other types than NSS herring, however this simple procedure is thought to introduce some contamination

of the stock indices of the targeted NSS herring. WGIPS noted in their 2019 report that the separation of different herring stock components is an issue in several of the surveys coordinated in WGIPS and the needs for development of standardized stock splitting methods was also noted in the WKSIDAC (ICES 2017) and WGIPS ever since as well as WKSIDAC2 and WKSIDAC3. Genetic samples of herring are therefore now collected routinely in the survey (Figure 5).

Blue whiting

Bootstrap estimates of abundance, biomass, mean length and mean weight of blue whiting during IESNS 2026 are shown in Table 2. The estimated biomass was 1.74 million tons (CV=0.15) which is a 17 % increase from last year's estimate, and above the average from the period 2008-2025. The estimated total abundance was 26.7 billion (CV=0.15) which is a 53% increase from last year's estimate. The surveyed population is dominated by one and two year old blue whiting this year, both the 2024- and 2025-year classes appear strong in the survey. Uncertainty estimates for numbers at age based on bootstrapping with StoX are shown in Figure 18 and Table 2.

The spatial distribution of blue whiting in 2026 is shown in Figure 16. As usual, most of the fish was registered in the eastern part of the Norwegian Sea. The largest fish was found in the northern and south-eastern part of the survey area (Figure 17). Comparison of the size and age distributions of blue whiting by stratum and country are shown in Figure 19 and 20, and they seem to be in good agreement.

Mackerel

Trawl catches of mackerel are shown in Figure 21. Mackerel was present in the southern part of the Norwegian Sea, but there were also catches further north close to Lofoten. The two largest catches in the north were dominated by small mackerel (18-22 cm), the rest of the catches consisted of larger mackerel. No further quantitative information can be drawn from these data as this survey is not designed to monitor mackerel.

General recommendations and comments

RECOMMENDATION	ADDRESSED TO
1. Continue the methodological research in distinguishing between herring and blue whiting in the interpretation of echograms.	WGIPS
2. Continue to conduct genetic sampling of all aged herring and blue whiting (even if the actual analysis will only be realised in a few years' time from now at least the samples will be there to produce a retrospective split).	WGIPS
3. Suggest age-reading exchange on herring in 2028 with follow-up workshop.	WGIPS/WGWIDE

Next year's post-cruise meeting

We will aim for a meeting 14-16 June 2027. The final decision will be made at the next WGIPS meeting.

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Tables

Table 1. IESNS 2026 in the Norwegian Sea. Estimates of abundance, mean weight and mean length of Norwegian spring-spawning herring. The estimates are mean of 1000 bootstrap replicates in Stox.

Length	Age in years (year class)													Number (10 ⁶)	Biomass (10 ⁶ kg)	Mean weight (g)
	1 (2025)	2 (2024)	3 (2023)	4 (2022)	5 (2021)	6 (2020)	7 (2019)	8 (2018)	9 (2017)	10 (2016)	11 (2015)	12 (2014)	Unknown			
18	0	0	0	0	0	0	0	0	0	0	0	0	5.1	5.1	0.2	46.7
19	0	0	0	0	0	0	0	0	0	0	0	0	5.1	5.1	0.3	54.1
20	0	0	0	0	0	0	0	0	0	0	0	0	7.3	7.3	0.5	61.8
21	0	0	0	45.8	0	0	0	0	0	0	0	0	20	65.8	4.8	73.1
22	0	58	0	388.1	0	0	0	0	0	0	0	0	3	449.1	37.5	83.6
23	0	62.3	46.1	1207.6	0	0	0	0	0	0	0	0	0.2	1316.2	125.2	95.1
24	0	3.6	51.2	1186.9	24	0	0	0	0	0	0	0	0	1265.7	133.3	105.3
25	0	3.3	2	1015.1	142.8	0	0	0	0	0	0	0	0	1163.2	133.8	115
26	0	59.8	0	1095	498.1	2.8	0	0	0	0	0	0	0	1655.7	218.7	132.1
27	0	0	48.9	988.8	505.4	85.2	11	2.1	0	2.3	0	0	0	1643.7	233.1	141.8
28	0	0	0	694.1	1131.1	25.5	10.1	5.3	3.8	2.4	24.5	2	0	1898.8	293.6	154.6
29	0	0	13.1	491.3	1347.4	99.3	8.8	40	3.3	10.1	6.1	7.7	0	2027.1	347.4	171.4
30	0	0	0	293	1678.4	13.9	22.6	18.7	6.1	43.6	5.7	20	0	2102	396.9	188.8
31	0	0	4	26.3	671.5	219.2	36.2	17.3	17	33.4	16.5	58.6	0	1100	230.7	209.7
32	0	0	0	6.8	229.7	348.1	105.5	107.1	47.2	127.9	6.4	12.7	0	991.4	230.1	232.1
33	0	0	0	0	150.7	204	186.7	329.8	370	589	3.6	13.7	0	1847.5	463.4	250.8
34	0	0	0	0	9.9	23.7	239.5	538	347.1	1548.4	10.4	15.5	0	2732.5	735.0	269
35	0	0	0	0	2.6	20.2	57.9	150.4	216.1	776.2	61.6	43	0	1328	380.1	286.2
36	0	0	0	0	0	2.7	20.7	36.3	44.7	225.3	26.9	87.5	0	444.1	136.3	306.9
37	0	0	0	0	0	0	0	0	0	3.3	6.3	149.7	0	159.3	52.1	327.1
38	0	0	0	0	0	0	0	6.9	0	0	0	23.3	0.2	30.4	10.5	344
39	0	0	0	0	0	0	0	0	0	0	0	0	6.7	6.7	2.6	394.7
40	0	0	0	0	0	0	0	0	0	0	0	4.1	0	4.1	1.6	399
TSN(mill)		186.9	165.4	7438.7	6391.5	1044.7	699.1	1251.9	1055.3	3361.8	168.1	437.8	47.6	22248.7		
cv (TSN)		0.93	0.78	0.37	0.27	0.2	0.3	0.25	0.22	0.23	0.29	0.26	-	0.20		
TSB(1000 t)		19.7	19	927	1105.4	223.7	177.2	325.5	281.1	903.3	42.4	128.3	5.4		4157.9	
cv (TSB)		0.93	0.74	0.34	0.27	0.2	0.32	0.26	0.23	0.24	0.28	0.24	-		0.17	
Mean length(cm)		24	26.5	26.5	29.5	31	31.5	32.1	32	32	32.5	33.6	25			
Mean weight(g)		104.4	133.3	132	177.9	207.6	238.6	255.8	264.7	268.6	244.6	287.3	164.7			

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Table 2. IESNS 2026 in the Norwegian Sea. Estimates of abundance, mean weight and mean length of blue whiting. The estimates are mean of 1000 bootstrap replicates in Stox.

Length	Age in years (year class)														Number (10 ⁶)	Biomass (10 ⁶ kg)	Mean weight (g)
	1 (2025)	2 (2024)	3 (2023)	4 (2022)	5 (2021)	6 (2020)	7 (2019)	8 (2018)	9 (2017)	10 (2016)	11 (2015)	12 (2014)	13 (2013)	Unknown			
14	0	0	0	0	0	0	0	0	0	0	0	0	0	6.9	6.9	0.1	15.1
15	3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	3.8	0.1	30
16	0	0	0	0	0	0	0	0	0	0	0	0	0	22.9	22.9	0.5	21
17	427.3	0	0	0	0	0	0	0	0	0	0	0	0	0	427.3	12.0	28
18	1956.9	0	0	0	0	0	0	0	0	0	0	0	0	0	1956.9	65.9	33.7
19	4794.6	10.1	0	0	0	0	0	0	0	0	0	0	0	0	4804.7	186.4	38.8
20	4237.5	40	0	0	0	0	0	0	0	0	0	0	0	0	4277.5	198.0	46.3
21	2008.3	257.9	0	0	0	0	0	0	0	0	0	0	0	0	2266.2	120.6	53.2
22	575.4	1076.4	28.4	0	0	0	0	0	0	0	0	0	0	0	1680.2	106.5	63.4
23	83.6	2725.7	241.6	0	0	6.7	0	0	0	0	0	0	0	0	3057.6	226.9	74.2
24	38.3	1998.4	423.1	22.4	74.7	0	0	0	0	0	0	0	0	0	2556.9	212.7	83.2
25	0	637.8	632.6	128.2	249.5	0	0	0	0	0	0	0	0	0	1648.1	150.5	91.3
26	0	205.4	473.7	339.4	248.9	19.6	0	0	0	0	0	0	0	0	1287	129.7	100.8
27	0	57.6	326.5	347.1	345.1	11.9	0	0	0	0	0	0	0	0	1088.2	123.3	113.3
28	0	0	90	353.3	265.2	38.6	11.1	0	0	0	0	0	0	0	758.2	98.0	129.3
29	0	0	0	102.6	284.2	80.6	6.7	15.4	0	0	0	0	0	0	489.5	69.9	142.8
30	0	0	0	50.2	86.5	83.7	0	0	0	0	0	0	0	0	220.4	35.6	161.4
31	0	0	17.8	7.9	12.7	39.2	10.3	0	0	0	0	0	0	0	87.9	15.5	176.6
32	0	0	0	0	7.4	13.5	11.3	0	0	0	0	10.7	0	0.3	32.5	6.4	197.2
33	0	0	0	0	0	20.6	5.2	0	0	0	0	0	0	0	25.8	4.7	182.7
34	0	0	0	0	0	0	0	0	5.2	0	0	0	0	1.9	7.1	1.7	237.2
35	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	3.2	0.7	217
36	0	0	0	0	0	0	0	0	0	0	0	3.6	4.8	0	0	0.00	279
TSN(mill)	14125.8	7009.3	2233.6	1351.2	1574.2	314.4	44.7	15.4	5.2			14.3	4.8	35.1	26728.9		
cv (TSN)	0.22	0.18	0.21	0.28	0.3	0.39	0.42	1.05	1.16			0.92	1.03	-	0.15		
TSB(1000 t)	609.9	532.7	207.6	153.8	172.3	43.8	7.1	1.7	1.2			3.2	1.4	1.8		1736.4	
cv (TSB)	0.21	0.18	0.21	0.27	0.28	0.41	0.43	1.06	1.15			0.92	1.03	-		0.15	
Mean length(cm)	19.9	23	25.8	27.5	28	28.8	30.6	29	34			34	36	27			
Mean weight(g)	42.6	76.8	95.1	122.4	120.7	143.2	160.6	111	238.7			220.8	280	55.2			

Figures

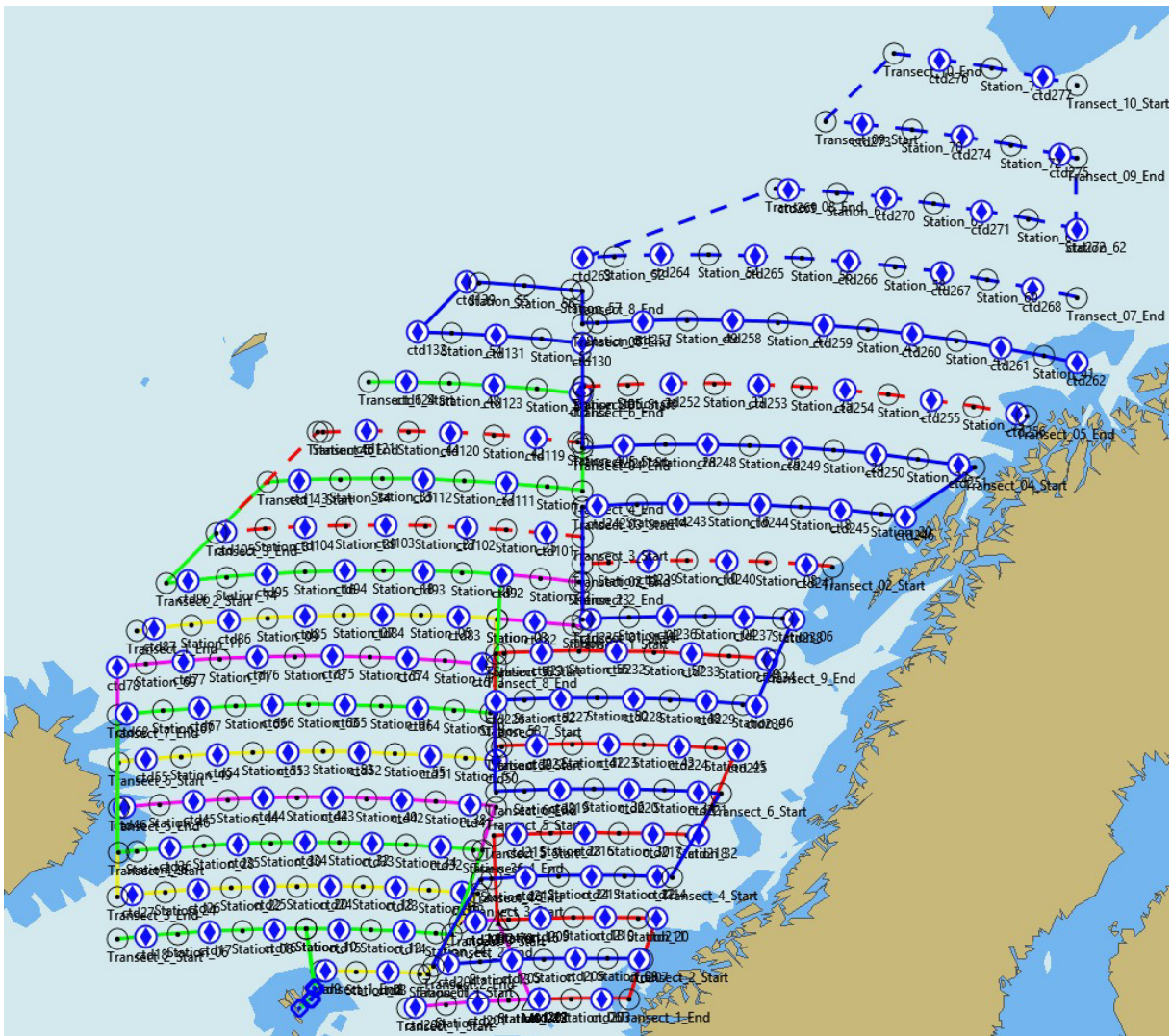


Figure 1. The pre-planned transects for the IESNS survey in 2026 (red: EU, dark blue: Norway, yellow: Faroes Islands, violet: UK, green: Iceland). Hydrographic stations and plankton stations are shown as blue circles with diamonds. All the transects have numbered waypoints for each 30 nautical mile and at the ends.

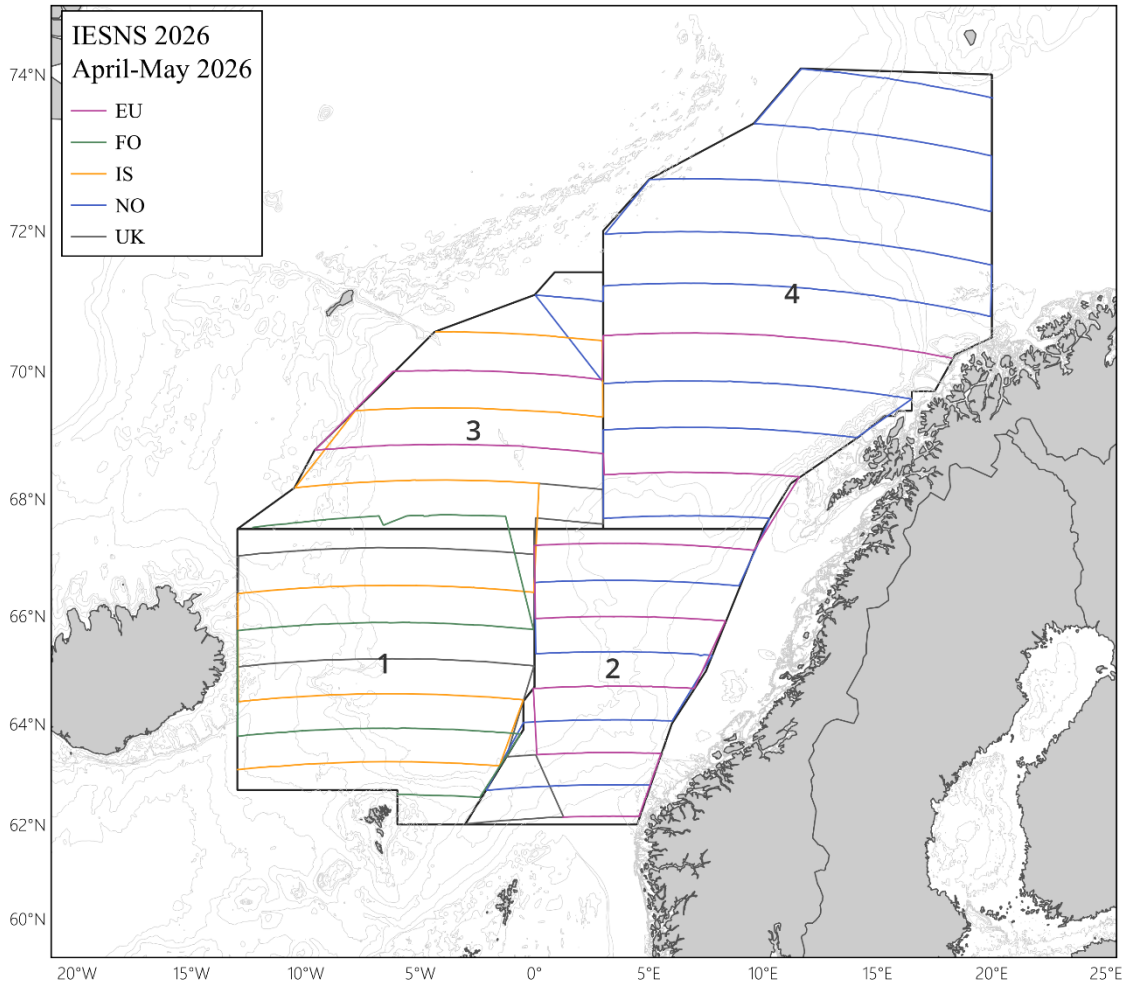


Figure 2. Cruise tracks and strata (with numbers) for the IESNS survey in May 2026.

Preliminary

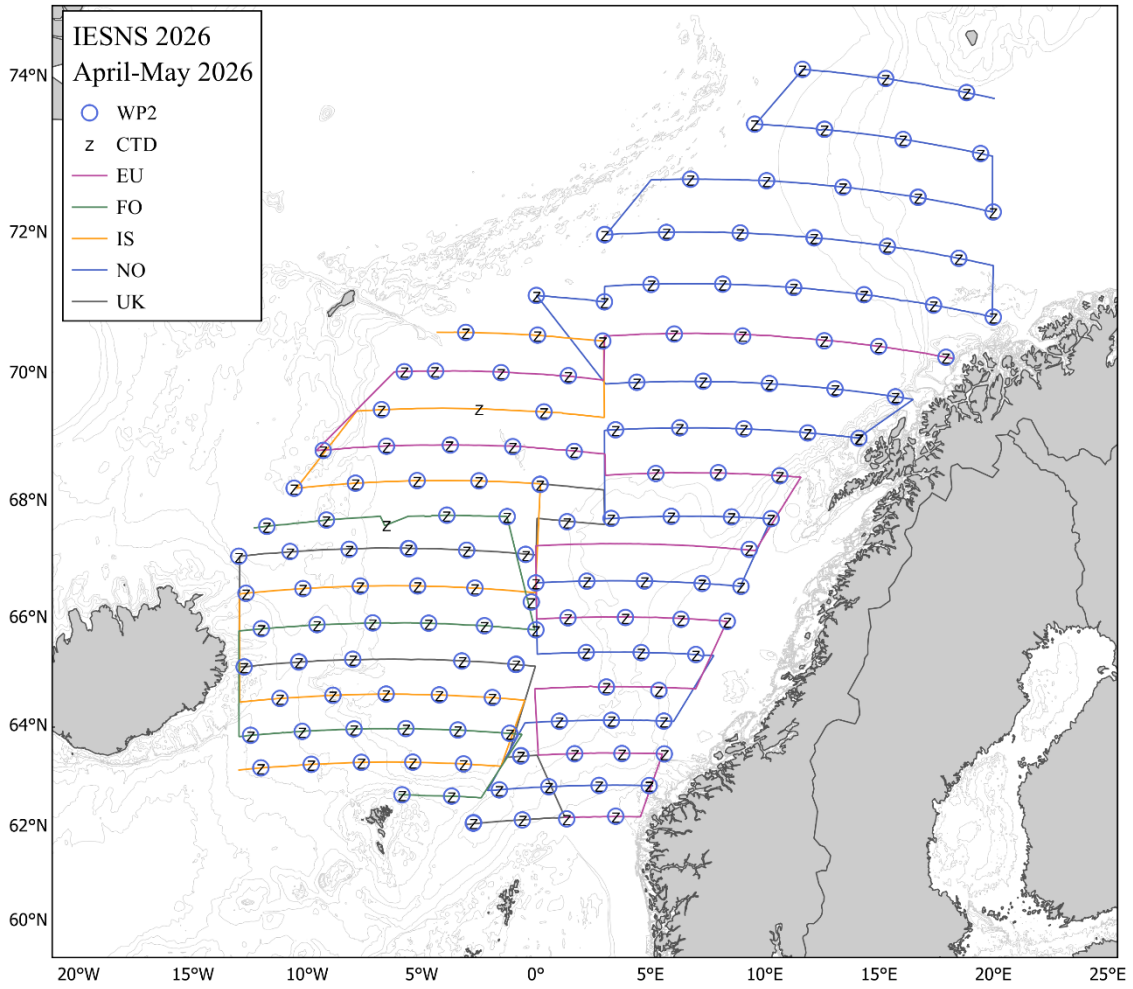


Figure 3. IESNS survey in May 2026: location of hydrographic and WP2 plankton stations.

Preliminary

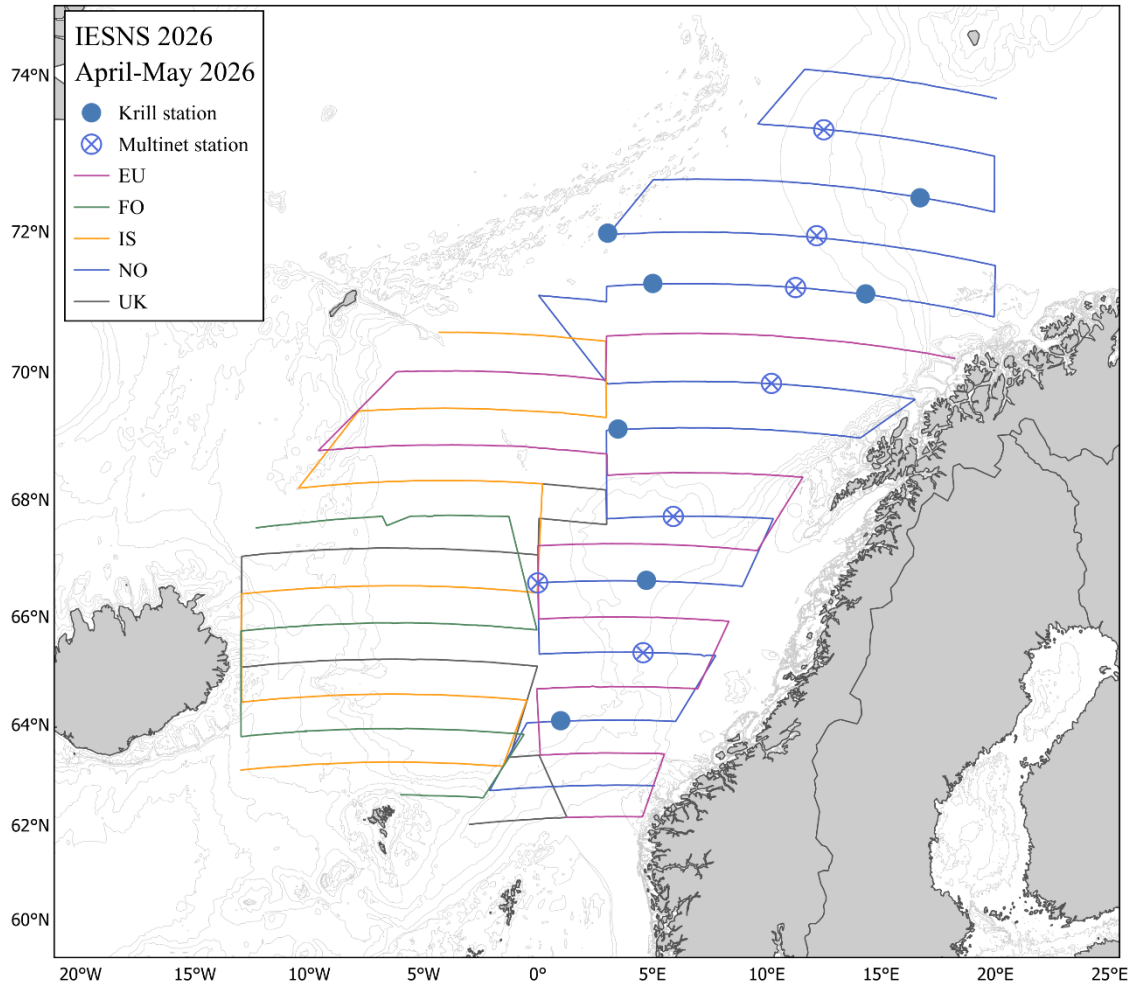


Figure 4. IESNS survey in May 2026: location of Macroplankton/Krill trawl and Multinet stations.

Preliminary

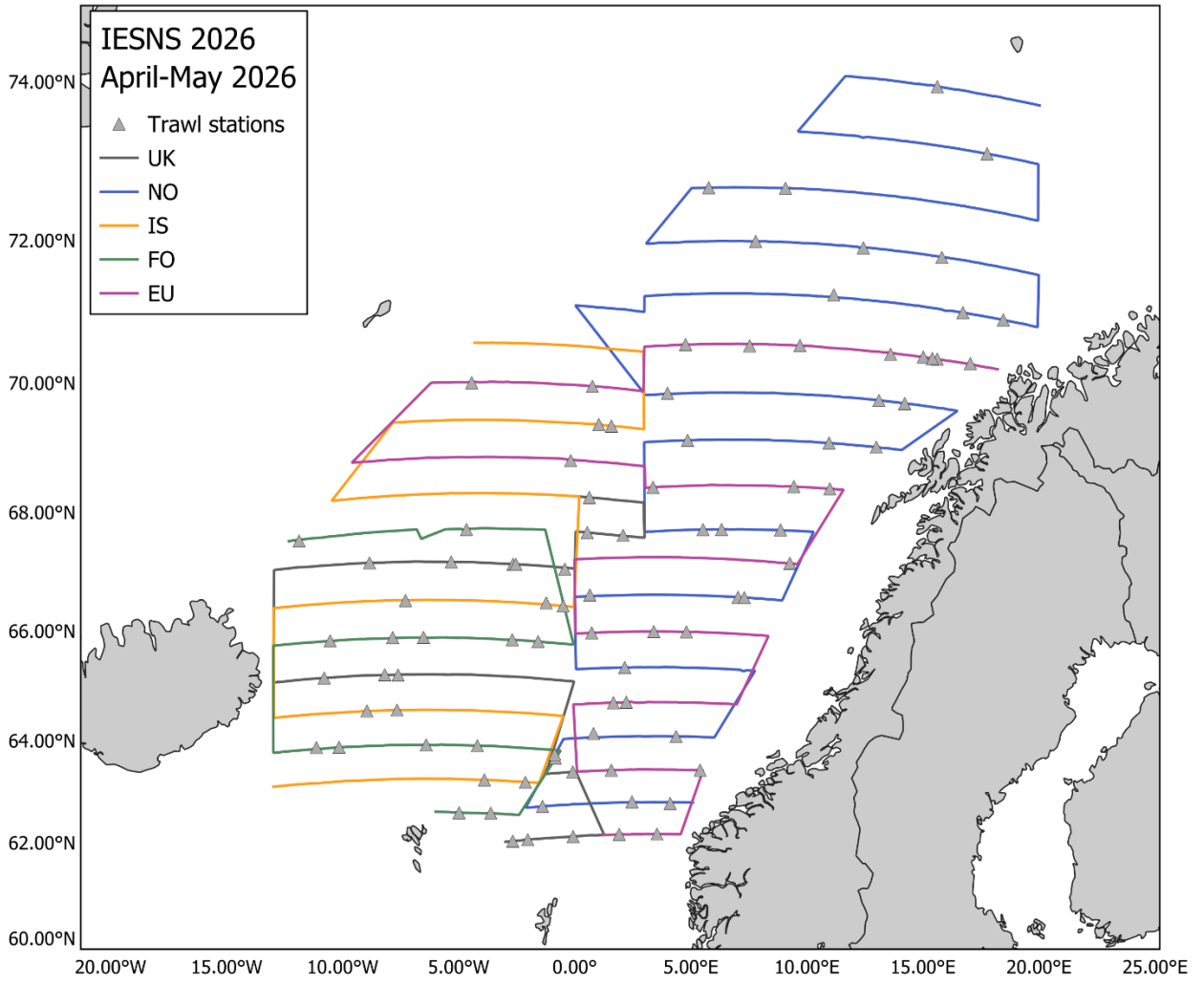


Figure 5. IESNS survey in May 2026: cruise tracks and location of pelagic trawl stations

Preliminary

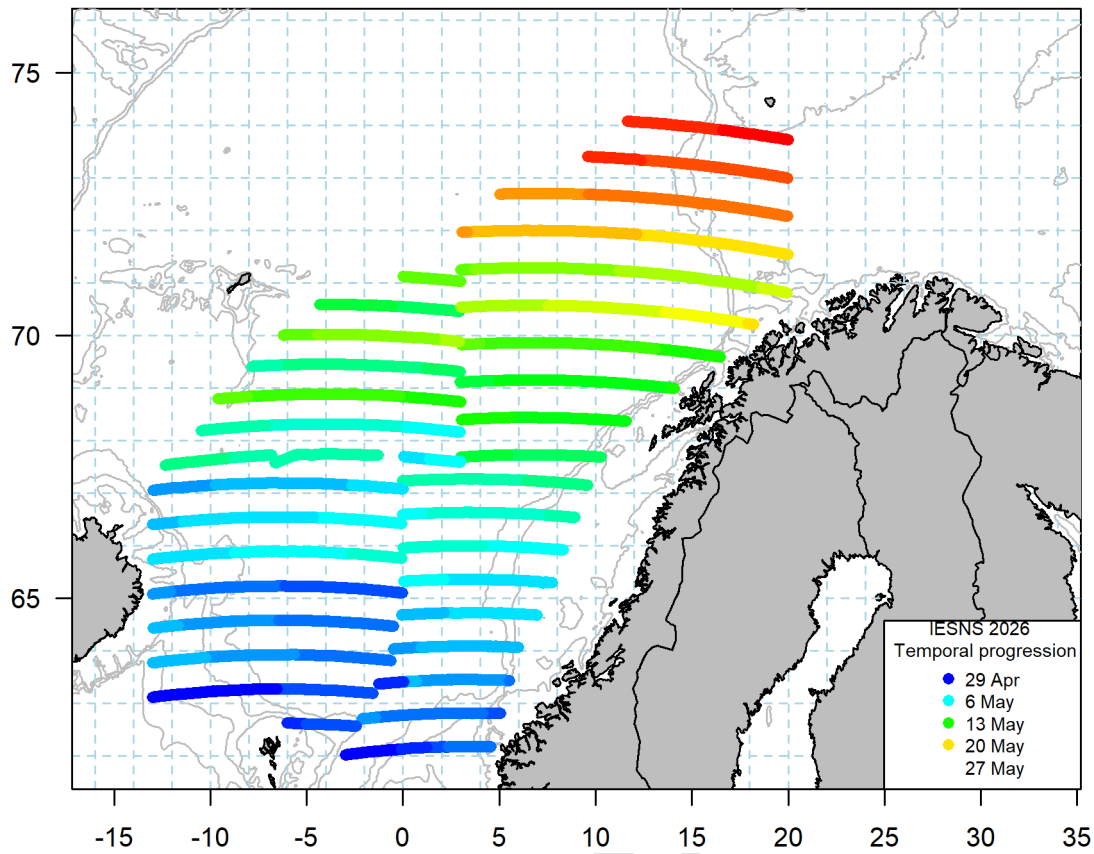


Figure 6. Temporal progression IESNS in April-May 2026.

Preliminary

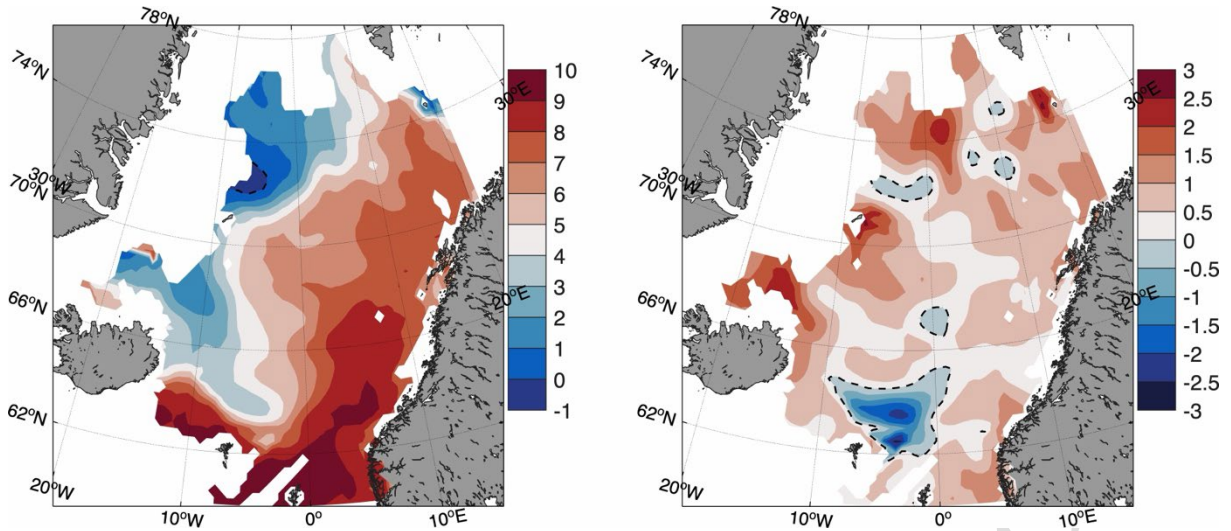


Figure 7a. Temperature (left) and temperature anomaly (right) averaged over 0-50 m depth in May 2026. Anomaly is relative to the 1995-2021 mean.

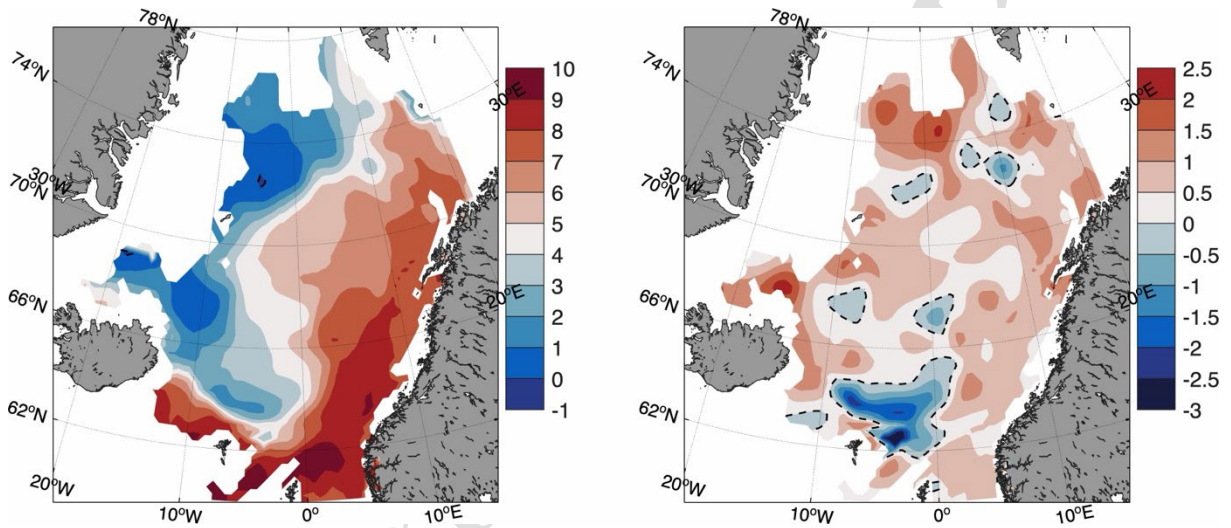


Figure 7b. Same as above but averaged over 50-200 m depth.

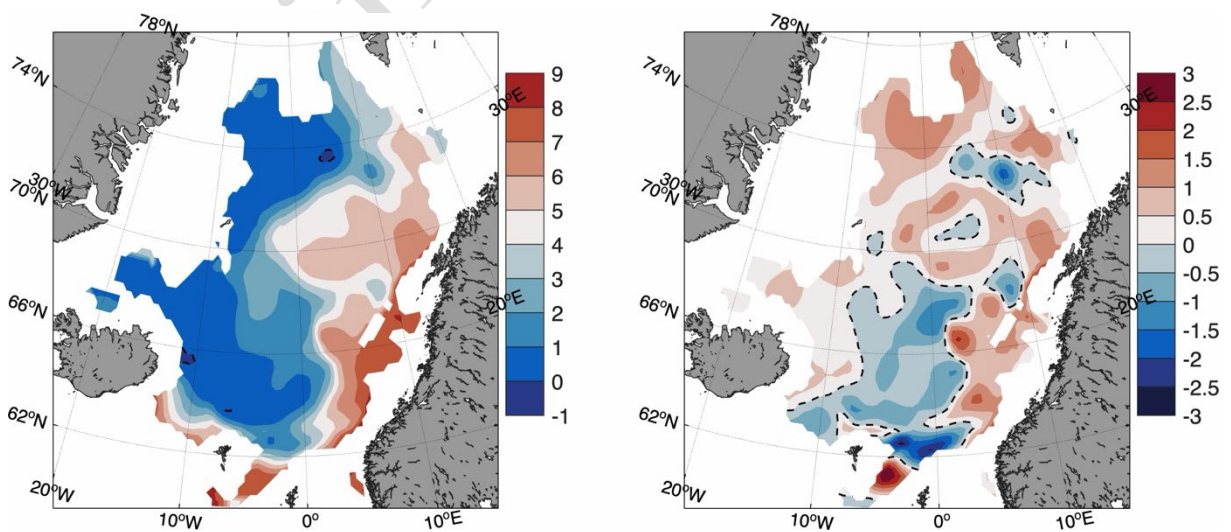


Figure 7c. Same as above but averaged over 200-500 m depth.

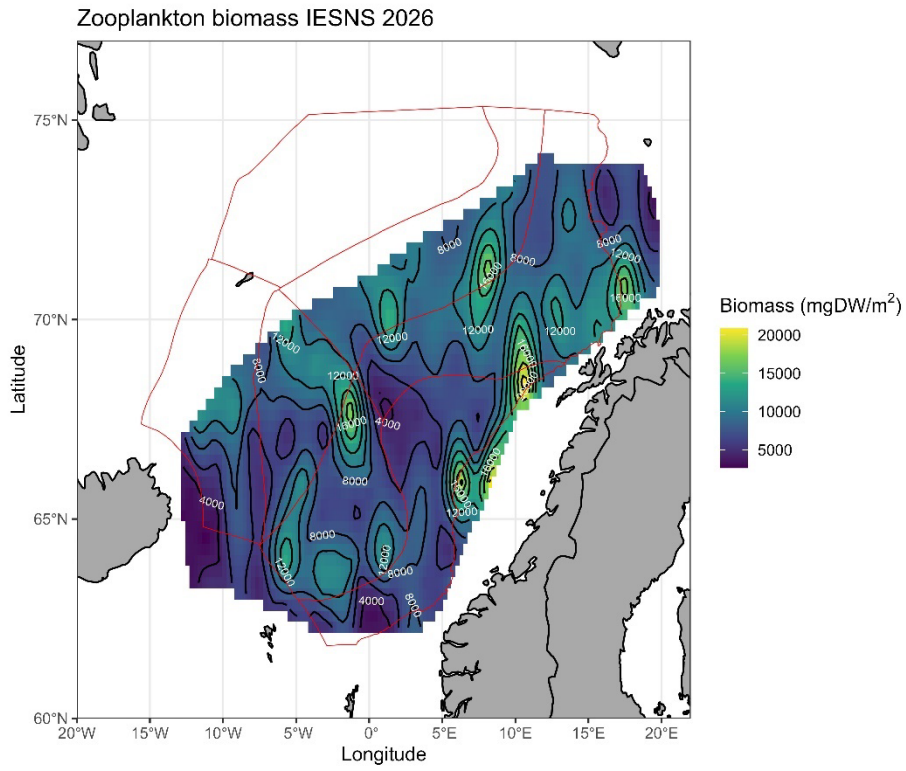
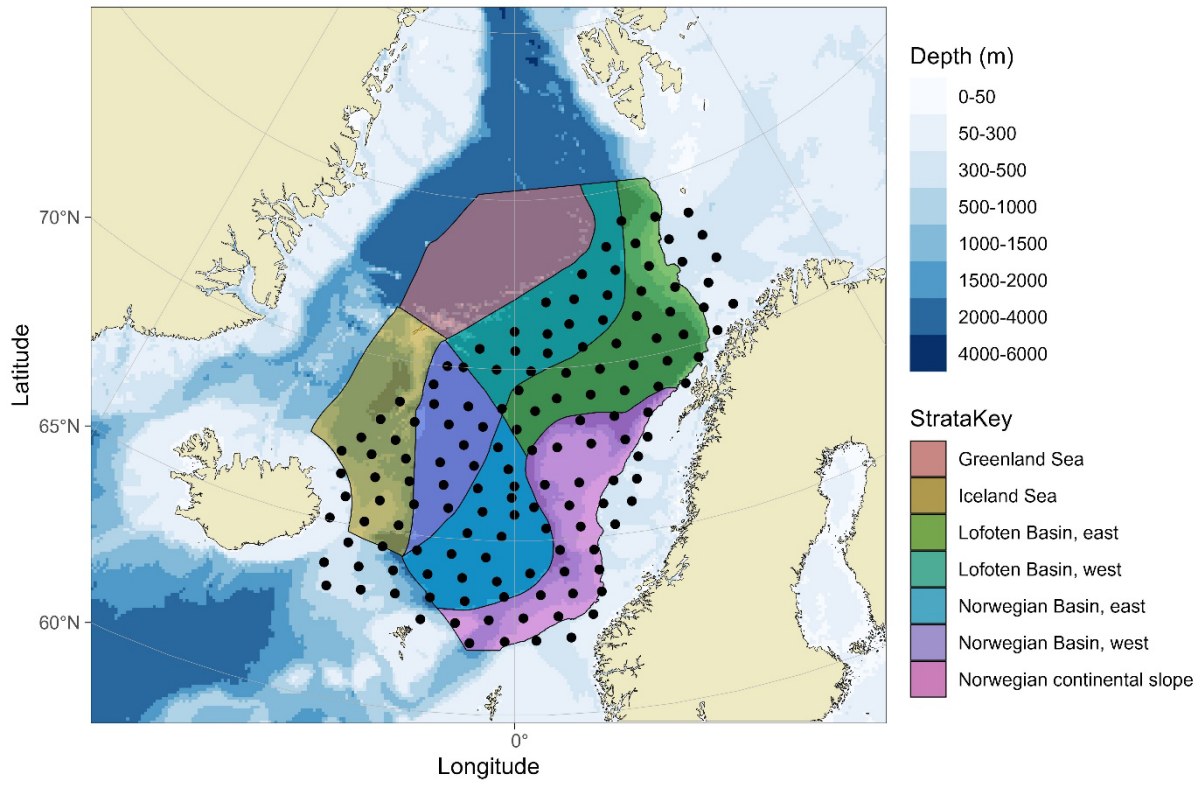


Figure 8. Distribution of zooplankton biomass (mg dry weight m⁻²) in the upper 200 m in May, IESNS survey 2026.

a)

MAP IESNS 2026



Preliminary

b)

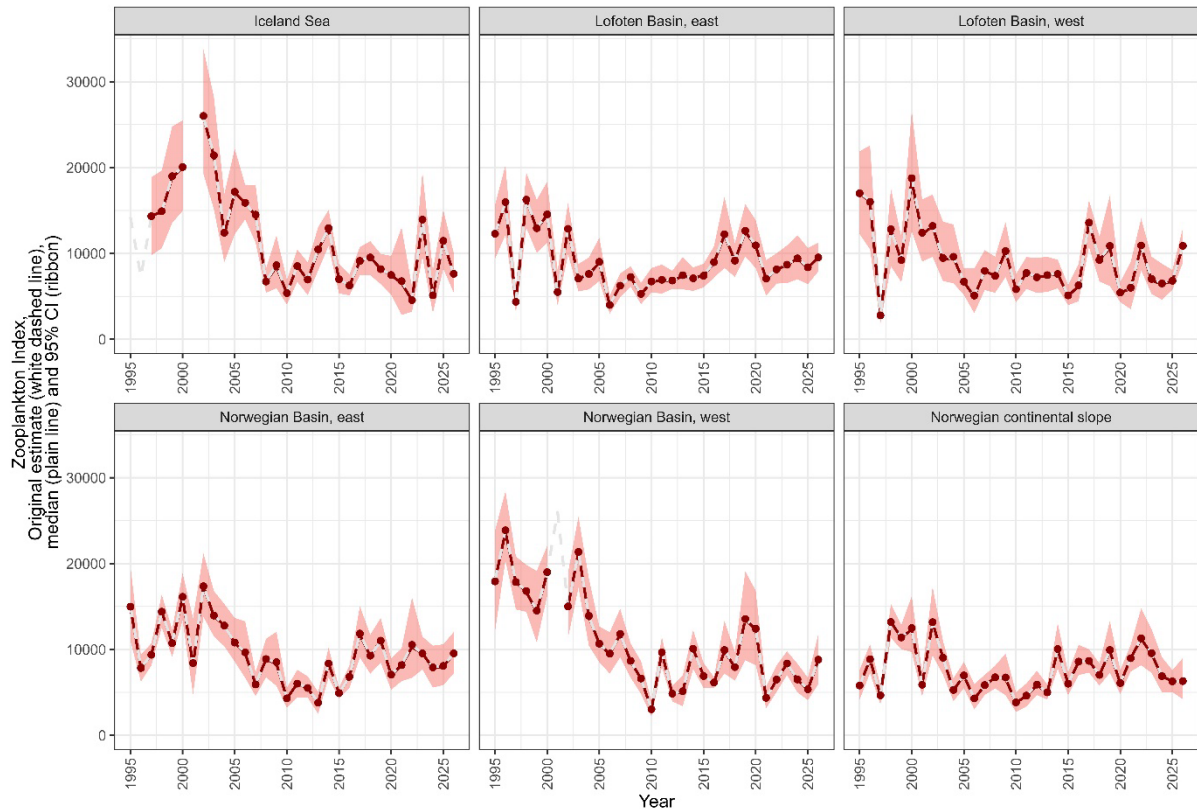
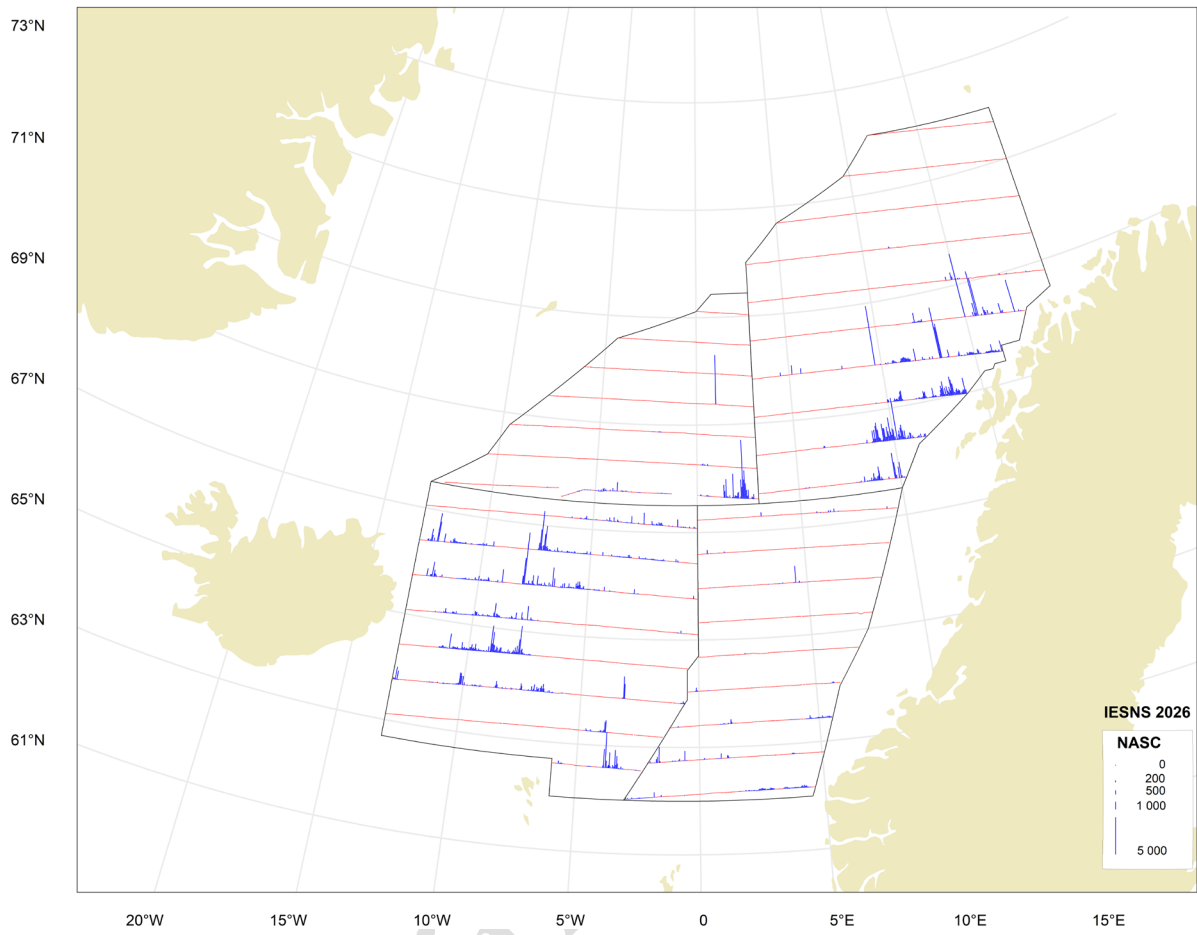


Figure 9 a) shows the sub-areas and distribution of stations, and b) the indices of zooplankton biomass ($\text{mg dry weight m}^{-2}$) sampled by WP2 in May from 1995-2026.

Preliminary

(a)



Preliminary

(b)

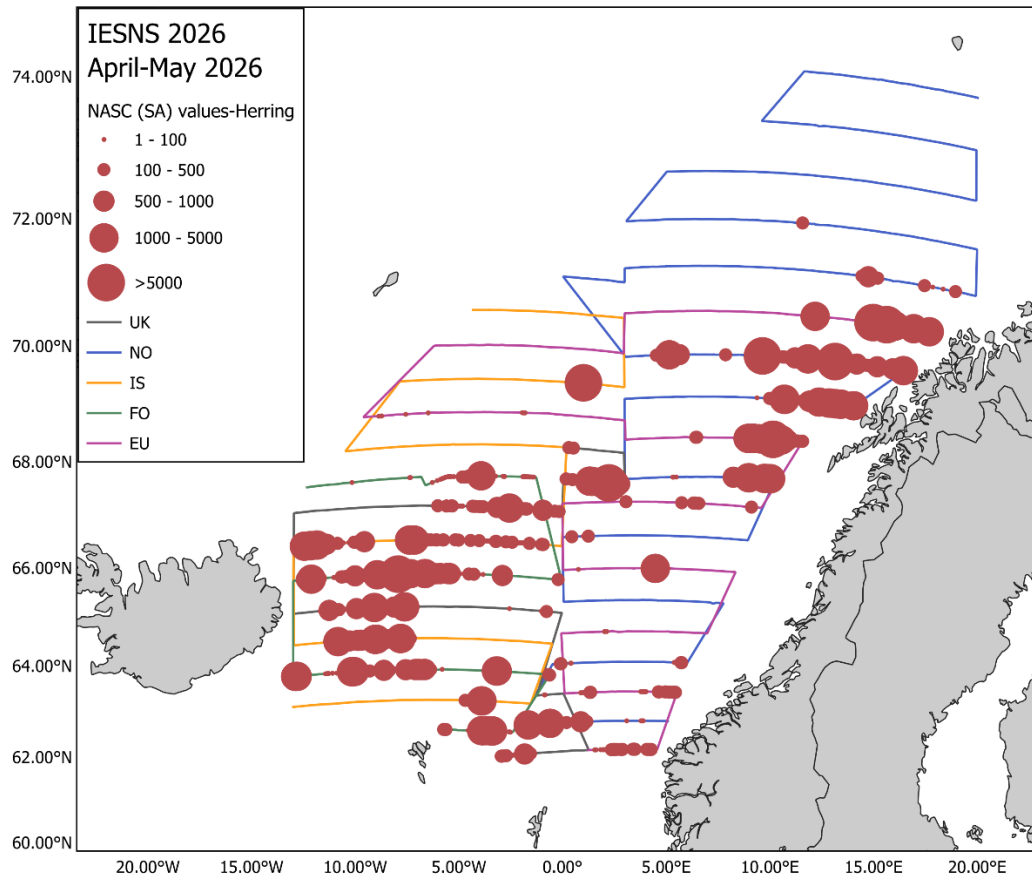


Figure 10. Distribution of Norwegian spring-spawning herring as measured during the IESNS survey in May 2026 in terms of NASC values (m^2/nm^2) averaged for every 1 nautical mile. The NASC values are represented as both bars (a) and bubbles (b).

Preliminary

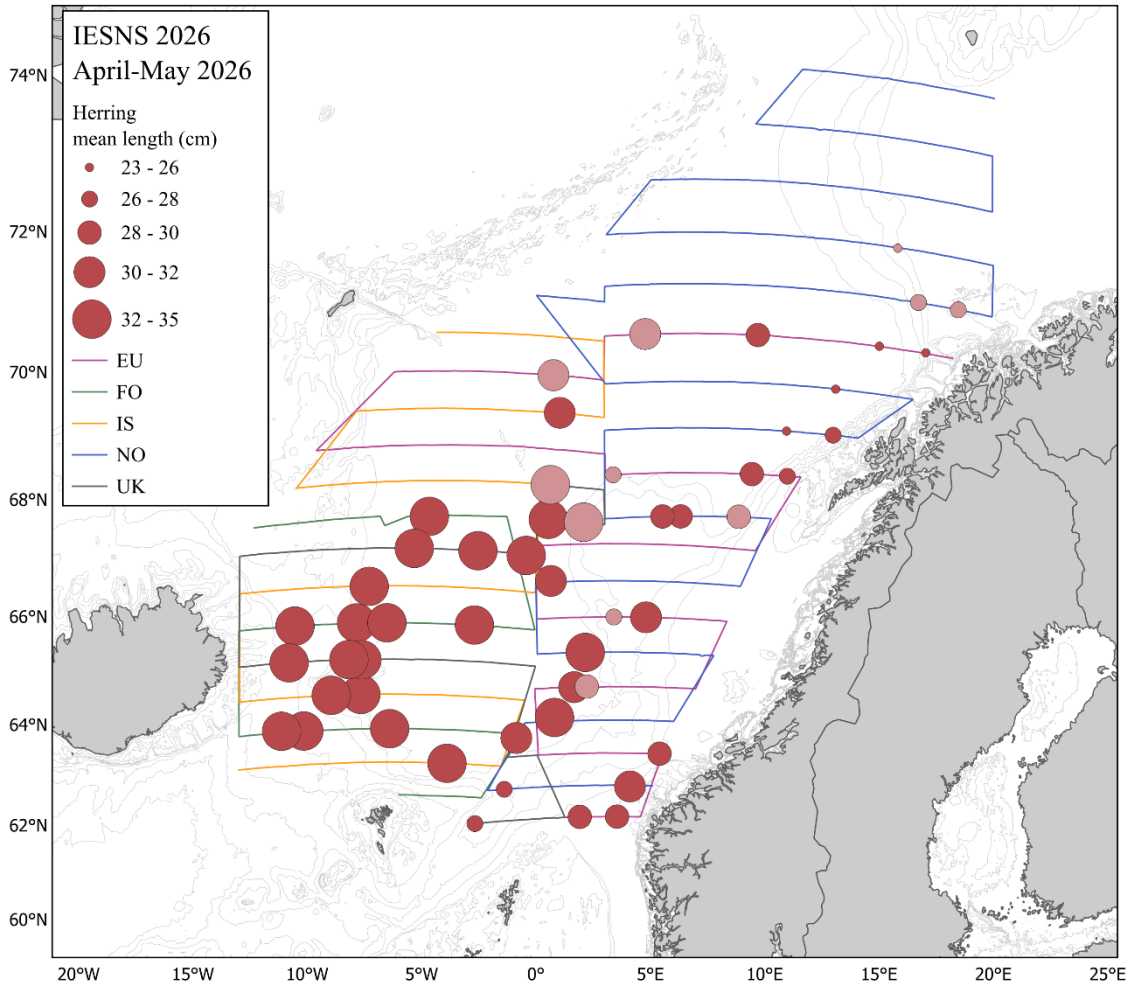


Figure 11. Mean length of Norwegian spring-spawning herring in all hauls in IESNS 2026. Hauls with less than 10 individuals caught are in lighter colour (not used in Stox).

Preliminary

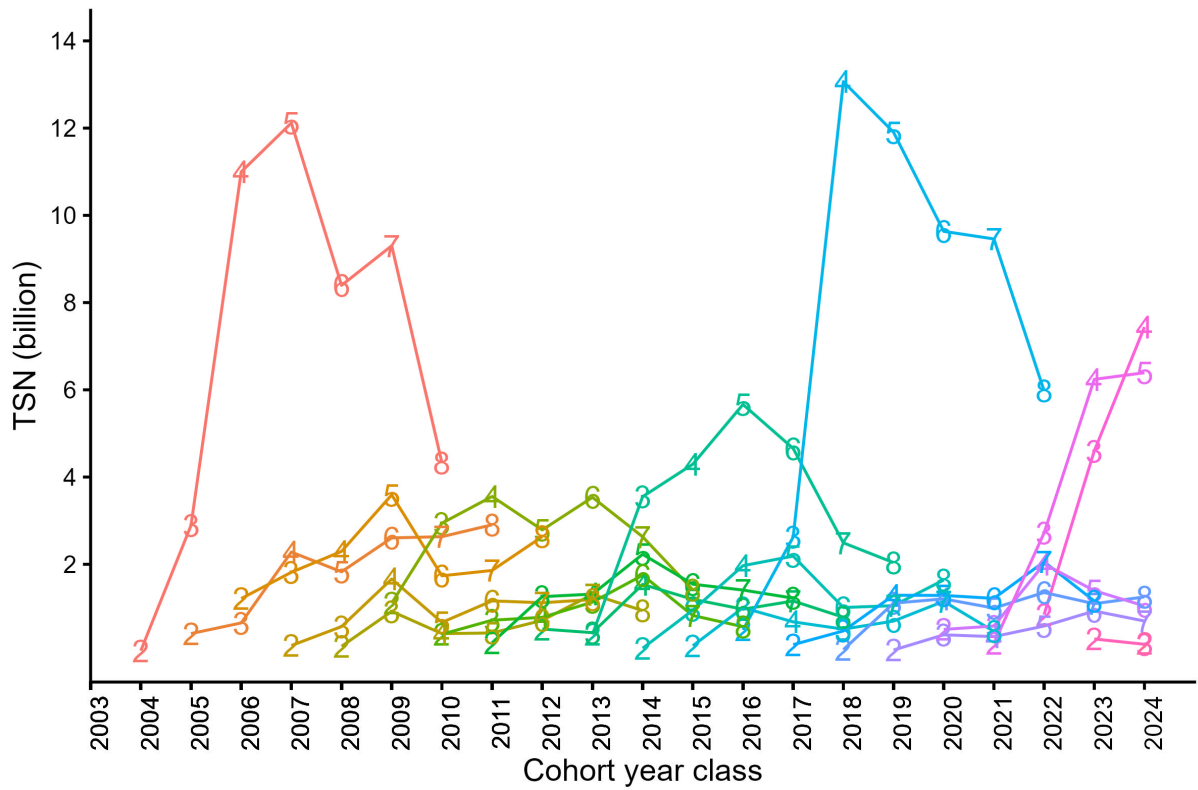


Figure 12. Tracking of the Total Stock Number at age (TSN, in billions) of Norwegian spring-spawning herring for each cohort since 2004 from age 2 to age 8. From 2008, stock is estimated using the StoX software. Prior to 2008, stock was estimated using BEAM.

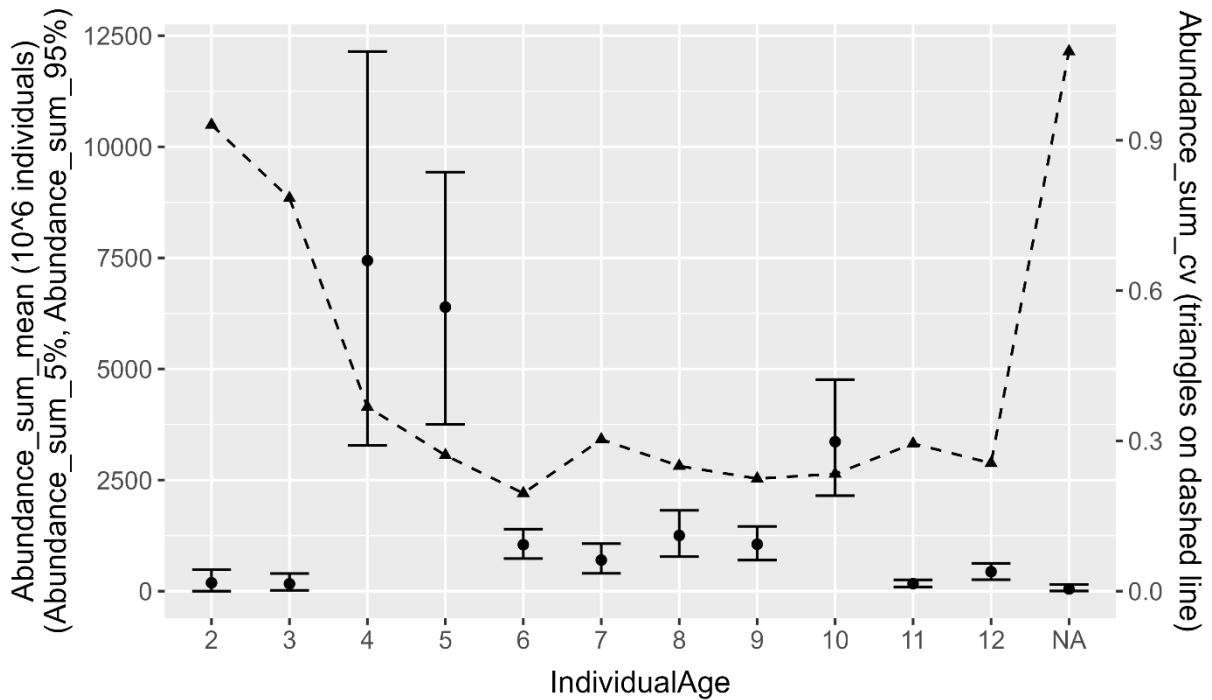


Figure 13. IESNS 2026. Norwegian spring-spawning herring in the Norwegian Sea: R boxplot of abundance and relative standard error (CV) obtained by bootstrapping with 1000 replicates using the StoX software.

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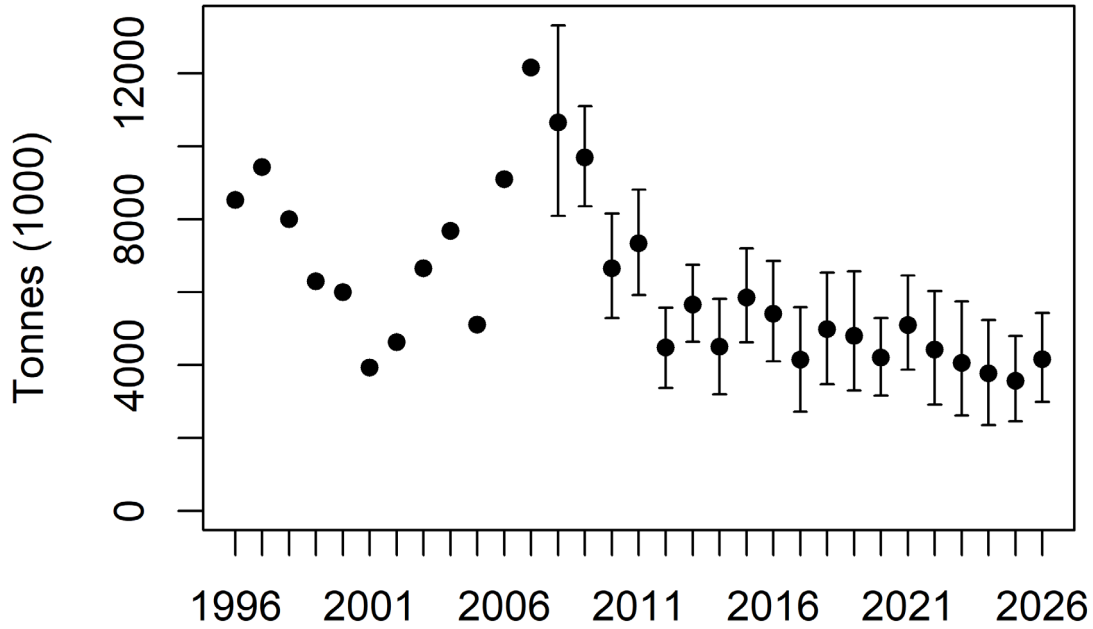


Figure 14. Biomass estimates of Norwegian-spring spawning herring in the IESNS survey (Barents Sea, east of 20°E, is excluded) from 1996 to 2026 as estimated using BEAM (1996-2007; calculated on basis of rectangles) and as estimated with the software StoX (2008-2026; bootstrap means with 90% confidence interval; calculated on basis of standard stratified transect design).

Preliminary

Age-distribution of herring IESNS 2026 - comparison by vessel and stratum

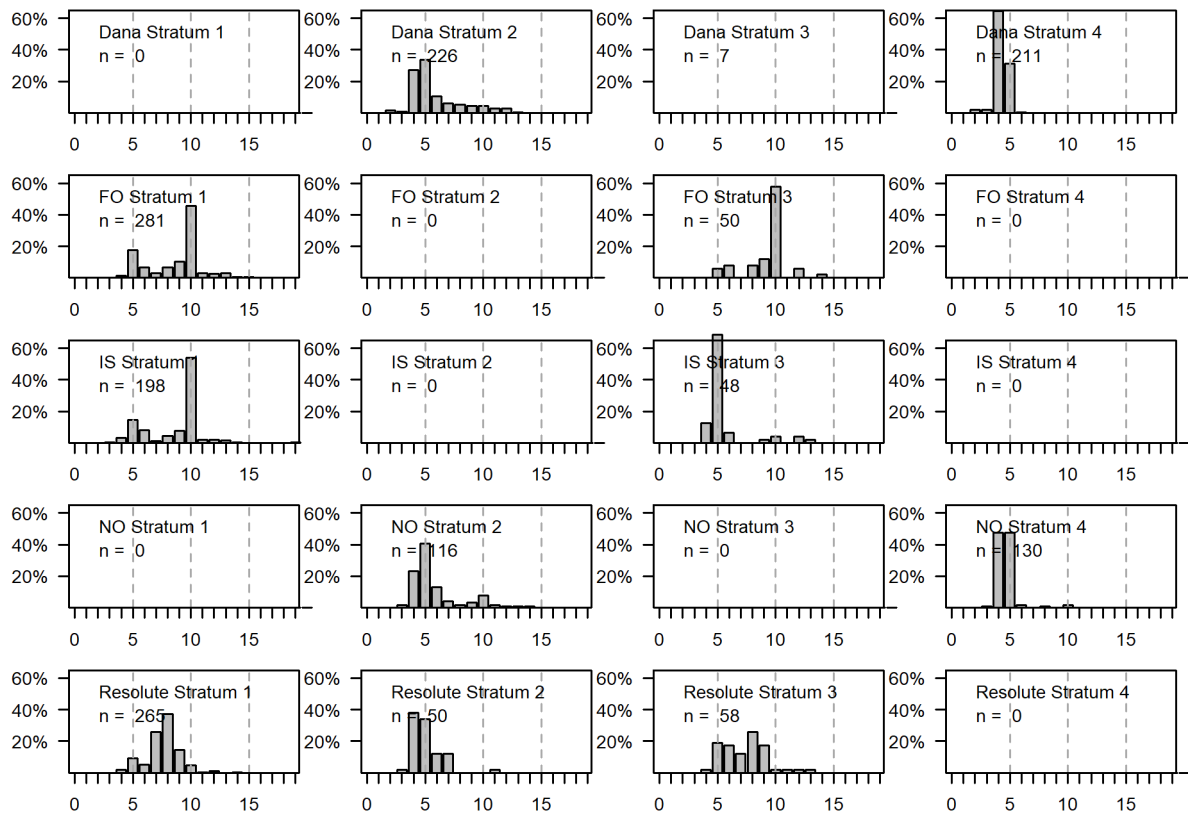
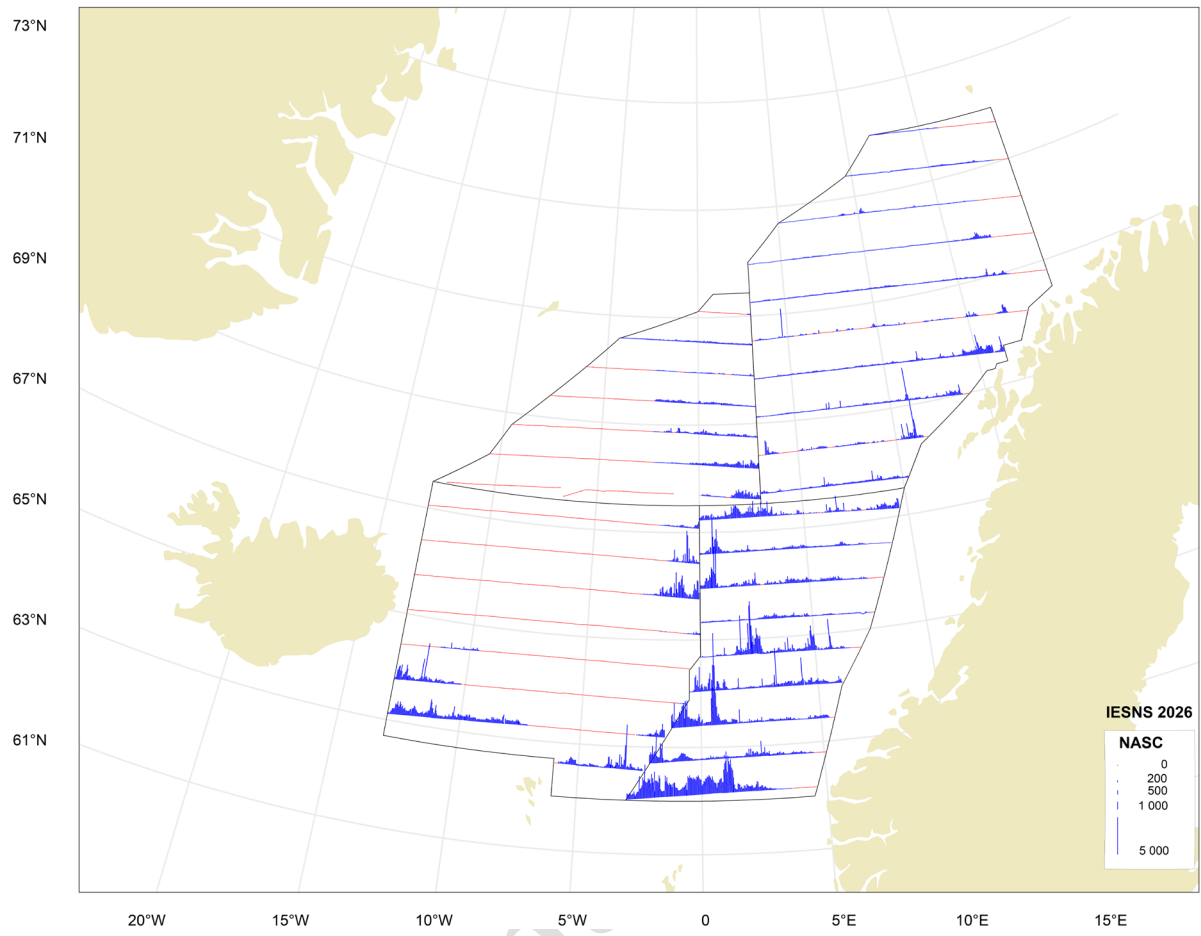


Figure 15. Comparison of the age distributions of herring by stratum and country in IESNS 2026. The strata are shown in Figure 2.

Preliminary

(a)



b)

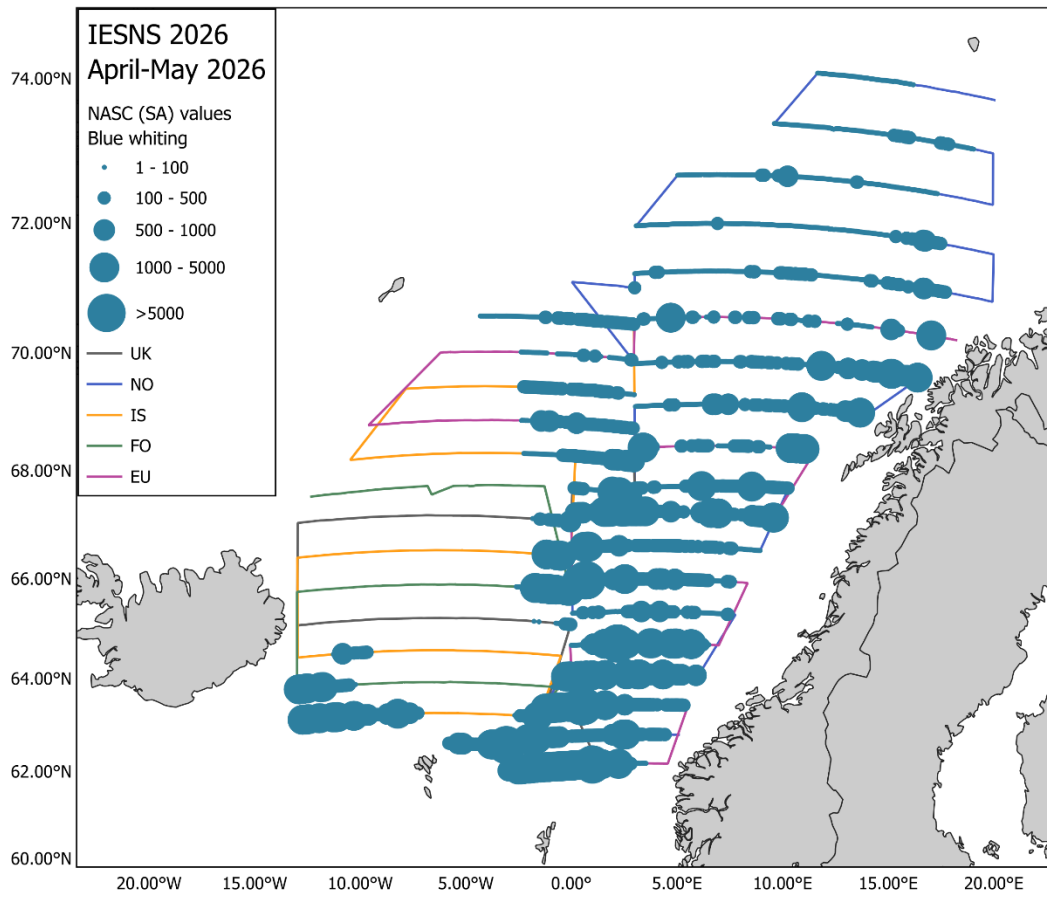


Figure 16. Distribution of blue whiting as measured during the IESNS survey in May 2026 in terms of NASC values (m^2/nm^2) (a) averaged for every 1 nautical mile. The NASC values are represented as both bars (a) and bubbles (b).

Preliminary

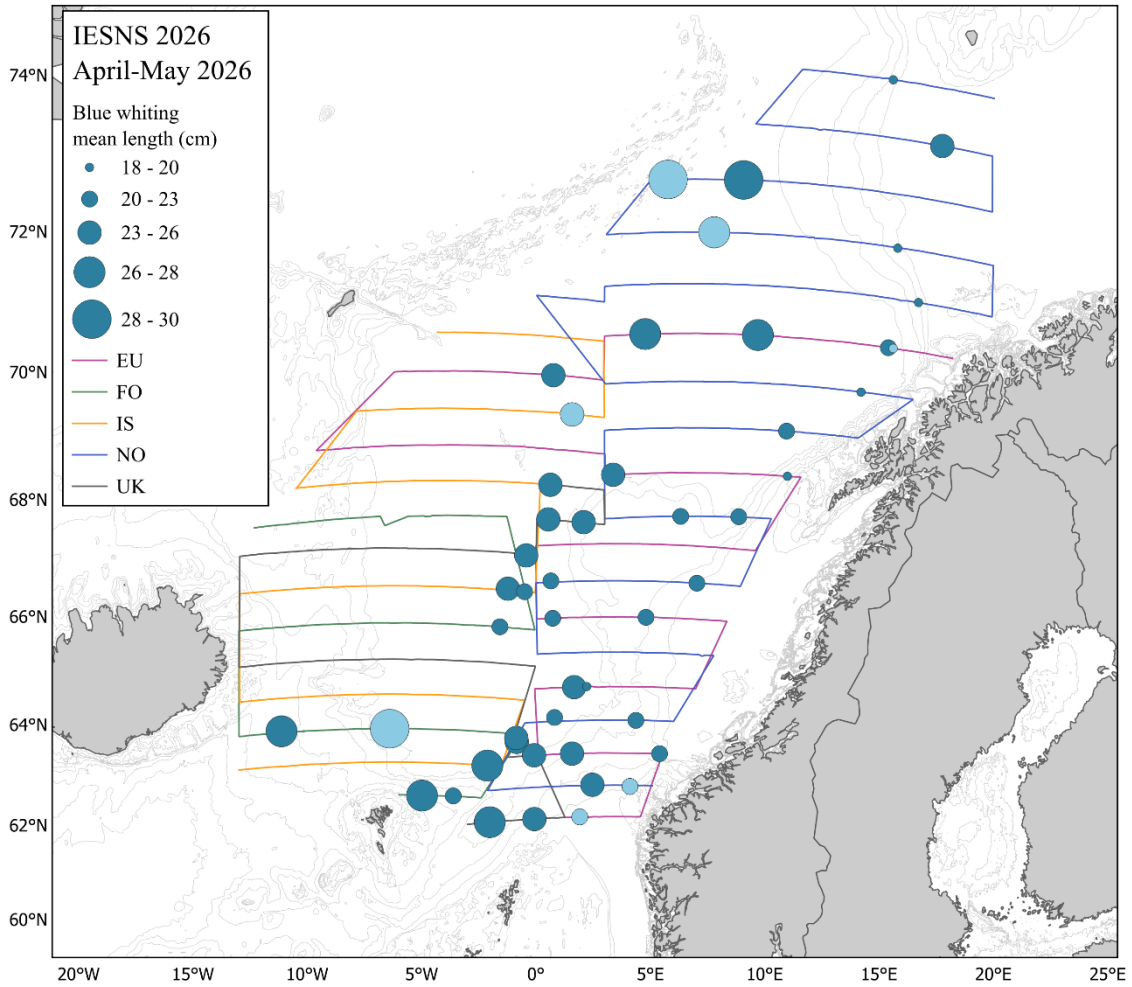


Figure 17. Mean length of blue whiting in all hauls in IESNS 2026. Hauls with less than 10 individuals caught are in lighter colour (not used in Stox).

Preliminary

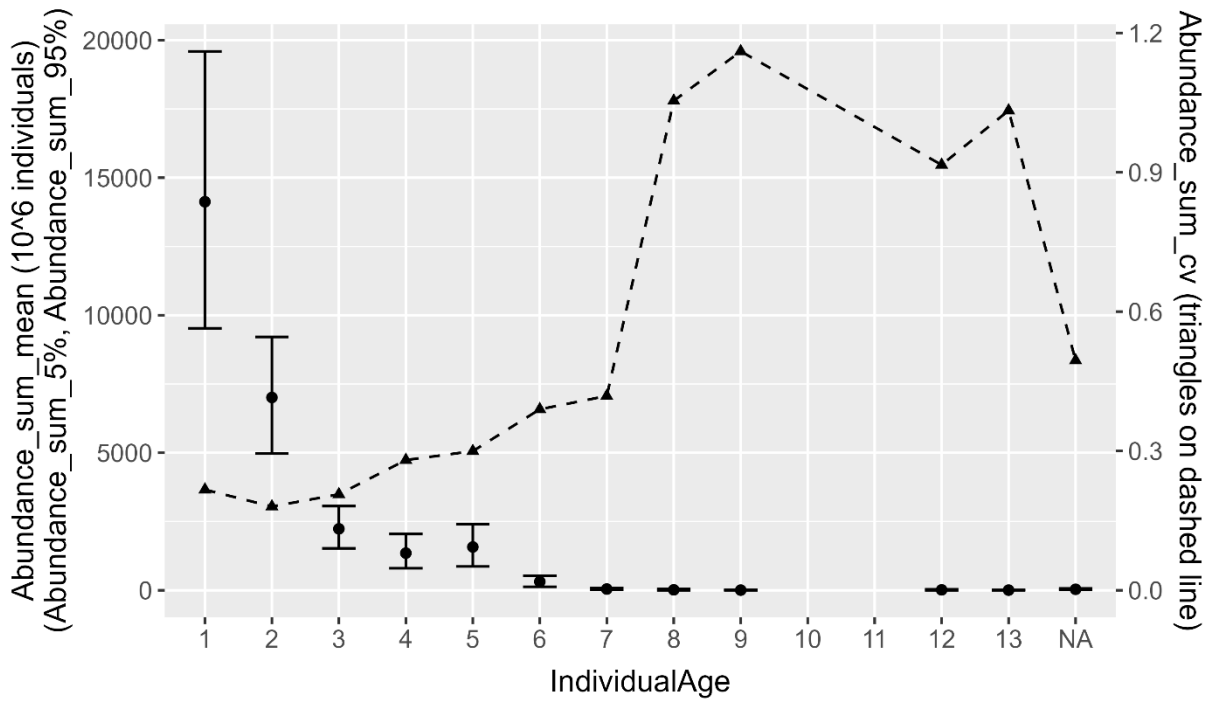


Figure 18. IESNS 2026. Blue whiting in the Norwegian Sea: R boxplot of abundance and relative standard error (CV) obtained by bootstrapping with 1000 replicates using the StoX software.

Preliminary

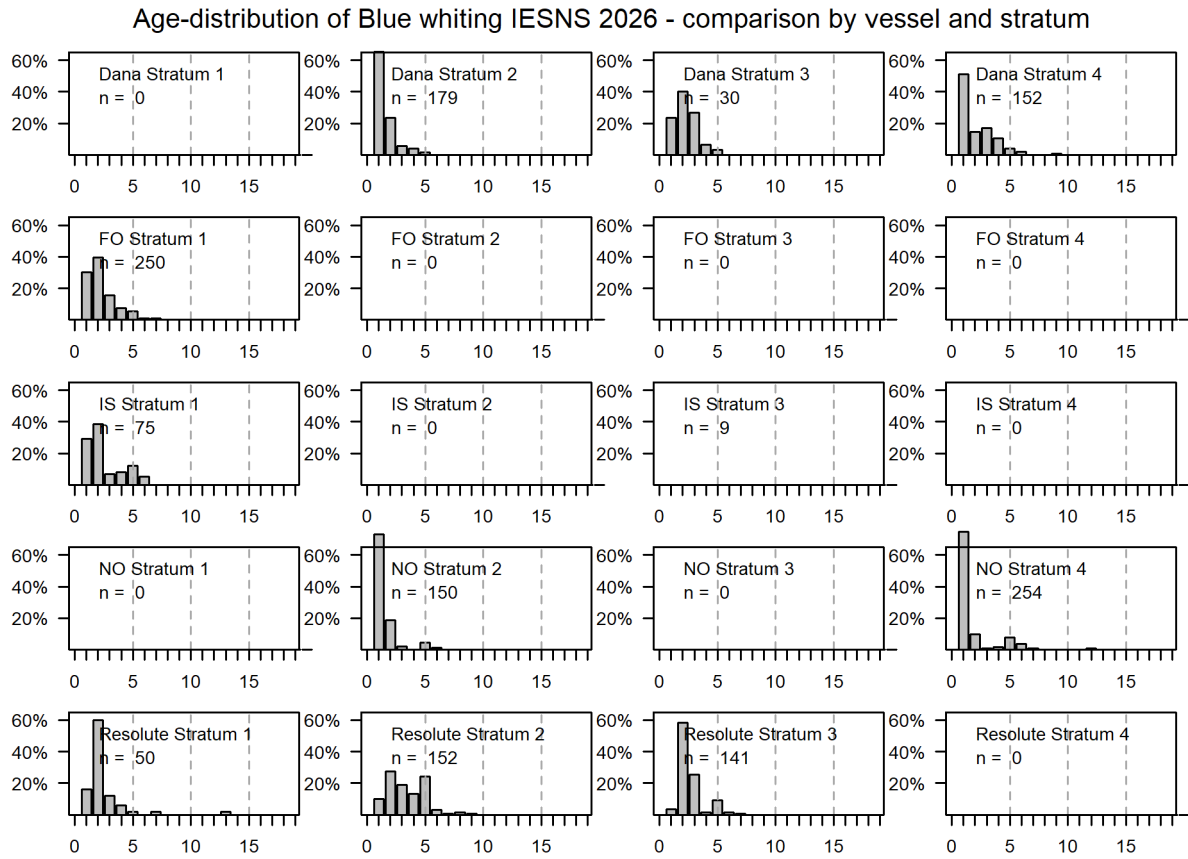


Figure 19. Comparison of the age distributions of blue whiting by stratum and country in IESNS 2026. The strata are shown in Figure 2.

Preliminary

Length distribution of blue whiting IESNS 2026 - comparison by vessel and stratum

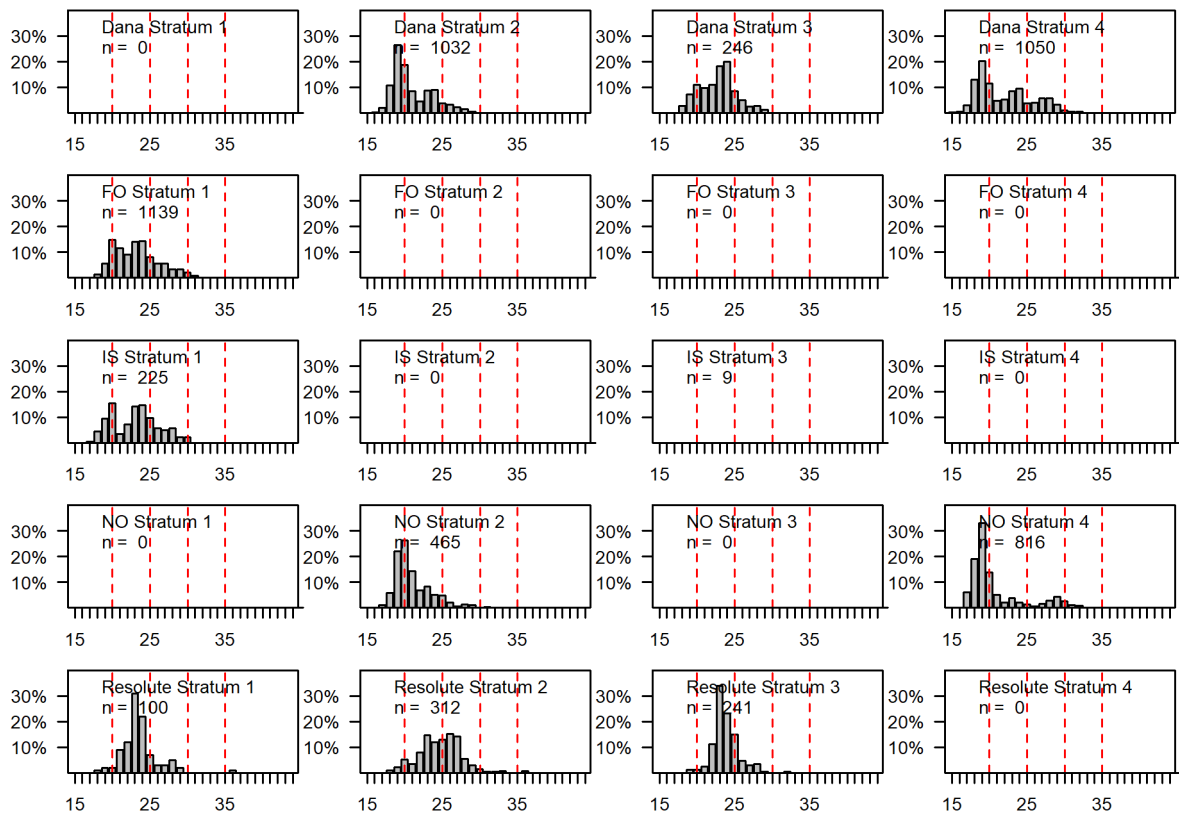


Figure 20. Comparison of the length distributions of blue whiting by stratum and country in IESNS 2026. The strata are shown in Figure 2.

Preliminary

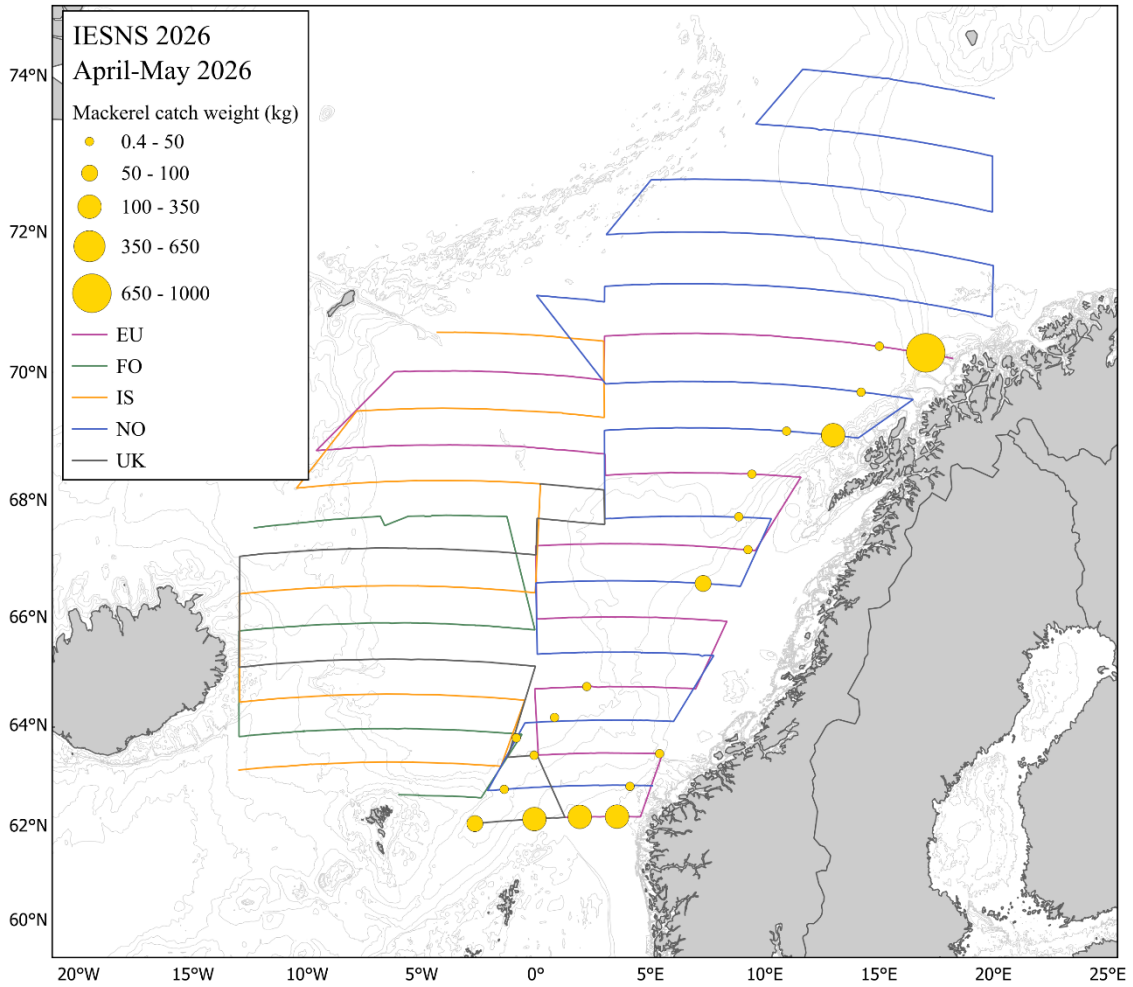


Figure 21. Pelagic trawl catches of mackerel in IESNS 2026.

Preliminary