4 Norwegian spring-spawning herring in Northeast Atlantic and Arctic Ocean

Clupea harengus in subareas 1, 2, 5 and divisions 4.a and 14.a (her.27.1-24a514a)

4.1 ICES advice in 2024

ICES advised that when the long-term management strategy agreed by the European Union, the Faroe Islands, Iceland, Norway, and the Russian Federation is applied, catches in 2025 should be no more than 401 794 tonnes. The advice for 2025 was 3% higher than that for 2024.

4.2 The fishery in 2024

4.2.1 Description and development of the fisheries

The distribution of the Norwegian spring-spawning herring (NSSH) fishery in 2024 for all countries by ICES rectangles is shown in Figure 4.2.1.1. The catches by ICES statistical rectangle and quarter are seen in Figure 4.2.1.2. The 2024 herring fishing pattern was similar to recent years. The fishery began in January on the Norwegian shelf and focused on overwintering, pre-spawning, spawning and post-spawning fish (Figure 4.2.1.2, quarter 1). Fisheries in the first quarter are now more focused on the shelf area compared to previous years. In the second quarter, the fishery was insignificant (Figure 4.2.1.2, quarter 2). In summer, the fishery moved into mainly Icelandic and International waters and in early autumn started in the overwintering area off Lofoten (Figure 4.2.1.2, quarter 3). In autumn and winter, the fishery continued in Icelandic waters and the overwintering areas in the fjords and oceanic regions off Lofoten, while in international waters it shifted further south, extending into Faroese waters (Figure 4.2.1.2, quarter 4). Nearly 62% of the catches were taken in the fourth quarter. Catches of Norwegian spring-spawning herring inside the NEAFC regulatory area was estimated by the working group to be 48 462 tonnes in 2024, which represents 11 % of the total catch.

4.3 Stock description and management units

4.3.1 Stock description

A description of the stock is given in the Stock Annex.

4.3.2 Changes in migration

Generally, it is not clear what drives the variability in migration of the stock, but the biomass and production of zooplankton are likely factors, as well as feeding competition with other pelagic fish species (*e.g.* mackerel and to a lesser extent blue whiting) and oceanographic conditions (*e.g.* limitations due to cold areas). Besides environmental factors, the age distribution in the stock will also influence the migration. Changes in the migration pattern of NSSH, as well as that of other herring stocks, are often linked to large year classes entering the stock initiating a different migration pattern, which subsequent year classes will follow. This pattern does not appear to be prevalent for NSS herring during the feeding season, where changes in distribution occur for all age-classes simultaneously (Eliasen et al., 2021). In 2017/2018 there was a shift in wintering areas. While wintering has been observed in fjords west of Tromsø (Norway) for several years, the 2013 year-class wintered in fjords farther north (Kvænangen) since 2017/2018 while the older fish seemed to have had an oceanic wintering area. The Kvænangen area has been an important wintering area for the 2013 and younger year classes up till the most recent winter (2024/2024). The oldest and largest fish move farthest south and west during feeding.

The large 2016 year-class still dominates the adult stock. The distribution of the 2016 year-class in the feeding area in 2023-2025 as observed in the ecosystem surveys in May and July appeared to be primarily distributed in the western and northern part of the Norwegian Sea. However, in 2025 younger herring from the 2021- and 2022-year classes were observed in the northeastern part of the Norwegian Sea and along the Norwegian coast.

The spawning areas have changed in recent years such that the traditional spawning along Møre and mid Norway has been abandoned, with almost all spawning occurring from Lofoten and northwards outside Troms (Norway). This is linked to the large 2016-year class leading the outnumbered older fish northwards (Slotte et al., 2025) rather than the usual pattern with younger fish following the older fish south to the main spawning areas.

4.4 Input data

4.4.1 Catch data

Catches in tonnes by ICES division, ICES rectangle and quarter in 2024 were available from Denmark, Faroe Islands, Germany, Greenland, Iceland, Ireland, The Netherlands, Norway, Sweden, United Kingdom and Russia. The total working group catch in 2024 was 460 226 tonnes (Table 4.4.1.1) compared to the ICES-recommended catch of a maximum of 401 794 tonnes. The majority of the catches (81%) were taken in division 2.a as in previous years. Age samples were not provided by Greenland, Netherlands or Sweden. Sampled catches accounted for 97 % of the total catches, which is on the same level as last year. The sampling levels of catches in 2024 in total, by country and by ICES division are shown in Tables 4.4.1.2, 4.4.1.3 and 4.4.1.4. Catch by nation, ICES division and quarter are shown in Table 4.4.1.5. The software SALLOC (ICES, 1998) was used to calculate total catches in numbers-at-age and mean weight at age representing the total catch. Samples allocated (termed fill-in in SALLOC) to cells (nation, ICES division and quarter) without sampling information are shown in Table 4.4.1.5. This year Russian age sample information and catch by quarter and ICES division and ICES rectangle for 2024 were officially delivered to Faroe Marine Research Institute, and ICES decided to use this information.

4.4.2 Discards

In 2008, the Working Group noted that in this fishery an unaccounted mortality caused by fishing operations and underreporting probably exists (ICES, 2008). It has not been possible to assess the magnitude of these extra removals from the stock, and considering the large catches taken after the recovery of the stock, the relative importance of such additional mortality is probably low. Therefore, no extra mortality to account for these factors has been added since 1994. In previous years, when the stock and the quotas were much smaller, an estimated number of fish was added to the catches.

The Working Group has not had access to comprehensive data to estimate discards of herring. Although discarding may occur on this stock, it is considered to be low and a minor problem for the assessment. This is confirmed by estimates from sampling programmes carried out by some

EU countries in the Data Collection Framework. Estimates of discarding in 2008 and 2009 of about 2% in weight were provided for the trawl fishery carried out by the Netherlands. In 2010 and 2012, this métier was sampled by Germany. No discarding of herring was observed (0%) in either of the two years. An investigation on fisheries induced mortality carried out by IMR with EU partners on fisheries induced and unreported mortality in mackerel and herring fisheries in the North Sea concluded with an estimated level of discarding at around 3%.

To provide information on unaccounted mortality caused by fishing operations in the Norwegian fishery, Ipsos Public Affairs, in cooperation with IMR and the fishing industry, conducted a survey in January/February 2016. The survey was done by phoning skippers and interviewing them. A total of 146 herring skippers participated in the survey, 31 skippers representing the bigger vessel group and 115 skippers representing the smaller vessel group. The data provided an indication that there have been periods of increased occurrence of net bursting. This was seen especially in the period 2007–2010. There was, however, no trend in the size of catches where bursting has occurred.

When it comes to slipping, the data showed a steady increase in the percentage that has slipped herring from 2004–2012, and then a significant decline in recent years. The variations in the proportion that have slipped herring were largely driven by the skippers on smaller coastal purse-seiners. Average size of purse-seine hauls slipped seems to be relatively steady over the period. However, the average size of net hauls slipped was lowest in the recent period.

4.4.3 Age composition of the catch

The estimated catch-at-age in numbers by year are shown in Table 4.4.3.1. The numbers are calculated using the SALLOC software. In 2024, catches were dominated by the 2016 year-class which comprised around 52% of the catch (in numbers). Catch curves were made based on the international catch-at-age (Figure 4.4.3.1). For comparison, lines corresponding to $Z=0.3$ are drawn in the background. The strong year classes generally show a consistent decline in catch number by cohort, indicating a reasonably good quality of the catch-at-age data.

4.4.4 Weight-at-age in catch and in the stock

The weight-at-age in the catches in 2024 was computed from the sampled catches using SALLOC. Trends in weight-at-age in the catch are presented in Figure 4.4.4.1 and Table 4.4.4.1. The mean weights at age for most of the age groups generally increased in 2010–2013 but levelled off around 2014. Since around 2015 the weight-at-age have decreased for most ages – earlier for the younger ages than for the older ages. A similar pattern is observed in weight-at-age in the stock (Figure 4.4.4.2 and Table 4.4.4.2). The mean weight-at-age in the stock was based on the survey in the wintering area until 2008. Since then, the mean weight-at-age in the stock was derived from samples taken in the fishery in the same area and at the same time as the wintering surveys were conducted in.

4.4.5 Maturity-at-age

In 2010 the method for estimating maturity-at-age in the stock assessment of NSSH was changed based on work done by the “workshop on estimation of maturity ogive in Norwegian spring-spawning herring” (WKHERMAT; ICES, 2010a). The method which was adopted by WGWIDE in 2010 (ICES, 2010b) is based on work by Engelhard *et al*. (2003) and Engelhard and Heino (2004). They developed a method to back-calculate age-at-maturity for individual herring based on scale measurements and used this to construct maturity ogives for the year classes 1930–1992.

The NSSH has irregular recruitment pattern with a few large year classes dominating in the stock when it is on a high level. Most of the year classes are, however, relatively small and referred to as "normal" year classes. The back-calculation dataset indicates that maturation of the large year classes is slower than for "normal" year classes.

WKHERMAT and WGWIDE considered the dataset derived by back calculation as a suitable candidate for use in the assessment because it is conceived in a consistent way over the whole period and can meet standards required in a quality-controlled process. However, the back-calculation estimates cannot be used for the most recent years since all year classes have to be fully matured before the calculation can be made. Therefore, assumptions have to be made for the recent year classes. For recent year classes, WGWIDE (ICES, 2010b) decided to use average back-calculated maturity for "normal" and "big" year classes thereby reducing maturity-at-age for ages 4, 5 and 6 when strong year classes enter the spawning stock. The default maturity ogives used for "normal" and "big" year-classes are given in the text table below.

age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
normal year class	0	0	0	0	0.4	0.8	1	1	1	1	1	1	1	1	1	1
strong year class	0	0	0	0	0.1	0.6	0.9	1	1	1	1	1	1	1	1	1

Assumed values should be replaced by back-calculated values in the annual assessments for each year where updated values are available. In 2025 the year 2020 was not updated with back-calculated values due to data format problems at IMR. Assumed (old) and updated values for 2019 (same figure as last year) are shown in figure 4.4.5.1. The 2016, 2021 and 2022 year-classes were considered to be strong year-classes by the working group based on the assessment estimate of recruitment, where several survey indices of these year-classes are included. The resulting maturity ogives used in the present assessment are presented in Table 4.4.5.1.

4.4.6 Natural mortality

In this year's assessment, the natural mortality M=0.15 was used for ages 3 and older and M=0.9 was used for age 2. These levels of natural mortality are in accordance with previous years and their justification is provided in the stock annex. Information about deviations from these levels in the time-series, *e.g.* due to diseases, are also provided in the stock annex.

4.4.7 Indices of abundance

This section describes the four surveys used in the assessment, three acoustic trawl surveys and one time series of indices based in RFID mark-recapture data.

4.4.7.1 Survey data

The surveys used in the assessment are described in the stock annex:

1. The International Ecosystem Survey in the Nordic Seas (IESNS) in May. This survey covers the entire stock during its migration on the feeding grounds, the adults in the Norwegian Sea and adjacent waters (IESNS in the Norwegian Sea) and the juveniles in the Barents Sea (IESNS in the Barents Sea). The data from these two areas are treated at separate time series in the assessment.
2. The Norwegian acoustic survey on the spawning grounds in February (NASF).

3. The Norwegian and Russian Barents Sea ecosystem surveys in August-October (BESS) which measure abundance of juveniles.

The cruise reports from the IESNS (WD07) and NASF (WD08) in 2025 are available as working documents to this report. NASF (Figure 4.4.7.2) and IESNS in the Norwegian Sea (Figure 4.4.7.1) were both carried out successfully in 2025. The cruise report from BESS in 2024 (Skaret and Prozorkevich 2025) is available at www.hi.no.

The abundance estimates from the spawning survey are shown in Table 4.4.7.1; from IESNS in the Barents Sea in Table 4.4.7.2, IESNS in the Norwegian Sea in Table 4.4.7.3 and BESS in Table 4.4.7.4.

Bootstrap mean values as point estimates of abundance are used from the IESNS and the spawning survey, which was decided at the last benchmark assessment (ICES 2025). However, the point estimates from BESS (age 2 and 3) were taken from table 7.3.2.2 in the cruise report (Skaret and Prozorkevich 2025). Though the abundance estimates from BESS were recalculated during the benchmark, it has not yet been clarified with Russia whether these recalculated can be used in the assessment. The estimates from the cruise report is very similar to te recalculated point estimates, and the working group accepted to use the estimates from the survey report. There are unfortunately no uncertainty estimates associated with the point estimates of abundance in the survey report, and this has some implications for how this time series is used in the assessment (see later).

Log abundance estimates by cohort were made for the spawning survey (Figure 4.4.7.4) and IESNS in the Norwegian Sea (Figure 4.4.7.5). As in the catch curves from the catch at age data, the strong year classes seem to decrease consistently by age.

4.4.7.2. Tagging data

In the last benchmark assessment (ICES 2025) it was agreed to use tag-based abundance indices at age 3-12+ for NSSH from the years 2017 onwards. A full description of data collection and estimation is given in WD02. In short, NSSH is tagged with RFID-tags in northern Norwegian fjords during wintering November-December (Figure 4.4.7.6), and Norwegian and Icelandic catches are scanned (Figure 4.4.7.7) for recaptures (Figure 4.4.7.8) at factories with RFID-antenna systems. Estimates used as input to the stock assessment (Figure 4.4.7.9) are means from bootstraps with 1000 iterations based on numbers released (R) of an age in a release year, and numbers scanned (Nscan) and recaptured (r) of the same year class in YearsOut = 1-2 after release using the Lincoln Petersen model (N = R * Nscan / r). The estimates come with CVs based on the uncertainty in both R, Nscan and r (Figure 4.4.7.10), which are used in the internal weighting of data sources in the SAM assessment.

4.4.8 Sampling error in catches and surveys

Sampling errors for Norwegian catch-at-age for the years 2010-2021 is estimated using ECA (Salthaug and Aanes 2015, Hirst *et al.* 2012), and 2022-2024 used probabilistic survey method (Otterå et al. 2023). Using the Taylor function (Aanes 2016a) to model the sampling variance of the catches yields and using this function to impute missing sampling variances for catch-at-age yields relative standard errors shown in Table 4.4.8.1. It is assumed that the relative standard errors in the total catches are equal to the Norwegian catches (which comprise ~60% of the total catches). Sampling errors for survey indices are estimated using StoX (http://www.imr.no/forskning/prosjekter/stox/nb-no) and Johnsen *et al*. (2019). The resultant relative standard errors are given in Tables 4.4.8.2-4.4.8.5.

4.4.9 Information from the fishing industry

No information was made available to the working group.

4.5 Stock assessment

The first benchmark of the NSSH assessment took place in 2008 with the assessment tool TASACS selected as the standard assessment tool for the stock. A second benchmark took place in 2016 (WKPELA - ICES, 2016a) where three assessment models were explored - TASACS, XSAM and one separable model. WKPELA accepted XSAM as the standard assessment tool for the NSSH. During the WGWIDE meeting in 2023, it was agreed to recommend using the SAM software with the same model and configuration as the XSAM software for WGWIDE 2024 and onwards. The reason was that the XSAM software is no longer maintained and will fail to compute if upgrading the R software or R packages. Since WGWIDE 2024, the software SAM has been used as the assessment model (Nielsen and Berg, 2014). During the benchmark WKBMACNSSH in 2025, it was decided to continue with SAM but with different configurations and data output.

4.5.1 SAM final assessment 2025

The 2025 SAM assessment was performed with the same model options as what was defined during WKBMACNSSH in 2025; however, since a permission for using the recalculated index of abundance for the BESS survey was not received, the historical data was used instead. Also, the standard errors for this survey were not used to weight the input data as it was during WKBMACNSSH. All other input data were weighted by the standard (Tables 4.4.8.1–4.4.8.5). Additional details on the assessment settings are given in the Stock Annex.

The parameter estimates from the 2025 assessment are shown in Table 4.5.1.1 and in Figure 4.5.1.1, and is compared with the 2024 benchmarked assessment. Larger discrepancies are seen for the parameter indicating the observation variance of the BESS survey. As described above, this change is due to the removal of the weight of the data; hence, the perception of the observation variance has changed. For the rest of the parameters, smaller changes has been observed. The resulting estimated selection pattern is gradual (Figure 4.5.1.2) and in line with the current knowledge about the fishery.

The weights each datum is given in the model fit are proportional to the empirical weights derived from sampling variances (Tables 4.4.8.1–4.4.8.4) which shows that the strong year classes in general are given larger weight to the model than weaker year classes (Figure 4.5.1.3).

In one step ahead observation residual it has been seen some diagonal trends, which show some correlation between year classes. This is also the case for the IESNS survey an the NASF (new) survey. The residuals for small values are bigger than residuals for the larger values since smaller values in general have higher variances than larger values (Tables 4.4.8.1–4.4.8.4) (Figure 4.5.1.3). The QQ-plots for the standardized residuals show that the distributional assumptions on the observation errors are adequate, except for the IESNS recruitment index and the BESS that has residuals that is outside a normal distribution. The process residual (Figure 4.5.1.6) and its QQplot (Figure 4.5.1.7) also indicates some slight deviation from a normal distribution. The process error, when compared to the 2024 benchmarked assessment, show some changes in the resent years; however, stable for most of the years.

The retrospective run for this model shows estimates within the estimated levels of precision (Figure 4.5.1.9), and has a reasonably low Mohn's rho value for SSB of 0.01 and 0.09 for F (Mohn, 1999; Brooks and Legault, 2016). Note that the retrospective patterns are remarkably stable.

Figure 4.5.1.10 illustrates the conflict between surveys. For the IESNS, that is now the longest time-series for age 3-12+, alters the perception of the cohort size and thus the SSB for the whole assessment period. The RFID time series has largest influence of the size of the 2016 cohort, thus removing this will change the perception in the SSB the latest years. The other surveys does not have any notably conflict.

The final 2025 assessment results are shown in Figure 4.5.1.10. The estimate of fishing mortality for 2019 to 2024 is rather high, as a response to the high catch in the last years with a point estimates from ~0.156 to ~0.218 with the peak value in 2020. In 2018 the fishing mortality is estimated to be lower than in 2017 and 2019. The spawning stock shows a declining trend since 2009 but an increase in 2021 and 2022 before continuing to decrease. The 95% confidence interval of the stock level in 2025 ranges from ~2.187 to ~3.39 million tonnes with a point estimate of 2.723. which is below B_{mp}=3.177 million tonnes, such that the probability of the stock being above B_{lim}=2.286 million tonnes is becoming lower.

The final results of the assessment are also presented in Tables 4.5.1.2 (stock in numbers), 4.5.1.3 (fishing mortality) and Table 4.5.1.4 is the summary table of the assessment.

4.6 NSSH reference points

4.6.1 PA reference points

The PA reference points for the stock were estimated by WKBMACNSSH in 2025. The benchmark concluded that B_{lim} should be reduce to 2.286 million tonnes (originally 2.5 million) and B_{pa} should be reduced to 3.177 million tonnes (originally 3.184 million).

4.6.2 MSY reference points

The MSY reference points were evaluated by WKBMACNSSH in 2025. In the ICES MSY framework B_{pa} is proposed/adopted as the default trigger biomass $B_{trigger}$ and was estimated by WKBMACNSSH at 3.177 million tonnes. F_{MSY} was increased to 0.21 (originally 0.157).

4.6.3 Management reference points

In the current management strategy, which was agreed upon in October 2018, the Coastal States have agreed a target reference point defined at F_{target} = 0.14 when the stock is above B_{pa}. If the SSB is below B_{pa}, a linear reduction in the fishing mortality rate will be applied from 0.14 at B_{pa} to 0.05 at B_{lim}.

4.7 State of the stock

The SSB on 1 January 2026 is estimated by SAM to be 3.012 million tonnes which is below B_{pa} (3.177 million t). The spawning stock has been declining since 2009 but increased in 2021 and 2022 followed by a decrease again in 2023 to 2025. The newly benchmarked assessment of NSSH leads to a somewhat revised perception of the stock. The estimated SSB in 2024 was 5% lower in this year's assessment compared to last year; further back in time the difference was larger. In the last 30 years, several large year classes have been produced (1998, 1999, 2002, 2004 and 2016). The year classes 2005-2015 and 2017-2019 are estimated to be average or small. Results from surveys in the Barents Sea the last two years have estimated the size of the 2022 year-class above average. Fishing mortality in 2024 is estimated to be 0.156 which is above the management strategy F (0.14) but below F_{MSY} and F_{pa} (0.21).

4.8 NSSH Catch predictions

4.8.1 Input data for the forecast

Forecasting was conducted using a modified version of the SAM forecast function. The modification includes the option of defining a weighted Fbar instead of the normal Fbar. This function is available in the relevant TAF repository and is consistent with previous years forecast.

Table 4.8.1.1 lists the point estimates of the starting values for the forecast. The input stock numbers-at-age 2 and older were taken from the final assessment. The catch weight-at-age, used in the forecast, is the average of the observed catch weights over the last 3 years.

For the weight-at-age in the stock, the values for 2025 were obtained from the commercial fisheries in the wintering areas in January. For the years 2026 and 2027 the average of the last 3 years was used.

Standard values for natural mortality were used. Maturity-at-age was defined by assuming the maturity at age are dependent on the cohort size (Vatnehol et al. 2024). The maturity at age was predicted using the estimated recruitment from the assessment model.

The exploitation pattern used in the forecast is taken from the predictions made by the model. The resultant mean annual exploitation pattern is shown in Figure 4.8.1.1 and displays a shift towards older fish in the recent years and further in the prediction.

The average fishing mortality is defined as the average over the ages 5 to 12+, weighted over the population numbers in the relevant year

$$\bar{F}_y = \sum_{a=5}^{12+} N_{a,y} F_{a,y} \Bigg/ \sum_{a=5}^{12+} N_{a,y}$$

where $F_{a,y}$ and $N_{a,y}$ are fishing mortalities and numbers by age and year. This procedure is in accordance with that used in previous years for this stock.

There was no agreement between the fishing parties on the sharing of the TAC for 2025. Therefore, to obtain an estimate of the total catch to be used as input for the catch-constraint projections for 2025, the sum of the unilateral quotas was used. In total, the expected outtake from the stock in 2025 amounts to 435 010 tonnes. F in 2025 is estimated by SAM based on this catch.

4.8.2 Results of the forecast

The Management Options Table with the results of the forecast is presented in Table 4.8.2.1. Assuming a total catch 435 010 tonnes is taken in 2025, it is expected that the SSB will increase from 2.723 million tonnes on 1 January in 2025 to 3.012 million tonnes in 2026, which is bellow $B_{trigger}$ (3.177 million tonnes). The weighted F over ages 5-12+ is 0.138 in 2025. The model predicts that stock will further increase in 2027 and 2028 (Figure 4.8.1.2). The catch in 2025 is predicted to be dominated by two age groups, age 9 (40%) and age 4 (16%). In 2026, it is predicted that the catch will be dominated by the ages 10 (27%), 5 (22%) and 4 (16%) (Figure 4.8.1.3).

4.8.3 Comparison between forecast 2024 basis and assessment 2025

A comparison between the basis of the short-term prediction in 2024, and the revised values from the 2025 assessment is shown in figure 4.8.3.1 and summarised in the table below. The stock numbers are similar (Panel A) for both the year 2024 and 2025, except for the age 2 in 2024 and, subsequently, the age 3 in 2025, where a reduction at age 2 in 2024 was reduced with 12%. The reason is twofold; first, a new model was introduced in WKBMACNSSH (2025) that changed altered the estimate of recruitment, and secondly, there is now 4 time-series informing the age 2 in 2024. The selection pattern (figure 4.8.3.1 panel B) has also changed, but the new model from WKBMACNSSH also included changes that effects the exploitation pattern, so care is advised when comparing the changes. More fish at age 8 was caught in 2024 than what was expected from the forecast in 2024; however, it should be noted an increase of 2.9% when comparing the expected landing in 2024 and the revised landing. Some minor differences are observed for the stock-mean-weight (Panel D) and catch-mean-weight (Panel E).

The estimated value of SSB in 2025 has been reduced by 7% compared to the basis in the forecast in 2024. The main reason for this reduction is that the inclusion of new data revised the SSB slightly downwards, as seen in the retrospective run (Figure 4.5.1.9). The weighted Fbar in 2024 increased with 16%, where the reason is threefold, firstly it is a new model, secondly the SSB in 2024 has been reduced, and thirdly the landings was higher than what was assumed in the forecast basis.

	2024 Forecast basis values	Updated values from assessment 2025	%difference
Landings 2024	446 928	460 226	2.9
Recruitment (age 2) Billions	37.429	20.739	-45
SSB (2025)	2.933	2.723	-7
F (2024)	0. 134	0.156	16

4.9 Comparison with previous assessment

A comparison between the assessments 2011-2025 is shown in Figure 4.9.1. In the years 2011-2015 the assessments were made with TASACS, but since 2016 XSAM has been applied, as accepted by WKPELA 2016. In 2024, the XSAM model is still being used but using the SAM software platform, and the model was further changed in 2025 during the WKBMACNSSH. With the change of the assessment tool in 2016 the age of the recruitment changed from 0 to 2 and the age span in the reference F changed from 5-14 to 5-11. In WKNSSHREF (ICES, 2018a) this was further changed to 5-12+.

The table below shows the SSB (thousand tonnes) on 1 January in 2024 and weighted F in 2023 as estimated in 2024 assessment and 2025 assessment.

	ICES 2024	WG2025	%difference
SSB (2024)	3 103	2 948	-5%
Weighted F (2023)	0.183	0.17	-7%

4.10 Management plans and evaluations

The current management strategy for the Norwegian spring spawning herring fishery was agreed by the Coastal States in November 2018.

The implemented long-term management strategy of Norwegian spring spawning herring is consistent with the precautionary approach and the MSY approach (WKNSSHREF, ICES, 2018a; WKNSSHMSE, ICES, 2018b) and aims at ensuring harvest rates within safe biological limits.

Extract from the Coastal States Agreed Record (4th November 2022) (Annex 1)

1. The Parties agree to implement a long-term management strategy for the fisheries on the Norwegian Spring Spawning (Atlanto-Scandian) Herring stock, which is consistent with the precautionary approach and the MSY approach, aiming at ensuring harvest rates within safe biological limits.
2. For the purpose of this long-term management strategy, in the following text, "TAC" means the total allowable catch as agreed by Coastal States.
3. As a priority, the long-term management strategy shall ensure with high probability that the size of the stock is maintained above B_{lim}.
4. In the case that the spawning biomass is forecast to be above or equal to $B_{trigger}$ (=B_{pa}) on 1 January of the year for which the TAC is to be set, the TAC shall be fixed to a fishing mortality of F_{mgt}=0.14.
5. Where the rules in paragraph 4 would lead to a TAC, that deviates by more than 20% below or 25% above the TAC of the preceding year, the Parties shall fix a TAC that is respectively no more than 20% less or 25% more than the TAC of the preceding year. The TAC constraint shall not apply if the spawning biomass at 1 January in the year for which the TAC is to be set is less than $B_{trigger}$
6. In the case that the spawning biomass (SSB) is forecast to be less than the precautionary biomass ($B_{trigger}$) but above or equal to Blim on 1 January of the year for which the TAC is to be set, the TAC shall be fixed at a level that is consistent with a fishing mortality given by:
   Target F = 0.05 +[(SSB-B_{lim})× (F_{mgt} –0.05) I($B_{trigger}$ -B_{lim})]
7. In the case that the spawning biomass is forecast to be less than B_{lim} on 1 January of the year for which the TAC is to be set, the TAC will be fixed corresponding to a fishing mortality F=0.05.
8. Each Party may transfer to the following year unutilised quantities of up to 10% of the quota allocated to it. The quantity transferred shall be in addition to the quota allocated to the Party concerned in the following year.
9. Each Party may authorize fishing by its vessels of up to 10% beyond the quota allocated. However, this shall not apply if the stock is forecast to be under $B_{trigger}$ at the end of the TAC year. All quantities fished beyond the allocated quota for one year shall be deducted from the Party's quota allocated for the following year.
10. The Parties, on the basis of ICES advice, shall review this long-term management strategy at intervals not exceeding five years. The first such review shall take place no later than 2023, in time for ICES to issue advice for 2024.

Whilst the Coastal States stated a review of the long-term management strategy was due in 2023 this has not been undertaken as it was considered appropriate to do this after an impending benchmark (undertaken in 2025). However, whilst ICES has not conducted a thorough MSE evaluation of the existing management plan using the updated reference points (MSY Btrigger and Blim), the management plan was examined during the Benchmark in 2025 and thought to still be precautionary.

A brief history of management strategies is in the stock annex. There has been no agreement on sharing of the TAC since 2013, resulting in the total catch being higher than the advised catch.

4.11 Management considerations

The stock was benchmarked in 2025. In addition to changes in the model configuration, the updated assessment model now includes RFID tagging data (as indices for age 3-12+) and one new recruitment survey (age 2 and 3) from the Norwegian and Russian Barents Sea ecosystem survey in August-October (BESS). Reference points have been updated; F_{MSY} has been revised upwards, and MSY $B_{trigger}$, Bpa and Blim have been reduced. The quality of the new assessment is considered higher than the previous assessment, and the perception of the stock did not change much with the addition of one new data year.

However, the perception of the stock has changed since last year's assessment (estimated SSB in 2024 is 5% lower in this year's assessment).

Historically, the size of the stock has shown large variations and dependency on the irregular occurrence of very strong year classes. Between 1998 and 2004 the stock produced several strong year classes which lead to an increase in SSB up to 2009. Since then, SSB has declined due to absence of strong year classes between 2005 and 2015. The 2016 year-class was, however, estimated to be well above average in the 2023 assessment and resulted in an increase in SSB from 2020 to 2021. After that, the SSB declined over the period 2022 and 2023 and is predicted to be below B_{mgt} in 2026 but above B_{mgt} in 2027. This is expected even if the management strategy (F_{mgt}=0.123) is applied in 2025 with an overshoot of the advice. However, the SSB is expected to increase in 2026 and 2027 due to the apparent above average 2021 and 2022 year-classes.

Between 1999 and 2013, catches were regulated through an agreed management. However, since 2013, a lack of agreement by the Coastal States on their share in the TAC has resulted in unilaterally set quotas. Collectively these are higher than the TAC recommended by the agreed management strategy resulting in steep reduction in the SSB over the period 2022 to 2025. The sum of the catch in 2025 is estimated to exceed the advised TAC by 6 %.

4.12 Ecosystem considerations

NSS herring juveniles and adults are an important part of the ecosystems in the Barents Sea, along the Norwegian coast, in the Norwegian Sea and in adjacent waters. This refers both to predation on zooplankton by herring and herring being a food resource to higher trophic levels (*e.g.* cod, saithe, seabirds, and marine mammals). The predation intensity of and on herring have seasonal, spatial, and temporal variation because of variation in migration pattern, prey density, stock size, size of year classes and stock sizes of competing stocks for resources and predators. Recent features of some of these ecosystem factors of relevance for the stock are summarized below.

- Following a maximum in zooplankton biomass in May during the early 2000s the biomass declined with a minimum in 2006. From 2010, the trend turned to an increase and the last five years the zooplankton biomass has fluctuated around the long-term mean in the Lofoten and Norwegian Basins (IESNS survey report - ICES, 2024a), but is still low compared to the early years in East Iceland waters and the Jan Mayen front. Interestingly, all the areas, excluding east of Iceland and on few occasions Jan Mayen, show co-varying changes in zooplankton biomass.
- The Atlantic water mass in the Norwegian Sea was warmer and saltier over the period 2000–2016 than the long-term mean (WGINOR - ICES, 2023b). However, since 2017, the extent of Artic water has increased resulting in a marked freshening of the water masses,

but the temperature remain above long -term average. Two different mechanisms can explain this, increased fraction of subpolar water (fresh and cold) and low heat loss to the atmosphere in the Norwegian Atlantic flow. The recent trend of **cooling and freshening of the** Atlantic Inflow into the Norwegian Sea has ceased (ICES, 2023b).

- The sea temperature in 2024 was generally below the long-term mean (1995-2021) in the Norwegian Sea, but the pattern was fragmented from 0m-200m depth, with the central part mostly above the mean (ICES, 2023a). The Arctic front in the southern Norwegian Sea was more southerly and easterly located in 2023 compared to the long-term mean.
- In general, the herring stock has had a more westerly and northerly feeding distribution (ICES, 2024a) in the recent years than what was previously observed. In May 2024, the herring in west was more northerly distributed than in recent years, with the southeastern areas virtually absent of herring. The large 2016-year class was by far the most abundant year class in areas where herring was found. The westerly distribution might be due to either better feeding opportunities there or a response to feeding competition with mackerel, but the consequence is a less spatial overlap of herring and mackerel in Norwegian Sea and adjoining waters since around 2014 (ICES, 2023c).
- Where herring and mackerel overlap spatially, they compete for food to some extent (Bachiller *et al*., 2016, 2018; Debes *et al*., 2012; Langøy *et al*., 2012; Óskarsson *et al*., 2016). There are studies showing mackerel being more effective feeder, which might indicate that the herring is forced to the southwestern and northeastern fringe of Norwegian Sea (ICES, 2023b). Alternatively, the higher zooplankton biomass in the southwest could also attract the herring into this location, since zooplankton biomass is much lower in the northeast (ICES, 2023b).
- Since 2005, herring have tended to stay longer in the western feeding areas into the autumn months (Homrum et al., 2022). During this same period, herring have had generally stable good somatic condition and started to build gonads in the autumn months. This trend is more pronounced for older herring. The most likely explanation is, that herring is able to utilize zooplankton resources in autumn – for example *Calanus finmarchicus,* which has been shown to be in the area in the autumn months (Strand et al., 2020).
- Results of stomach analyses of mackerel on the Norwegian coastal shelf (between about 66°N and 69°N) suggest that mackerel fed opportunistically on herring larvae, and that predation pressure therefore largely depends on the degree of overlap in time and space (Skaret *et al*., 2015). Sampling in June 2017 and 2018, specifically studying mackerel predation on herring larvae, found significant numbers of herring larvae in mackerel stomachs in the area just south of Lofoten (Allan *et al*., 2021).
- The 2016 year-class of herring was the strongest since the 2004-year class in the Norwegian Sea as 4-year-olds, but as expected abundance is now beginning to visibly decrease (see the IESNS survey 2024 (Table 4.4.7.3).
- Recent surveys indicate that the 2021- and 2022-year classes are stronger than average, however, the drivers for these stronger year classes are unknown.
- In the winter 2017/2018, the overwintering grounds shifted northward along the coast of Norway with older individuals occurring in oceanic areas. Such changes previously coincided with large year classes entering the spawning stock, however this recent change did not. Also, the onset of the overwintering period has been later in the year since the end of the 2000s.
- Around spawning time of 2025 most of the spawning stock was found west of Lofoten and Vesterålen, further north and more concentrated than usual but similar to the 2021-2024 surveys. This has recently (Slotte et al., 2025) been shown to be driven by the large 2016-year class outnumbering the older fish and drawing the entire stock northwards to spawn.

4.13 Changes in fishing patterns

The fishery for Norwegian spring spawning herring has previously (before 2013) been described as progressing clockwise in the Nordic Seas during the year. However, the last 5-10 years the annual progression of the fishery has changed into a pendular behaviour, starting in the winter along the Norwegian coast, moving gradually to the west towards Iceland in the summer, and then east again into the central Norwegian Sea in the last quarter of the year.

The fishery reached its lowest catches since the mid-nineties in 2015, after which the catches increased again, reaching a maximum in 2021 of 850 000 tonnes (Table 4.4.1.1). Since then, catches have declined, amounting to 680 000 tonnes in 2023 and 460 000 tonnes in 2024. The main fishery is in quarter four, with up to 2/3 of the catches taken in this quarter. The fishery in quarter four the last few years has partly been north and west of Lofoten and partly in the central Norwegian Sea and east of Iceland, whereas before 2015 it used to be stretched out towards the coast of Norway and north towards the Bear Island.

The change in migration pattern since 2017/18, where the part of the stock (old fish) overwinters in the central Norwegian Sea, has caused the fishery in this area to be extended to later in the winter, and in 2024 there was fishery in the central Norwegian Sea in the fourth quarter. Further, the fishery in quarter one has moved further north and is now restricted to the Norwegian coast.

4.14 Recommendations

Not applicable in 2025.

4.15 References

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4.16 Figures

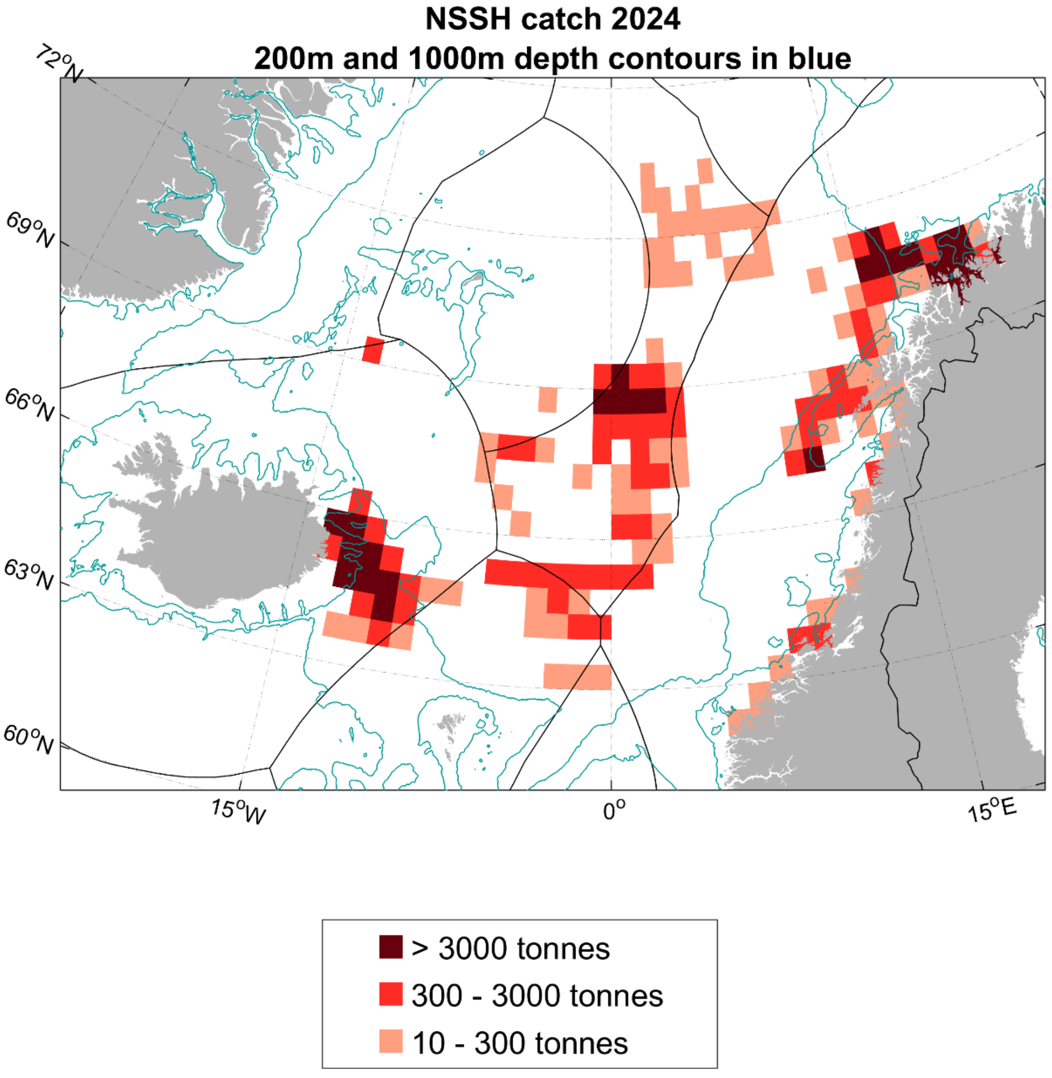

Figure 4.2.1.1. Total reported landings (ICES estimates) of Norwegian spring-spawning herring in 2024 by ICES rectangle. Landings below 10 tonnes per statistical rectangle are not included.

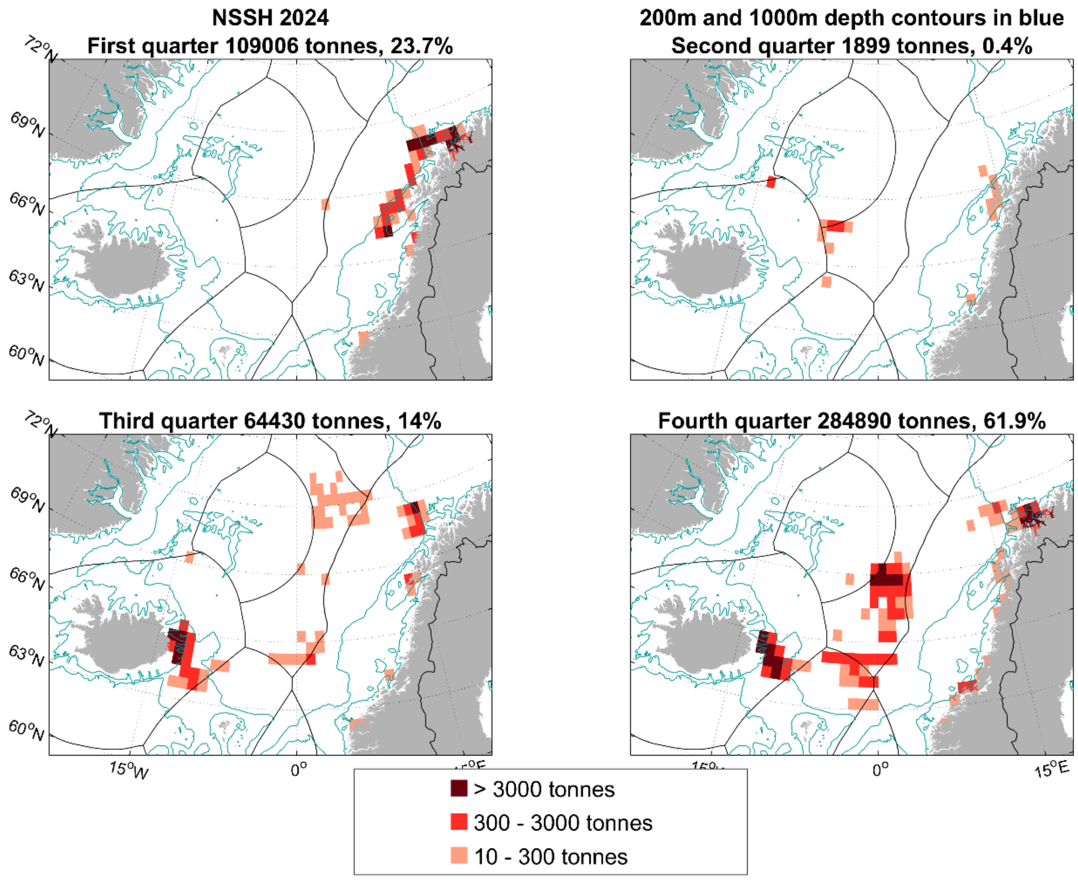

Figure 4.2.1.2. Total reported landings (ICES estimates) of Norwegian spring-spawning herring in 2024 by quarter and ICES rectangle. Landings below 10 tonnes per statistical rectangle are not included.

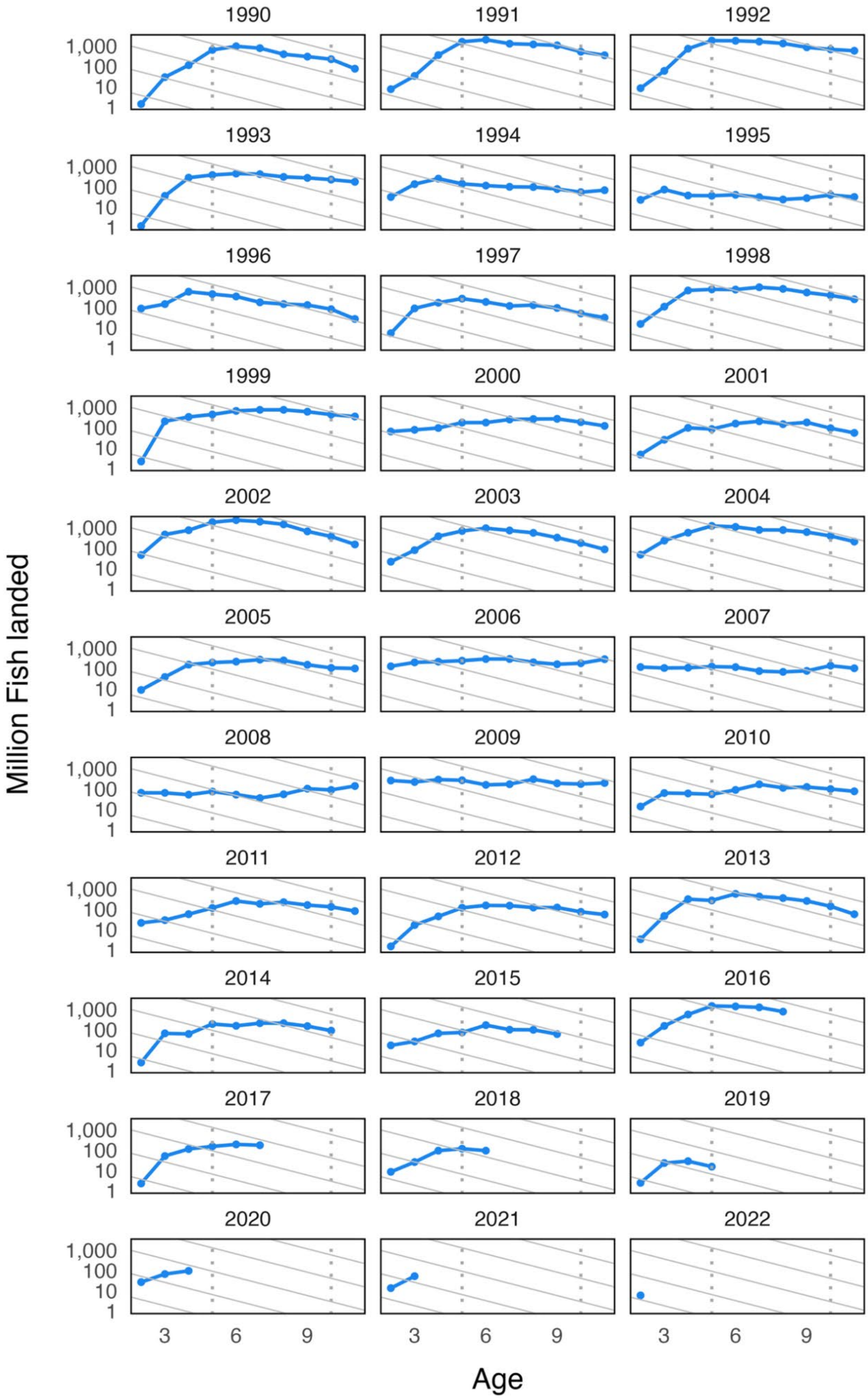

Figure 4.4.3.1. Norwegian spring spawning herring. Age disaggregated landings in numbers plotted on a log scale. Age is on x-axis. The labels indicate year classes and grey lines correspond to Z = 0.3.

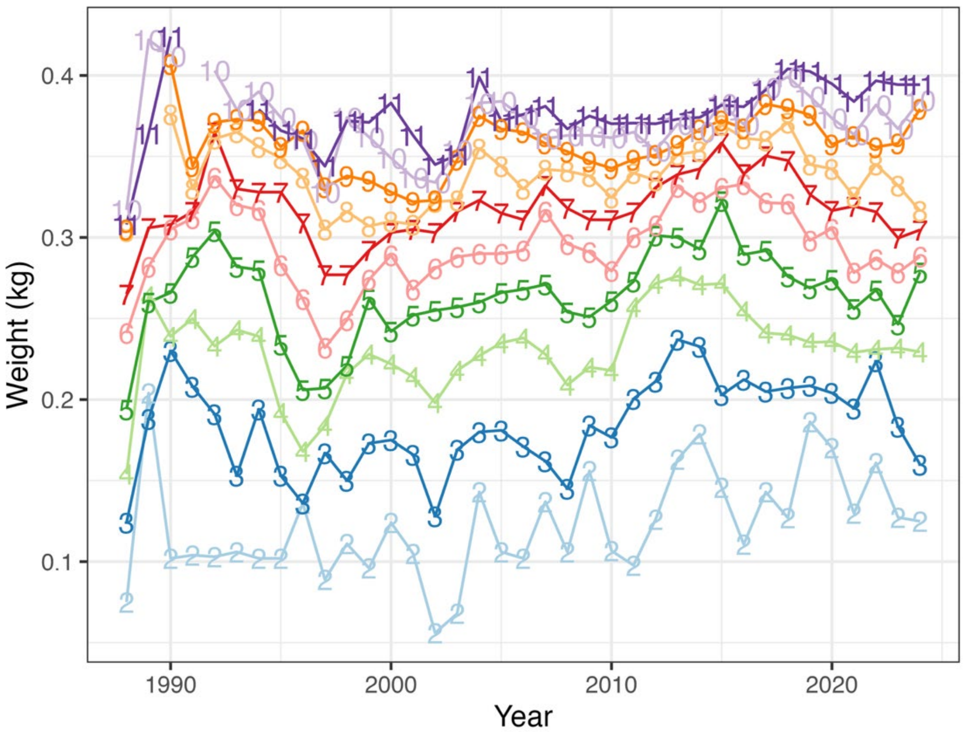

Figure 4.4.4.1. Norwegian spring spawning herring. Mean weight-at-age by age groups 2–11 in the years 1981—2024 in the landings.

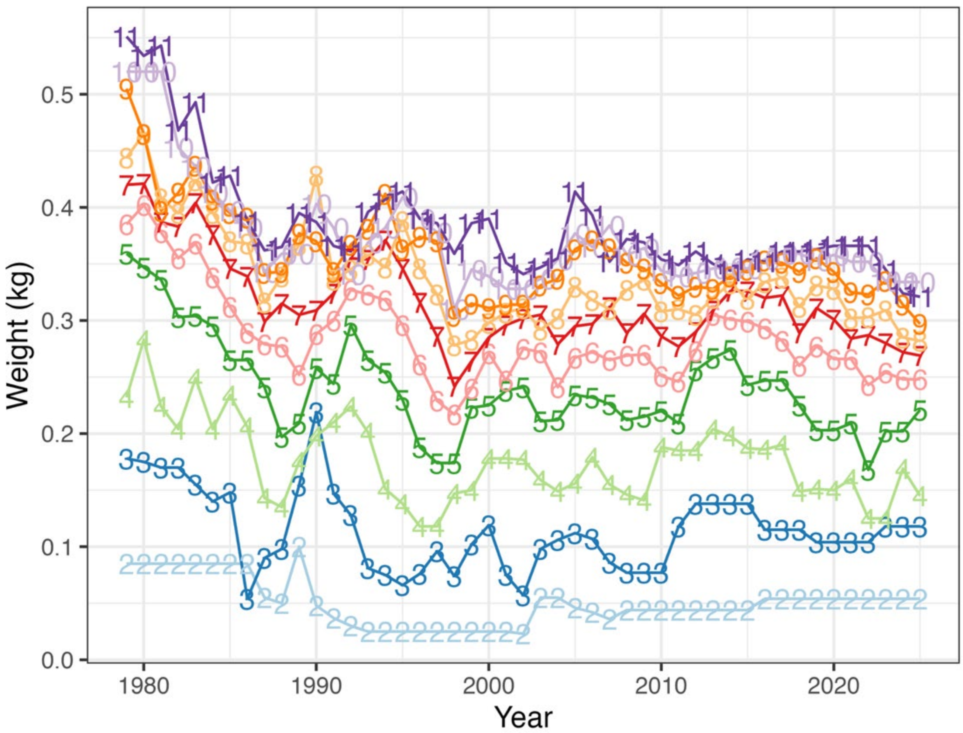

Figure 4.4.4.2. Norwegian spring-spawning herring. Mean weight-at-age in the stock by age groups 2–11 for the years 1981—2025.

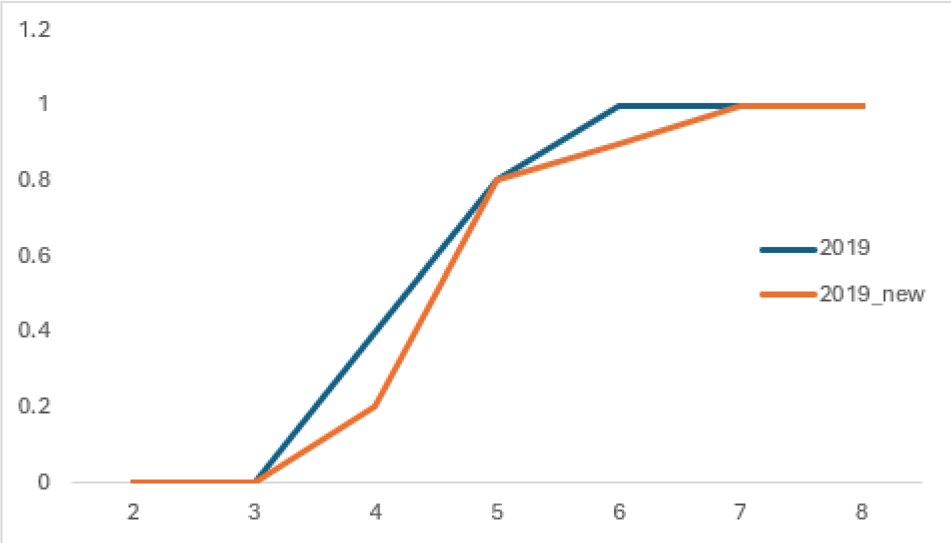

Figure 4.4.5.1. Old assumed (blue line) and new back-calculated (orange line) maturity-at-age for the year 2019.

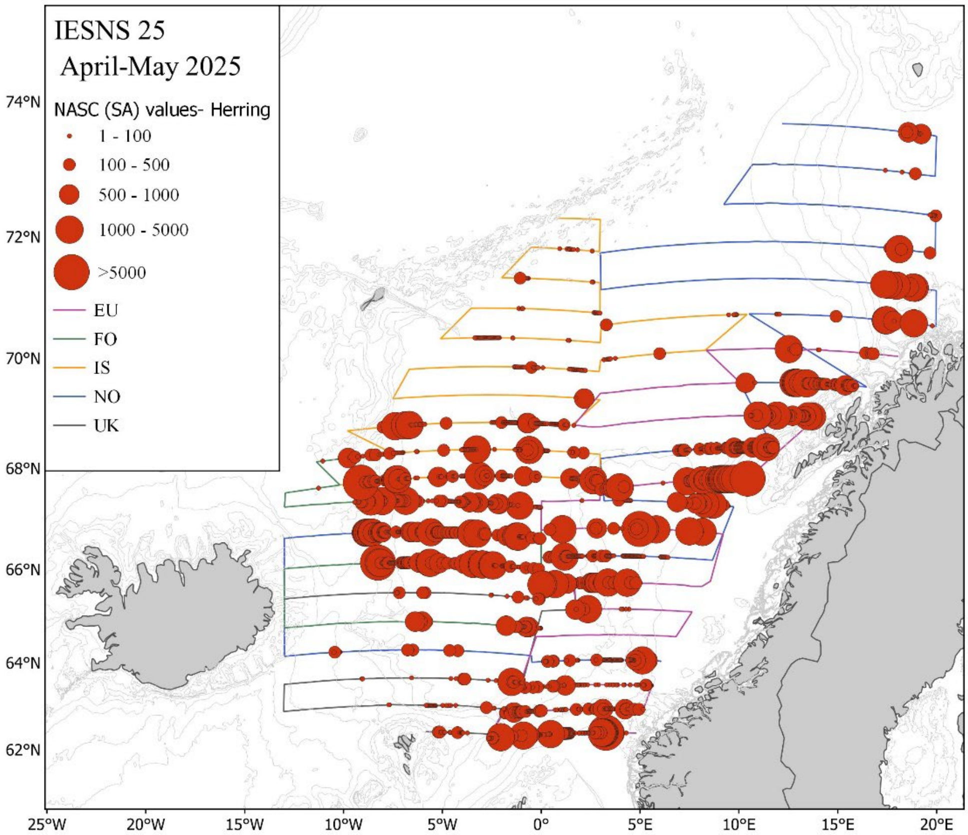

Figure 4.4.7.1. Distribution of Norwegian spring-spawning herring as measured during the IESNS survey in April-June 2025 in terms of NASC values (m²/nm²).

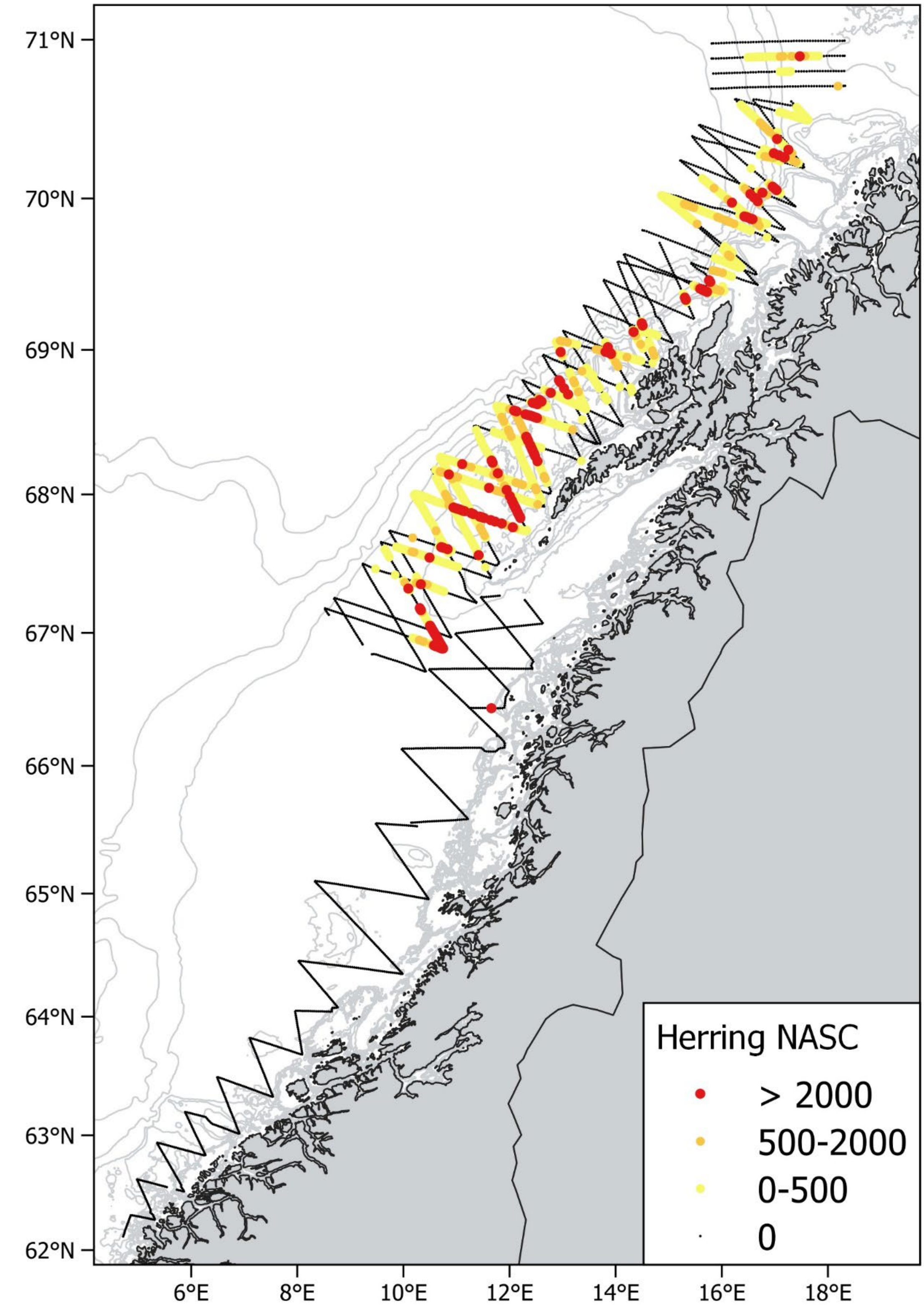

Figure 4.4.7.2. Norwegian acoustic survey on the NSSH spawning grounds. Distribution and acoustic density of herring recorded in 2025.

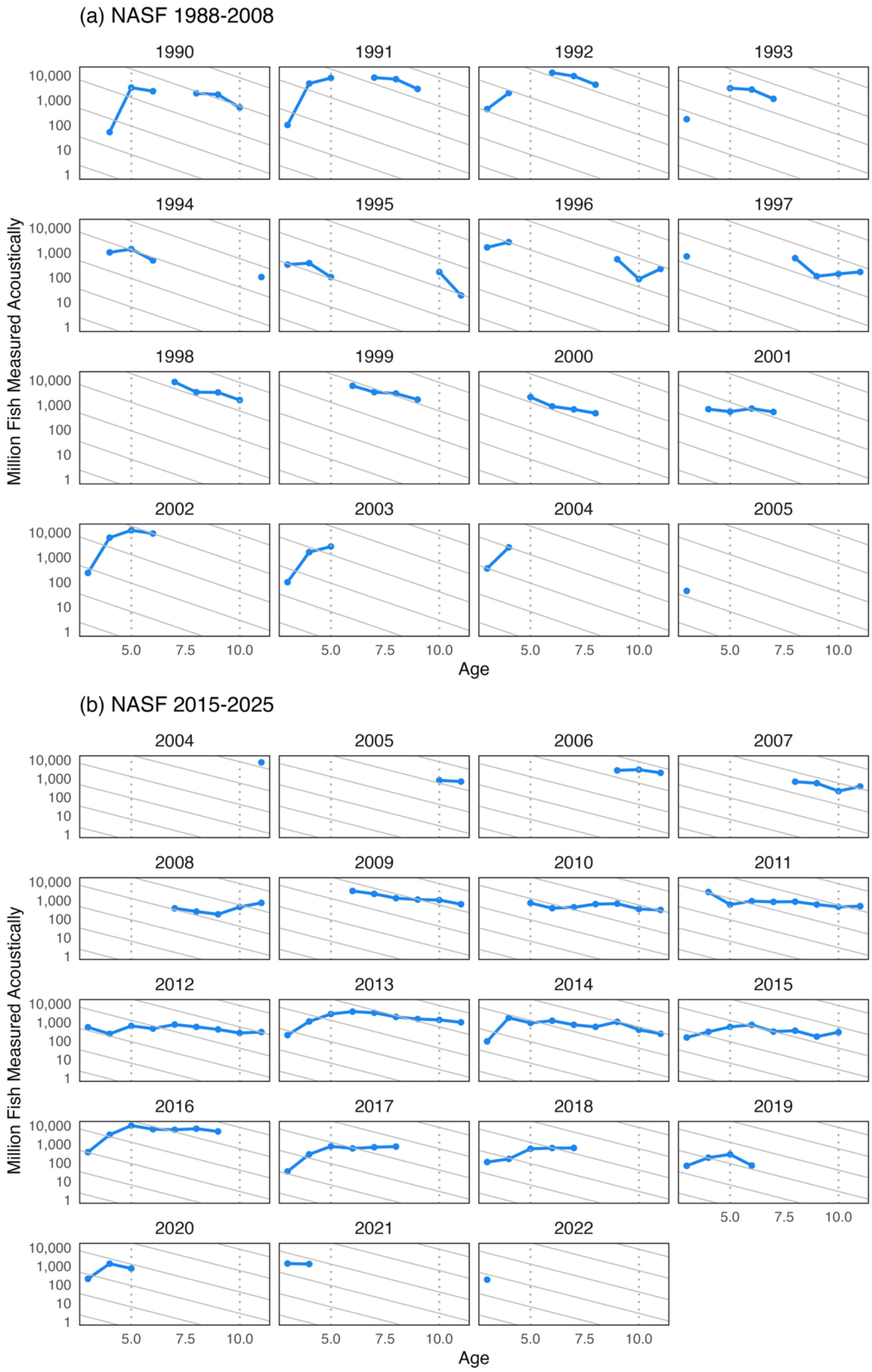

Figure 4.4.7.4. Norwegian spring spawning herring. Age disaggregated abundance indices (millions) from the acoustic survey on the spawning area in February-March a) 1988-2008 and b) 2015-2025 plotted on a log scale. The labels indicate year classes and grey lines correspond to Z = 0.3. Age is on x-axis.

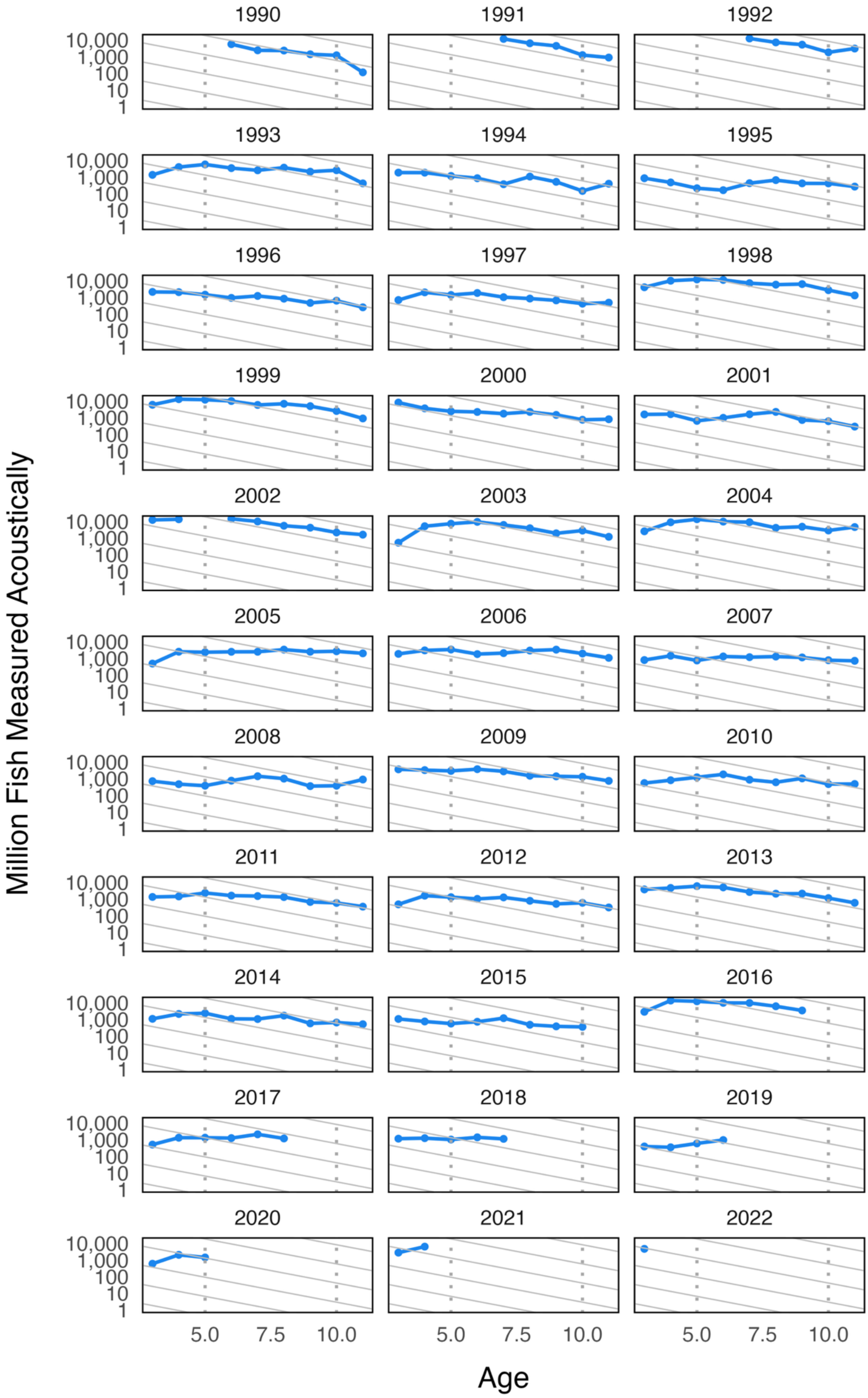

Figure 4.4.7.5. Norwegian spring spawning herring. Age disaggregated abundance indices (millions) from the acoustic survey in the feeding area in the Norwegian Sea in May (Fleet 5) plotted on a log scale. The labels indicate year classes and grey lines correspond to Z = 0.3.

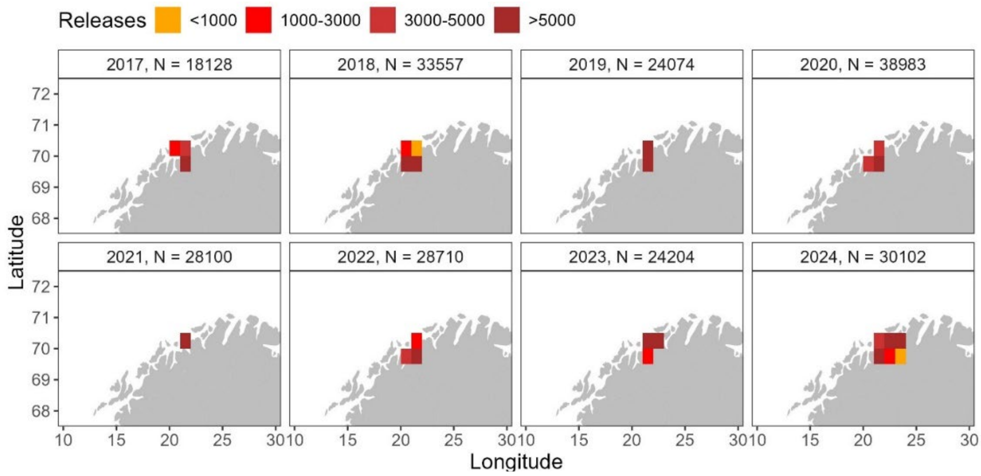

Fig 4.4.7.6. Yearly distributions of tagged NSSH in northern Norwegian fjords. Note that in 2018 the planned November-December survey was postponed to January 2019, but the releases are moved to 2018 both in the map and index.

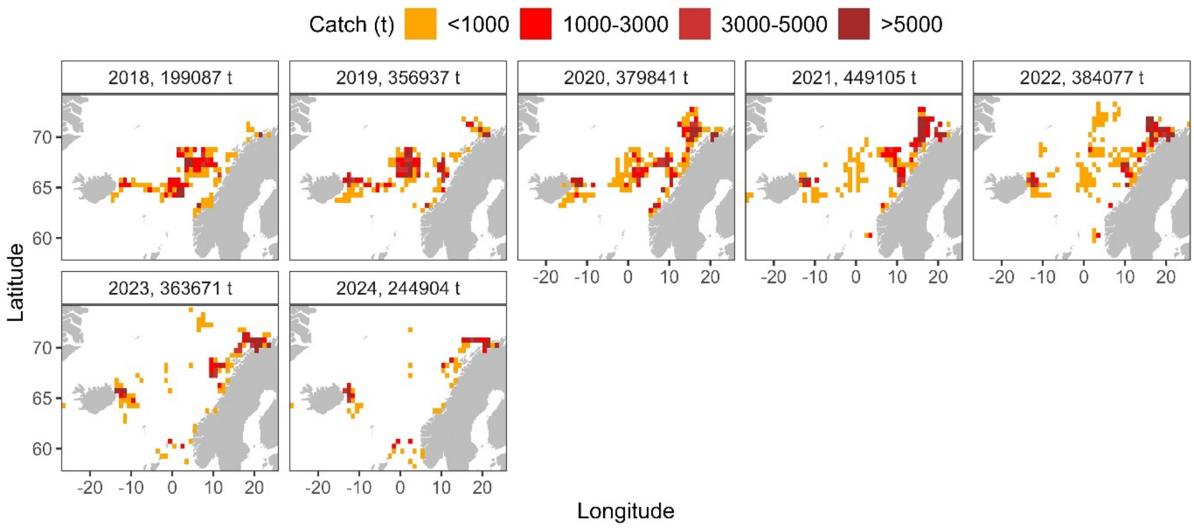

Fig 4.4.7.7. Yearly distributions of catches scanned for tags in NSSH. Note that all catches are included in the maps, also from factories excluded from estimation of the age-based abundance indices due to low efficiency.

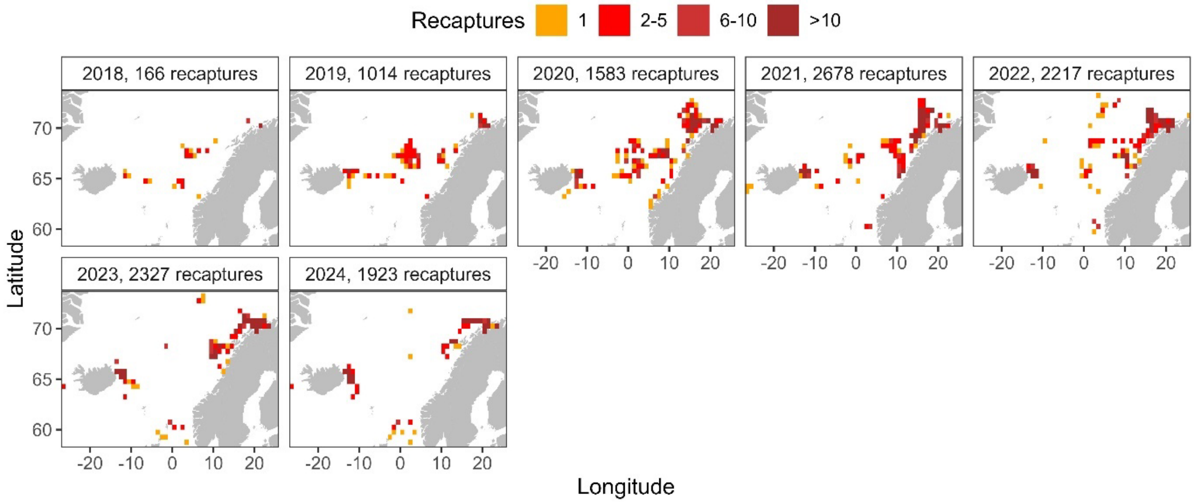

Fig 4.4.7.8. Yearly distributions of recaptured NSSH from releases shown in Fig. 4.4.7.6, and catches shown in Fig.4.4.7.7. All recaptures up to 2024 are included, also recaptures in same year as release (YearsOut = 0 - n) and from factories excluded from estimation of the age-based abundance indices due to low efficiency.

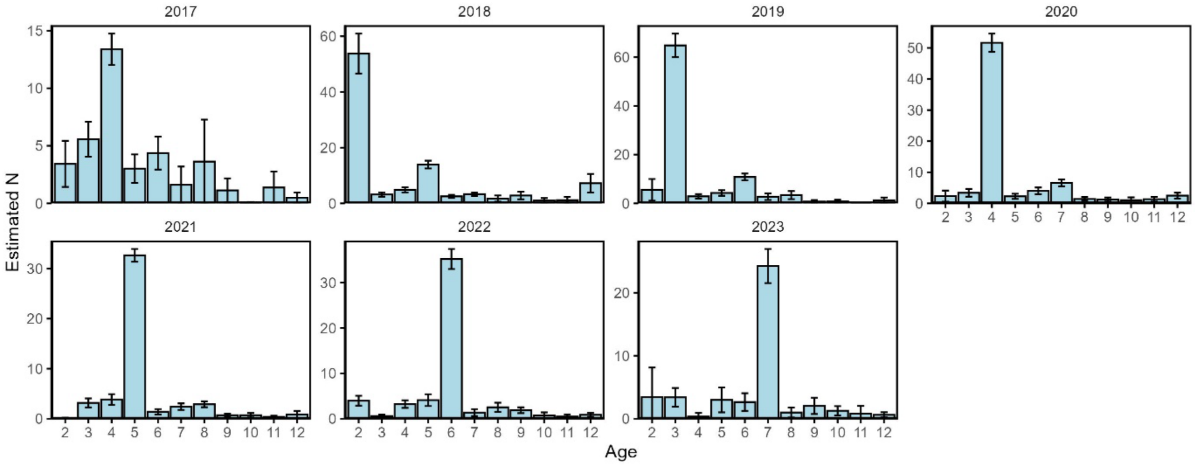

Fig 4.4.7.9. Yearly tag-based abundance estimates at age for NSSH based on the Lincoln Petersen model (N = R * Nscan / r). Estimates are means with 95 % CIs from bootstraps with 1000 iterations based on R of an age in a release year, and Nscan and r of the same year class in YearsOut = 1-2 after release. Age 12 is plus group. Estimates are only based on Nscan and r from factories and periods with accepted efficiencies.

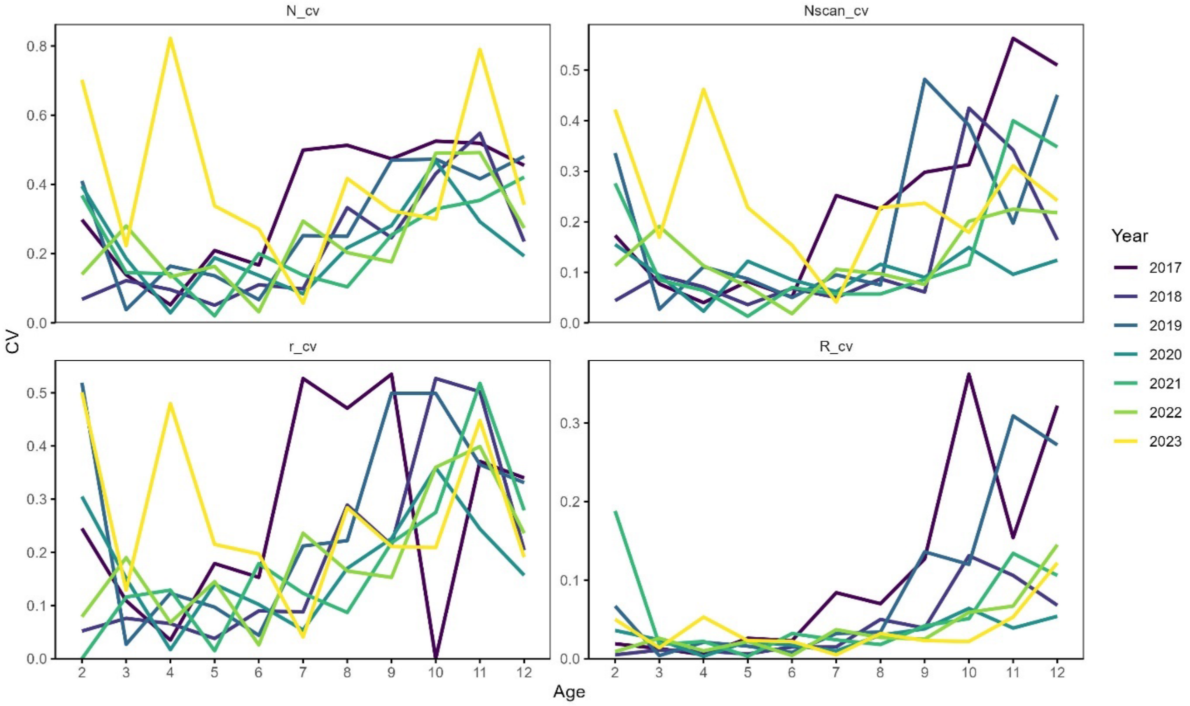

Figure 4.4.7.10. Yearly CVs at age for NSSH for Lincoln Petersen abundance estimates, and for the specific input data to the model (R, Nscan and r). CV-estimates are based on bootstraps with 1000 iterations based in YearsOut = 1-2 after release. Age 12 is plus group.

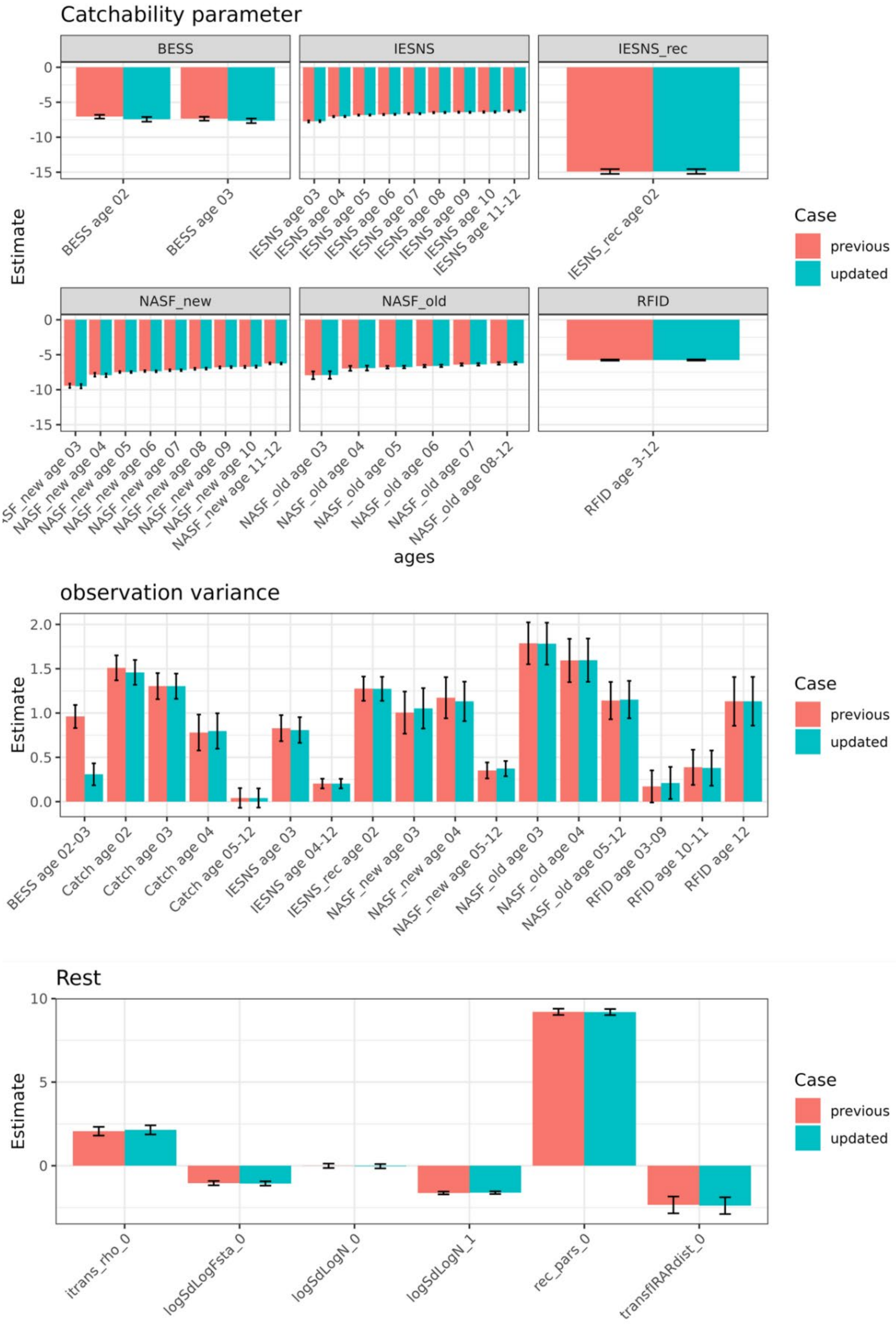

Figure 4.5.1.1. Norwegian spring-spawning herring. A visual representation of parameter estimates of the final SAM model fit. The estimates from the 2024 benchmarked assessment are also shown (red). Note that in the 2024 benchmarked assessment external weights was used for the BESS but excluded in 2025 assessment; hence, the observation variance is different.

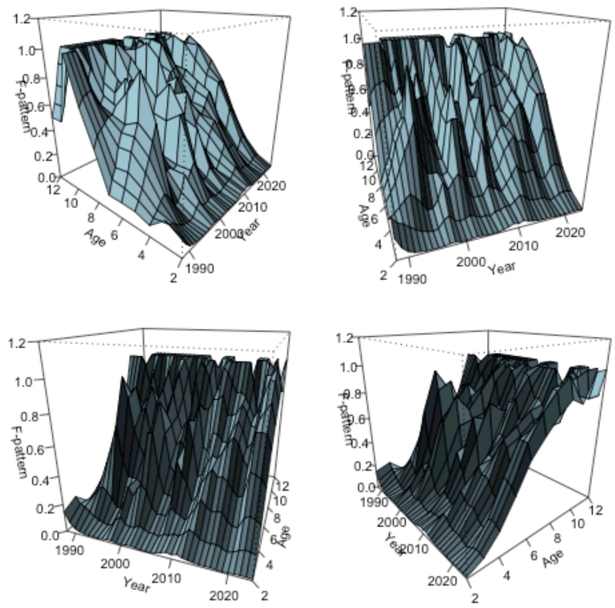

Figure 4.5.1.2. Estimated exploitation pattern for the years 1988–2024 by the SAM model fit. All panels show the same data but are depicted at different angles to improve visibility at various time periods.

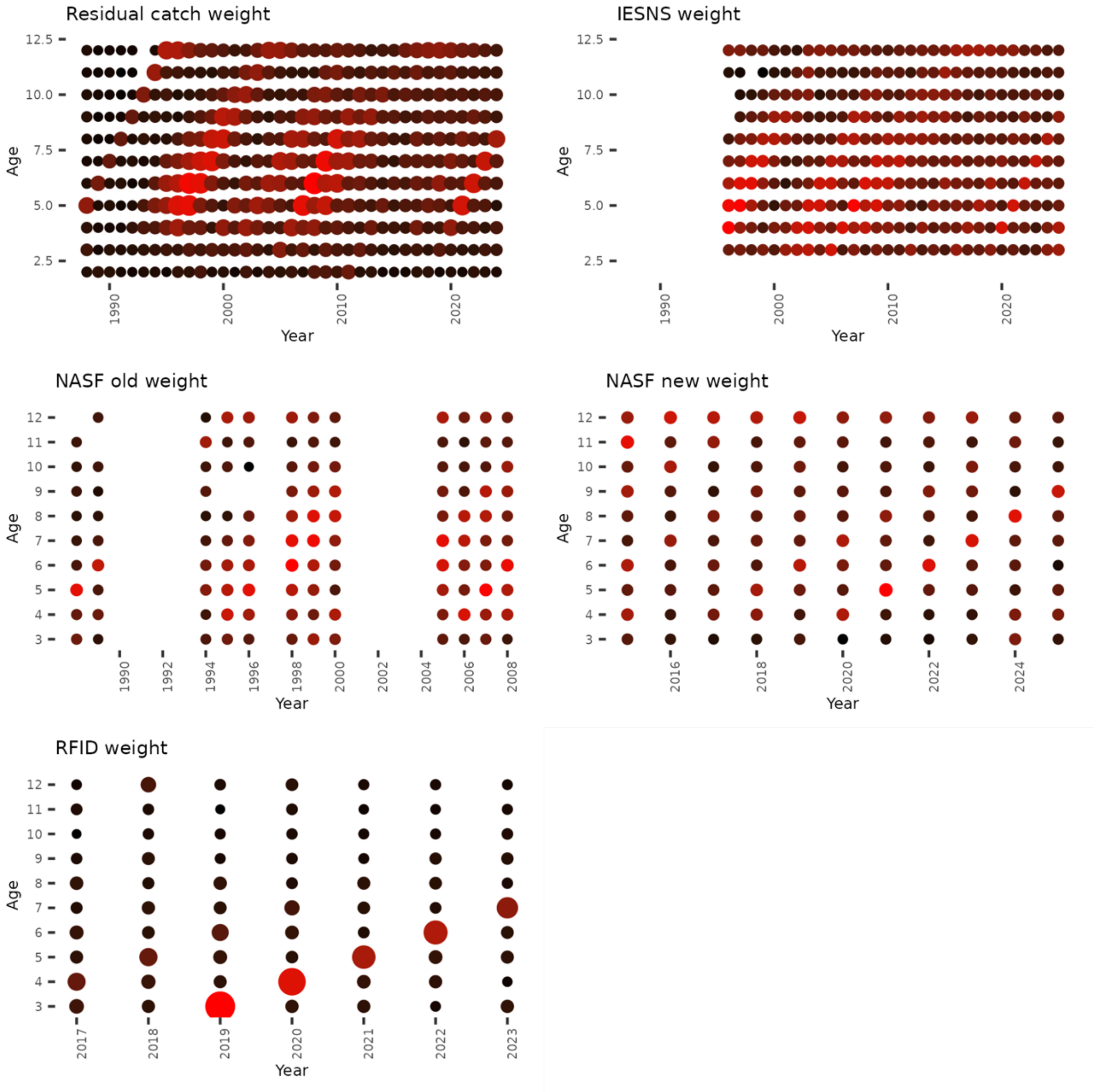

Figure 4.5.1.3. Norwegian spring spawning herring. External data weights used in the final SAM model fit.

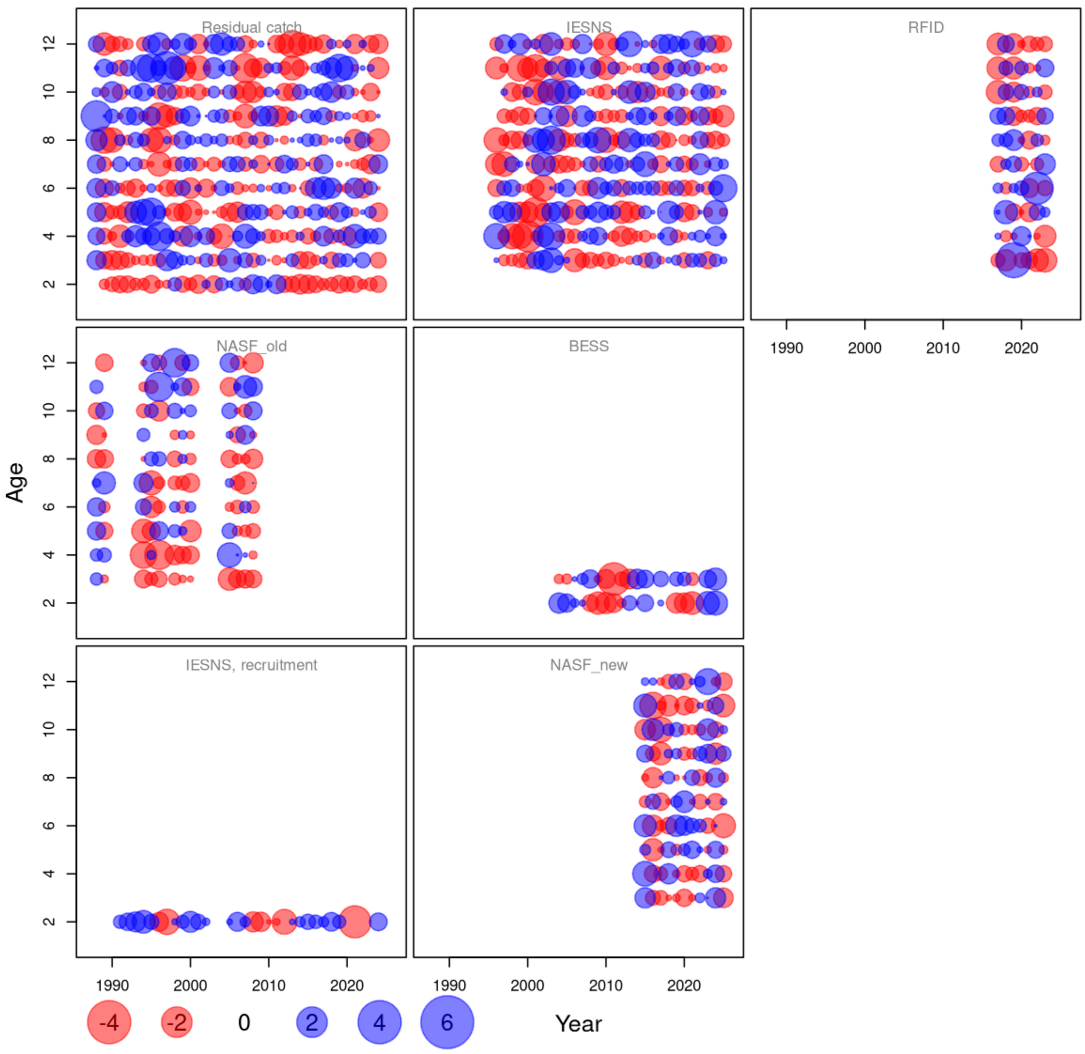

Figure 4.5.1.4. Norwegian spring spawning herring. Standardized residuals of the data input in the final SAM model fit for the data

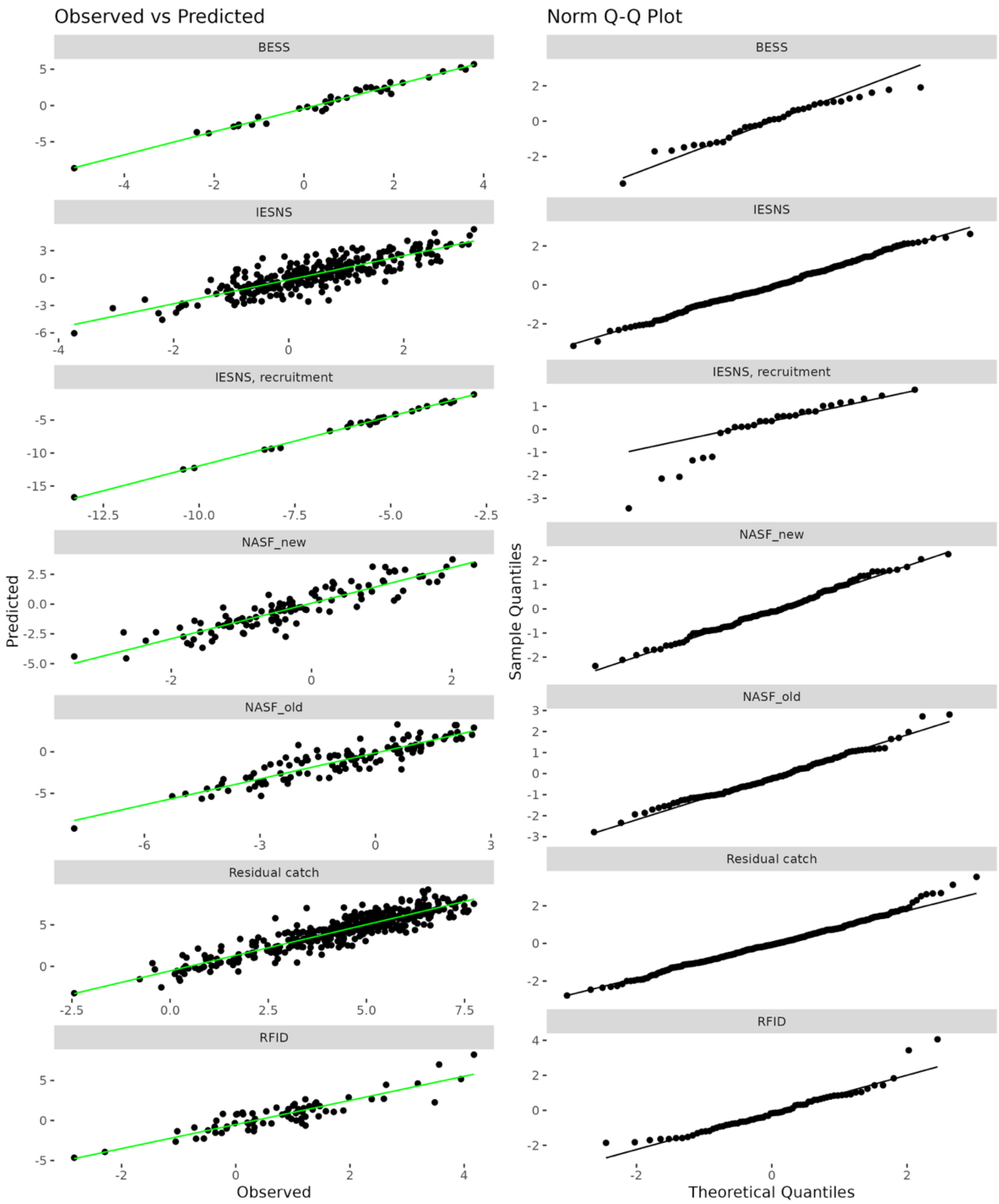

Figure 4.5.1.5. Norwegian spring spawning herring. Observed vs. predicted values (left column) and qq-plot based on residuals (right column) based on the final SAM model fit.

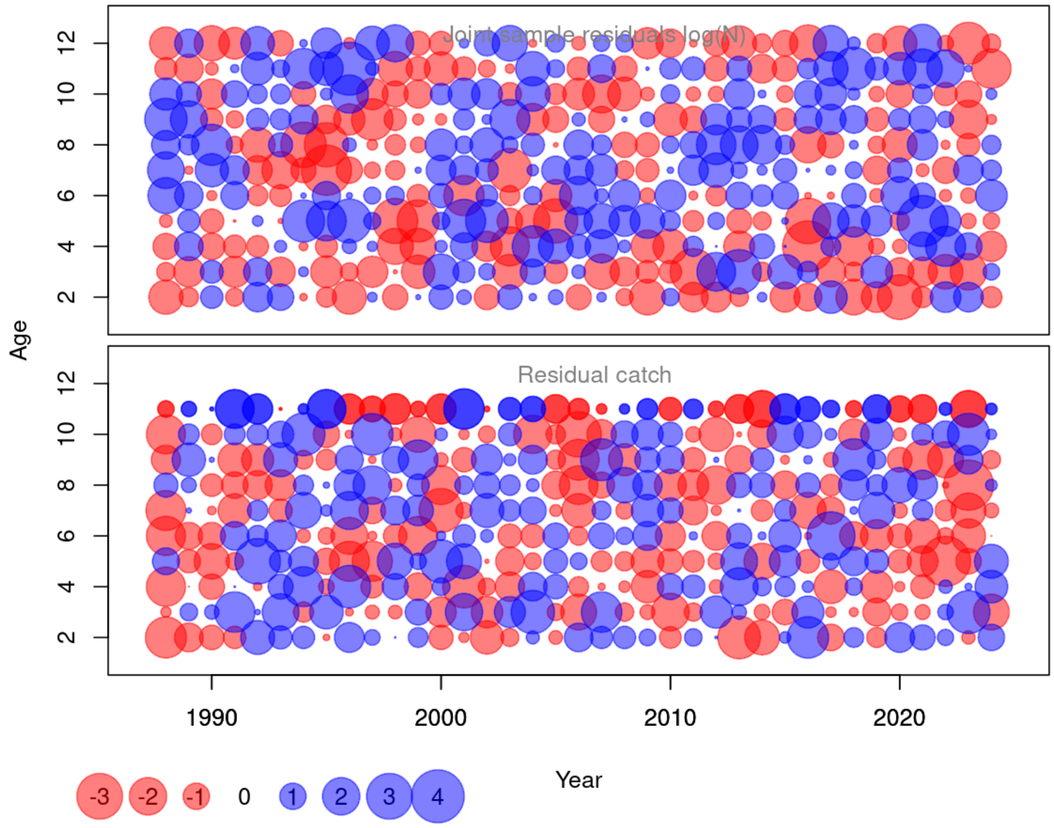

Figure 4.5.1.6. Norwegian spring spawning serring. Process residual for the final model is shown with log(N) in the upper panel and residual catch in the lower panel.

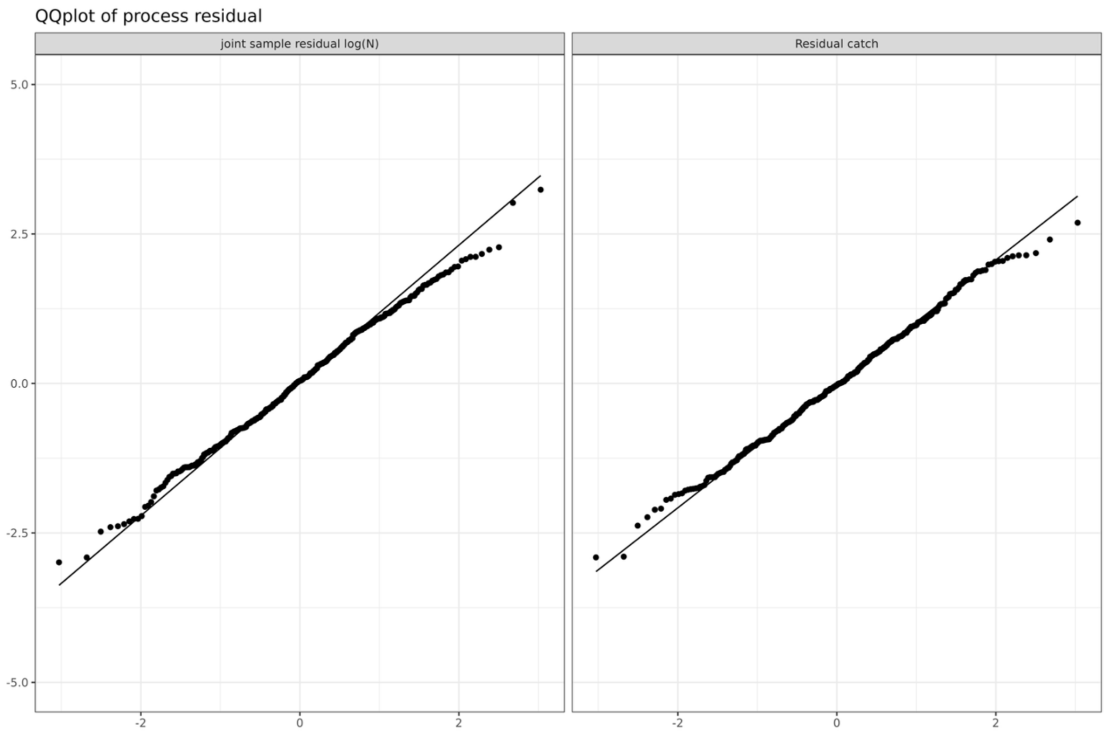

Figure 4.5.1.7. Norwegian spring spawning erring. The corresponding QQ-plot for the process residual in figure 4.5.1.6.

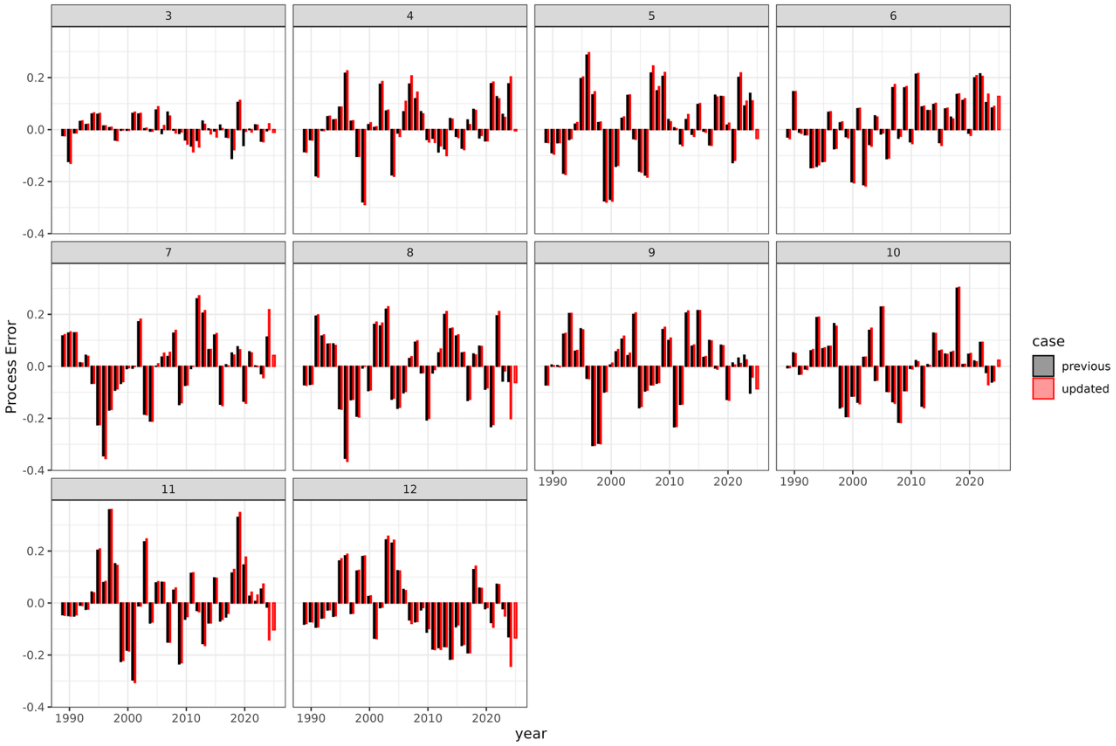

Figure 4.5.1.8. Norwegian spring spawning herring. Comparison between the process error from the 2025 assessment and the 2024 benchmarked assessment.

Figure 4.5.1.9. Norwegian spring spawning herring. Retrospective SAM model fits of SSB and weighted average of fishing mortality ages 5-12 for the years 2019-2024. Mohn's rho values are shown in the figures title. The assessment output is indicated with a black line, and 95% confidence interval with the grey shaded area.

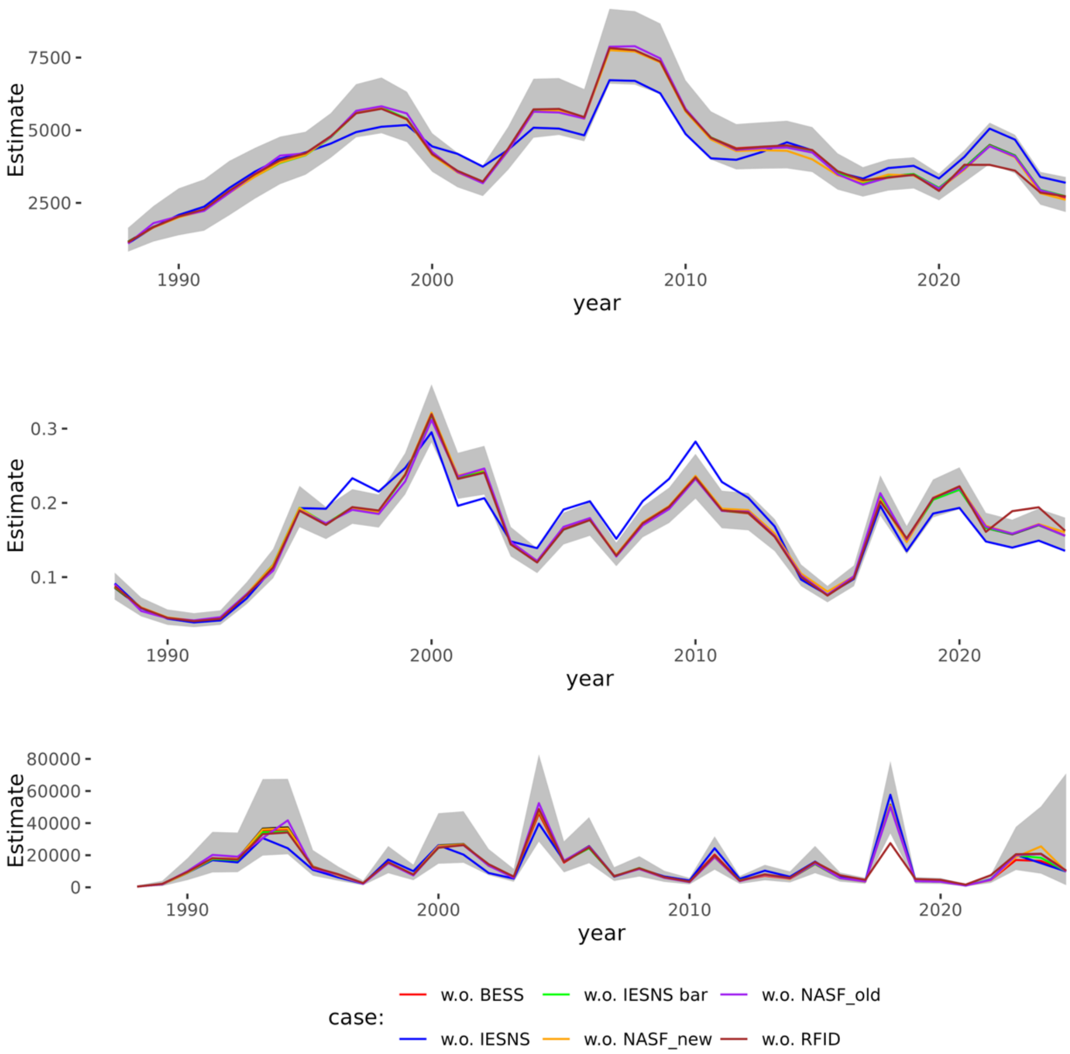

Figure 4.5.1.10. Norwegian spring-spawning herring. Alternative runs show the effect of leaving one fleet out. The assessment output is indicated with a black line, and 95% confidence interval with the grey shaded area.

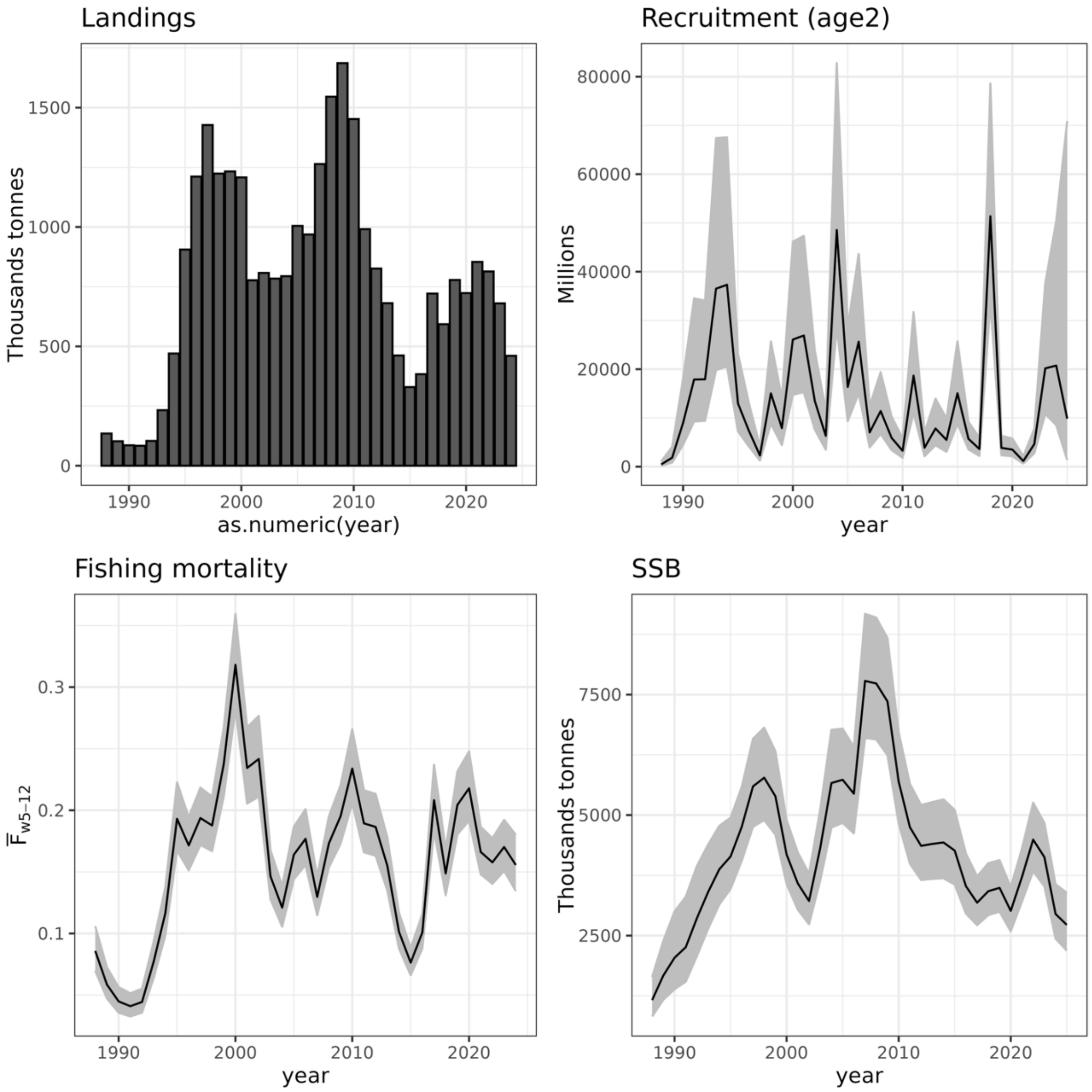

Figure 4.5.1.11. Norwegian spring-spawning herring. Total observed landings 1988-2024, estimated recruitment, weighted average of fishing mortality (ages 5-12+) and spawning-stock biomass for the years 1988–2025 based on the final SAM model fit.

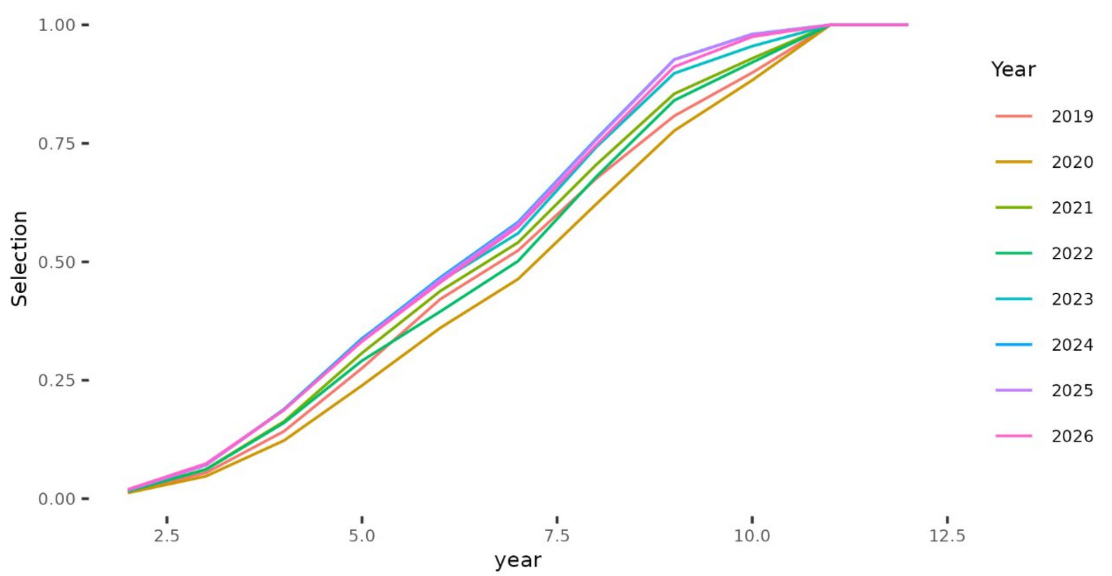

Figure 4.8.1.1. Norwegian spring-spawning herring. SAM estimated selection pattern; selected years (estimates for 2019–2024 and predictions for 2025-2026) are shown in colours as indicated in the legend.

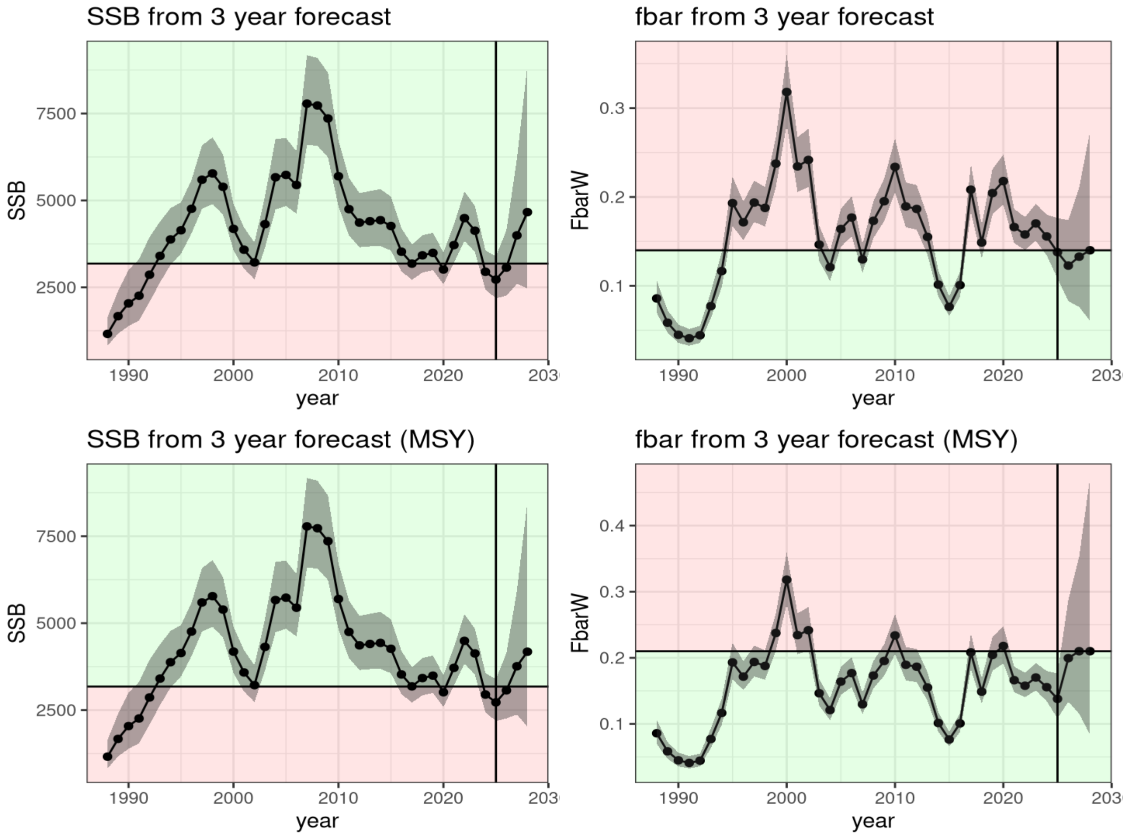

Figure 4.8.1.2 Norwegian spring-spawning herring. 3 years predictions on SSB (to the left) and weighted F (to the right). Upper panels represent the scenario when following the management plan (red field indicates SSB<Bpa or F>Fmgt). Lower panels represent when following the MSY approach (red field indicates SSB<Bpa or F>Fmsy)

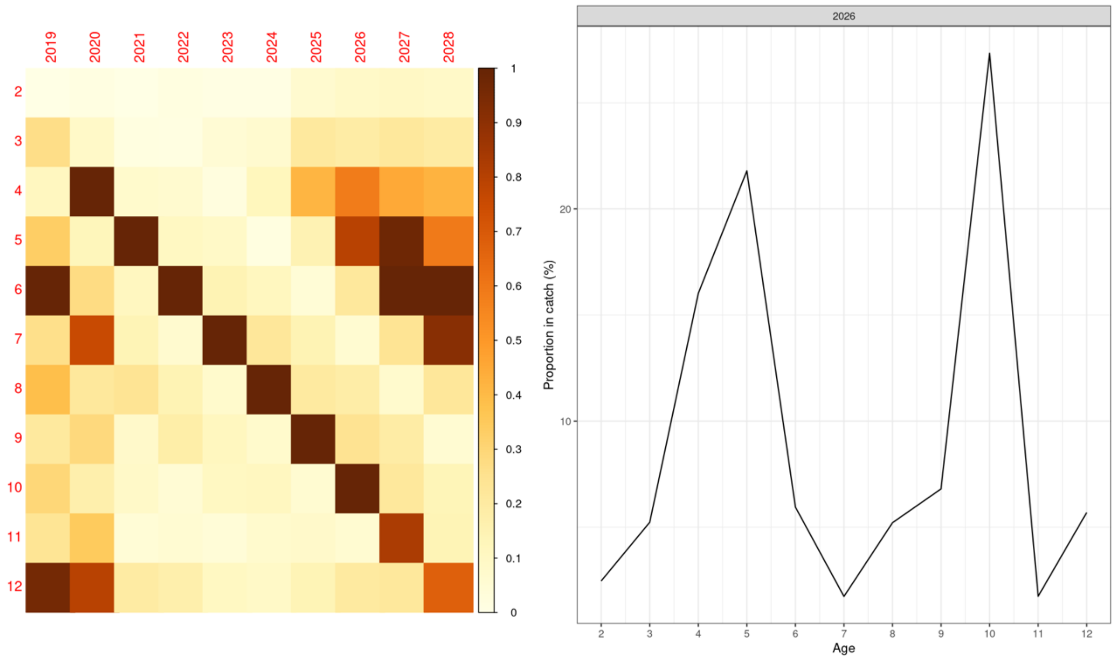

Figure 4.8.1.3 Norwegian spring-spawning herring. The observed and predicted catch at age for the year 2019 to 2028 (left). Colours are scaled to the maximum catch withing the year. To the right, the predicted catch at age distribution in 2026.

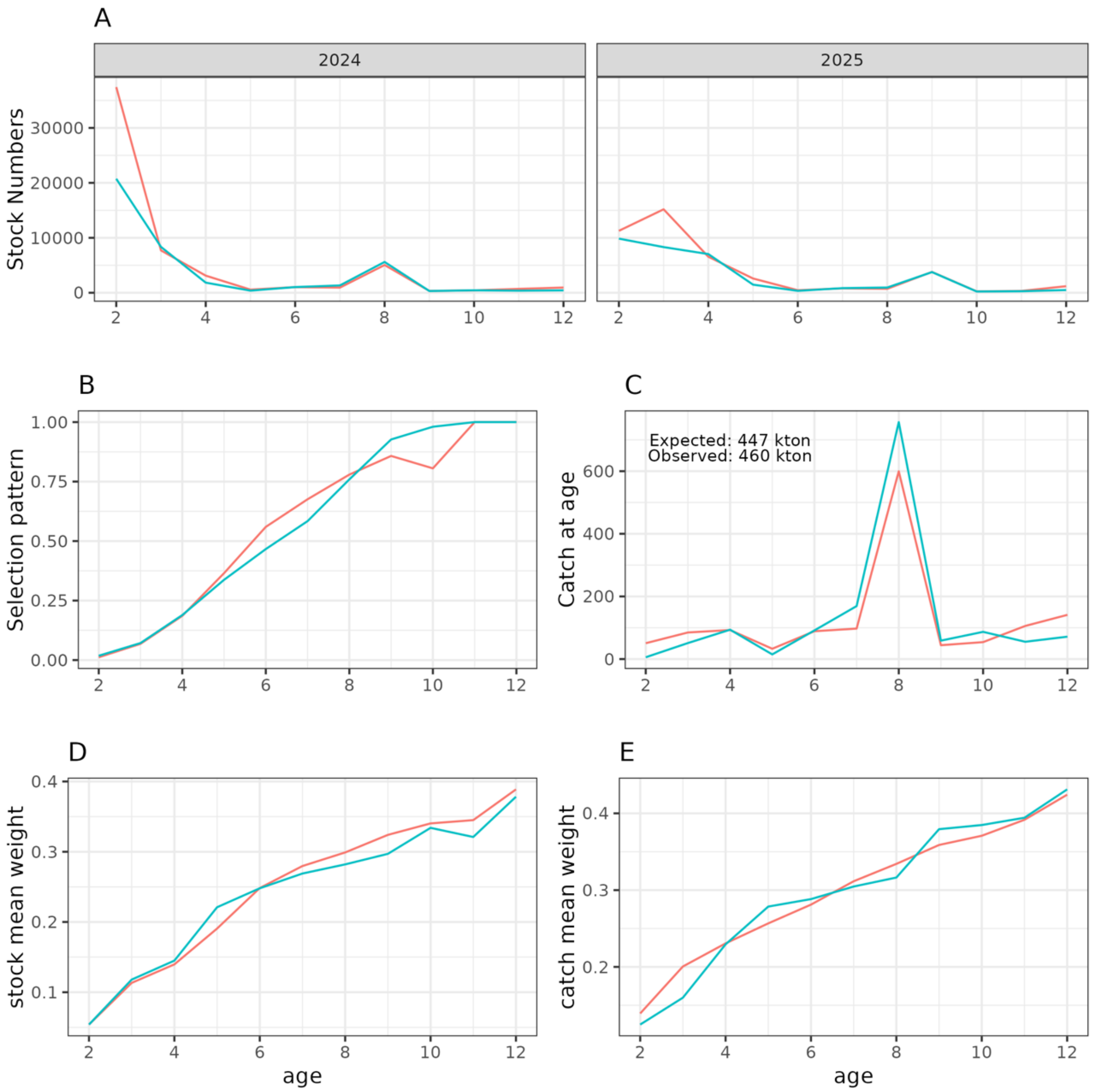

Figure 4.8.3.1. Norwegian spring-spawning herring. Comparison between the initial values in the 2024 forecast (red lines) and updated values in the 2025 assessment (blue lines). Panel A show the stock numbers in 2024 and 2025. Panel B show the exploitation pattern, C is the catch-at-age in 2024, D is the stock mean weight, and E is the catch mean weight.

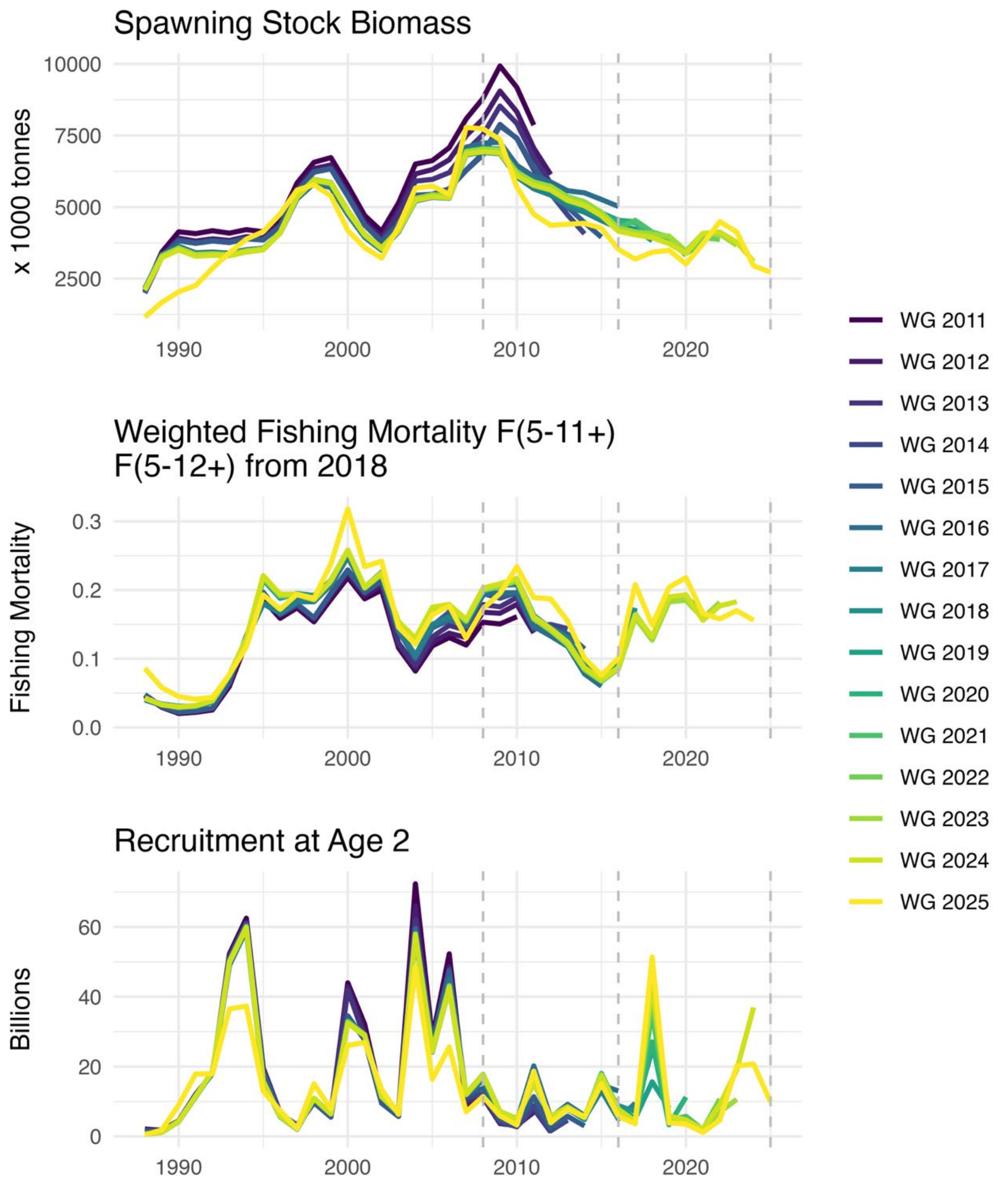

Figure 4.9.1. Norwegian spring spawning herring. Comparisons of spawning stock; weighted fishing mortality F (5-11/5-12+); and recruitment at age 2 with previous assessments. In 2016 the proportion mature in the years 2006-2011 was changed; recruitment age changed from 0 to 2 and fishing mortality is calculated over ages 5 to 11. In 2018 (WKNSSHREF) the age range for the fishing mortality changed to ages 5 to 12+. The vertical dotted lines indicate the benchmark years 2008 and 2016.

4.17 Tables

Table 4.4.1.1 Total landings (ICES estimate) of Norwegian spring-spawning herring (tons) since 1972. Data provided by Working Group members.

Year	Norway	USSR/ Russia	Denmark	Faroes	Iceland	Ireland	Netherlands	Greenland	UK	Germany	France	Poland	Sweden	Total
1972	13161	-	-	-	-	-	-	-	-	-	-	-	-	13161
1973	7017	-	-	-	-	-	-	-	-	-	-	-	-	7017
1974	7619	-	-	-	-	-	-	-	-	-	-	-	-	7619
1975	13713	-	-	-	-	-	-	-	-	-	-	-	-	13713
1976	10436	-	-	-	-	-	-	-	-	-	-	-	-	10436
1977	22706	-	-	-	-	-	-	-	-	-	-	-	-	22706
1978	19824	-	-	-	-	-	-	-	-	-	-	-	-	19824
1979	12864	-	-	-	-	-	-	-	-	-	-	-	-	12864
1980	18577	-	-	-	-	-	-	-	-	-	-	-	-	18577
1981	13736	-	-	-	-	-	-	-	-	-	-	-	-	13736
1982	16655	-	-	-	-	-	-	-	-	-	-	-	-	16655
1983	23054	-	-	-	-	-	-	-	-	-	-	-	-	23054
1984	53532	-	-	-	-	-	-	-	-	-	-	-	-	53532
1985	167272	2600	-	-	-	-	-	-	-	-	-	-	-	169872
1986	199256	26000	-	-	-	-	-	-	-	-	-	-	-	225256

Year	Norway	USSR/ Russia	Denmark	Faroes	Iceland	Ireland	Netherlands	Greenland	UK	Germany	France	Poland	Sweden	Total
1987	108417	18889	-	-	-	-	-	-	-	-	-	-	-	127306
1988	115076	20225	-	-	-	-	-	-	-	-	-	-	-	135301
1989	88707	15123	-	-	-	-	-	-	-	-	-	-	-	103830
1990	74604	11807	-	-	-	-	-	-	-	-	-	-	-	86411
1991	73683	11000	-	-	-	-	-	-	-	-	-	-	-	84683
1992	91111	13337	-	-	-	-	-	-	-	-	-	-	-	104448
1993	199771	32645	-	-	-	-	-	-	-	-	-	-	-	232457
1994	380771	74400	-	2911	21146	-	-	-	-	-	-	-	-	479228
1995	529838	101987	30577	57084	174109	-	7969	2500	881	556	-	-	-	905501
1996	699161	119290	60681	52788	164957	19541	19664	-	46131	11978	-	-	22424	1220283
1997	860963	168900	44292	59987	220154	11179	8694	-	25149	6190	1500	-	19499	1426507
1998	743925	124049	35519	68136	197789	2437	12827	-	15971	7003	605	-	14863	1223131
1999	740640	157328	37010	55527	203381	2412	5871	-	19207	-	-	-	14057	1235433
2000	713500	163261	34968	68625	186035	8939	-	-	14096	3298	-	-	14749	1207201
2001	495036	109054	24038	34170	77693	6070	6439	-	12230	1588	-	-	9818	766136
2002	487233	113763	18998	32302	127197	1699	9392	-	3482	3017	-	1226	9486	807795
2003*	477573	122846	14144	27943	117910	1400	8678	-	9214	3371	-	-	6431	789510
2004	477076	115876	23111	42771	102787	11	17369	-	1869	4810	400	-	7986	794066

Year	Norway	USSR/ Russia	Denmark	Faroes	Iceland	Ireland	Netherlands	Greenland	UK	Germany	France	Poland	Sweden	Total
2005	580804	132099	28368	65071	156467	-	21517	-	-	17676	0	561	680	1003243
2006	567237	120836	18449	63137	157474	4693	11625	-	12523	9958	80	-	2946	968958
2007	779089	162434	22911	64251	173621	6411	29764	4897	13244	6038	0	4333	0	1266993
2008	961603	193119	31128	74261	217602	7903	28155	3810	19737	8338	0	0	0	1545656
2009	1016675	210105	32320	85098	265479	10014	24021	3730	25477	14452	0	0	0	1687371
2010	871113	199472	26792	80281	205864	8061	26695	3453	24151	11133	0	0	0	1457015
2011	572641	144428	26740	53271	151074	5727	8348	3426	14045	13296	0	0	0	992997
2012	491005	118595	21754	36190	120956	4813	6237	1490	12310	11945	0	0	705	826000
2013	359458	78521	17160	105038	90729	3815	5626	11788	8342	4244	0	0	23	684743
2014	263253	60292	12513	38529	58828	706	9175	13108	4233	669	0	0	0	461306
2015	176321	45853	9105	33031	42625	1400	5255	12434	55	2660	0	0	0	328740
2016	197501	50455	10384	44727	50418	2048	3519	17508	4031	2582	0	0	0	383174
2017	389383	91118	19037	98170	90400	3495	6679	12569	4358	5201	0	1	1155	721566
2018	332028	64185	17052	82062	83393	2428	4290	2465	2582	1989	0	0	425	592899
2019	430507	84364	21207	113945	108045	2775	5111	3190	1801	4188	0	1327	705	777165
2020	409436	74936	16523	103029	98173	2704	5060	3546	143	2969	0	1352	3065	720937
2021**	489632	92841	15854	114291	114299	1793	10939	6456	0	3365	0	1242	1101	851813
2022	445938	85870	15014	122083	112739	3209	3783	6818	9620	5600	0	0	3160	813834

Year	Norway	USSR/ Russia	Denmark	Faroes	Iceland	Ireland	Netherlands	Greenland	UK	Germany	France	Poland	Sweden	Total
2023	389306	74145	10237	90371	92197	1016	6119	6647	7607	2158	0	0	750	680552
2024	259002	49790	7422	58584	62967	2141	3097	5662	5843	2142	0	0	3575	460226

Table 4.4.1.2 Norwegian spring-spawning herring. Sampling coverage by year.

Year	TOTAL CATCH	% catch covered by sampling programme	No. samples	No. Measured	No. Aged
2000	1207201	86	389	55956	10901
2001	766136	86	442	70005	11234
2002	807795	88	184	39332	5405
2003	789510	71	380	34711	11352
2004	794066	79	503	48784	13169
2005	1003243	86	459	49273	14112
2006	968958	93	631	94574	9862
2007	1266993	94	476	56383	14661
2008	1545656	94	722	81609	31438
2009	1686928	94	663	65536	12265
2010	1457015	91	1258	124071	12377
2011	992.997	95	766	79360	10744
2012	825.999	93	649	59327	14768
2013	684.743	91	402	33169	11431
2014	461.306	89	229	18370	5813
2015	328.739	92	177	25156	5039
2016	383.174	91	203	39120	5892
2017	721566	95	335	31755	7241
2018	592899	97	253	22106	6047
2019	777165	97	361	29856	7421
2020	720937	98	232	34232	6742
2021	851813	88	207	18830	5975
2022	813834	97	299	23100	5844
2023	680552	98	312	31096	6342
2024	460226	97	209	18388	4407

Table 4.4.1.3 Norwegian spring-spawning herring. Sampling coverage by country in 2024.

COUNTRY	OFFICIAL CATCH	% catch covered by sampling programme	NO. SAMPLES	NO. MEAS-URED	NO. AGED
Denmark	7422	100	7	356	163
Faroes	58584	98	15	456	456
Germany	2142	100	18	4869	250
Greenland	5662	0	0	0	0
Iceland	62967	100	74	2586	1582
Ireland	2141	100	4	269	172
Netherlands	3097	0	0	0	0
Norway	259002	100	40	1672	1159
Russia	49790	99	48	7638	501
Sweden	3575	0	0	0	0
United King-dom	5843	100	3	542	124
Total	460226	97	209	18388	4407

Table 4.4.1.4 Norwegian spring-spawning herring. Sampling coverage by ICES Division in 2024.

Area	Official Catch	No Sam-ples	No Aged	No Meas-ured	No Aged/ 1000 tonnes	No Measured/ 1000 tonnes
1.b	2	0	0	0	0	0
2.a	372205	131	2685	15726	7	42
5.a	87218	78	1722	2662	20	31
14.a	801	0	0	0	0	0
Total	460226	209	4407	18388	10	40

Table 4.4.1.5 Norwegian spring-spawning herring. Catch data provided by working group members and samples allocated to unsampled catches in SALLOC for 2024.

Line	Country	Quarter	Div.	Catch (T)	Samples allocated (line)
1	Norway	1	I	2	2
2	Norway	1	IIa	92452	
3	Norway	2	IIa	109	2
4	Norway	3	IIa	1088	11,16
5	Norway	4	IIa	165352	

6	Faroes	1	IIa	966	2,14,17,22
7	Faroes	3	IIa	292	11,16
8	Faroes	4	IIa	31278	
9	Faroes	4	Va	25967	
10	Faroes	3	XIVa	81	11,12,16
11	Iceland	3	IIa	1716	
12	Iceland	3	Va	47849	
13	Iceland	4	Va	13402	
14	Denmark	1	IIa	4604	
15	Denmark	4	IIa	2818	
16	Germany	3	Iia	2142	
17	Ireland	1	IIa	2141	
18	Greenland	2	IIa	105	11,16
19	Greenland	3	IIa	17	11,16
20	Greenland	4	IIa	4820	5,8,15
21	Sweden	1	IIa	3575	2,14,17,22
22	United Kingdom	1	IIa	5843	
23	Russia	1	IIa	389	2,14,17,22
24	Russia	3	IIa	11244	
25	Russia	4	IIa	38157	
26	Greenland	2	XIVa	720	11
27	Netherlands	4	IIa	3097	5,8,15

Table 4.4.3.1. Norwegian spring spawning herring. Catch in numbers (thousands).

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1950	5112600	2000000	600000	276200	184800	185500	547000	628600	79500	88600	109500	86900	194500	368300	66400	344300
1951	1635500	7607700	400000	6600	383800	172400	164400	515600	602000	77100	82700	103100	107600	253500	348000	352500
1952	13721600	9149700	1232900	39300	60500	602300	136300	204500	380200	377900	79200	85700	107700	106800	186500	564400
1953	5697200	5055000	581300	740100	46600	100900	355600	81900	110900	314100	394900	61700	91200	94100	98800	730400
1954	10675990	7071090	855400	266300	1435500	142900	236000	490300	128100	199800	440400	460700	88400	100600	133000	803200
1955	5175600	2871100	510100	93000	276400	2045100	114300	189600	274700	85300	193400	295600	203200	58700	84600	580600
1956	5363900	2023700	627100	116500	251600	314200	2555100	110000	203900	264200	130700	198300	272800	163300	63000	565100
1957	5001900	3290800	219500	23300	373300	153800	228500	1985300	72000	127300	182500	88400	121200	149300	131600	281400
1958	9666990	2798100	666400	17500	17900	110900	89300	194400	973500	70700	123000	200900	98700	77400	70900	255600
1959	17896280	198530	325500	15100	26800	25900	146600	114800	240700	1103800	88600	124300	198000	88500	77400	235900
1960	12884310	13580790	392500	121700	18200	28100	24400	96200	73300	203900	1163000	85200	129700	153500	56700	168900
1961	6207500	16075600	2884800	31200	8100	4100	15000	19400	61600	49200	136100	728100	49700	45000	63000	60100
1962	3693200	4081100	1041300	1843800	8000	3100	7200	20200	11900	59100	52600	117000	813500	44200	54700	152300
1963	4807000	2119200	2045300	760400	835800	5300	1800	3600	18300	9300	107700	92500	174100	923700	79600	185300
1964	3613000	2728300	220300	114600	399000	2045800	13700	1500	3000	24900	29300	95600	82400	153000	772800	336800
1965	2303000	3780900	2853600	89900	256200	571100	2199700	19500	14900	7400	19100	40000	100500	107800	138700	883100

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1966	3926500	662800	1678000	2048700	26900	466600	1306000	2884500	37900	14300	17400	26200	11000	69100	72100	556700
1967	426800	9877100	70400	1392300	3254000	26600	421300	1132000	1720800	8900	5700	3500	8500	8900	17500	104400
1968	1783600	437000	388300	99100	1880500	1387400	14220	94000	134100	345100	2000	1100	830	2500	2600	17000
1969	561200	507100	141900	188200	800	8800	4700	700	11700	33600	36000	300	200	200	200	2400
1970	119300	529400	33200	6300	18600	600	3300	3300	1000	13400	26200	28100	300	100	200	2000
1971	30500	42900	85100	1820	1020	1240	360	1110	1130	360	4410	6910	5450	0	20	120
1972	347100	41000	20400	35376	3476	3583	2481	694	1486	198	0	494	593	593	0	0
1973	29300	3500	1700	2389	25200	651	1506	278	178	0	0	0	0	0	180	0
1974	65900	7800	3900	100	241	24505	257	196	0	0	0	0	0	0	0	0
1975	30600	3600	1800	3268	132	910	30667	5	2	0	0	0	0	0	0	0
1976	.20100	2400	1200	23248	5436	0	0	13086	0	0	0	0	0	0	0	0
1977	43000	6200	3100	22103	23595	336	0	419	10766	0	0	0	0	0	0	0
1978	20100	2400	1200	3019	12164	20315	870	0	620	5027	0	0	0	0	0	0
1979	32600	3800	1900	6352	1866	6865	11216	326	0	0	2534	0	0	0	0	0
1980	6900	800	400	6407	5814	2278	8165	15838	441	8	0	2688	0	0	0	0
1981	8300	1100	11900	4166	4591	8596	2200	4512	8280	345	103	114	964	0	0	0
1982	22600	1100	200	13817	7892	4507	6258	1960	5075	6047	121	37	37	121	0	0

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1983	127000	4680	1670	3183	21191	9521	6181	6823	1293	4598	7329	143	40	143	860	0
1984	33860	1700	2490	4483	5388	61543	18202	12638	15608	7215	16338	6478	0	0	0	1650
1985	28570	13150	207220	21500	15500	16500	130000	59000	55000	63000	10000	31000	50000	0	0	2640
1986	13810	1380	3090	539785	17594	14500	15500	105000	75000	42000	77000	19469	66000	80000	0	2470
1987	13850	6330	35770	19776	501393	18672	3502	7058	28000	12000	9500	4500	7834	6500	7000	450
1988	15490	2790	9110	62923	25059	550367	9452	3679	5964	14583	8872	2818	3356	2682	1560	540
1989	7120	1930	25200	2890	3623	5650	324290	3469	800	679	3297	1375	679	321	260	0
1990	1020	400	15540	18633	2658	11875	10854	226280	1289	1519	2036	2415	646	179	590	480
1991	100	3370	3330	8438	2780	1410	14698	8867	218851	2499	461	87	690	103	260	540
1992	1630	150	1340	12586	33100	4980	1193	11981	5748	225677	2483	639	247	1236	0	0
1993	6570	130	7240	28408	106866	87269	8625	3648	29603	18631	410110	0	0	0	0	0
1994	430	20	8100	32500	110090	363920	164800	15580	8140	37330	35660	645410	2830	460	100	2070
1995	0	0	1130	57590	346460	622810	637840	231090	15510	15850	69750	83740	911880	4070	250	450
1996	0	0	30140	34360	713620	1571000	940580	406280	103410	5680	7370	66090	17570	836550	0	0
1997	0	0	21820	130450	270950	1795780	1993620	761210	326490	60870	20020	32400	90520	19120	370330	300
1998	0	0	82891	70323	242365	368310	1760319	1263750	381482	129971	42502	25343	3478	112604	5633	108514
1999	0	0	5029	137626	35820	134813	429433	1604959	1164263	291394	106005	14524	40040	7202	88598	63983

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
2000	0	0	14395	84016	560379	34933	110719	404460	1299253	1045001	216980	71589	16260	22701	23321	71811
2001	0	0	2076	102293	160678	426822	38749	95991	296460	839136	507106	73673	23722	3505	3356	22164
2002	0	0	62031	198360	643161	255516	326495	29843	93530	264675	663059	339326	52922	12437	7000	10087
2003	0	3461	4524	75243	323958	730468	175878	167776	22866	74494	217108	567253	219097	38555	8111	6192
2004	125	1846	43800	24299	92300	429510	714433	111022	137940	26656	52467	169196	401564	210547	28028	11883
2005	0	442	20411	447788	94206	170547	643600	930309	121856	123291	37967	65289	139331	344822	126879	15697
2006	0	1968	45438	75824	729898	82107	171370	726041	772217	88701	77115	30339	57882	133665	142240	49128
2007	0	4475	8450	224636	366983	1804495	152916	242923	728836	511664	47215	25384	15316	24488	64755	58465
2008	0	39898	123949	36630	550274	670681	2295912	199592	256132	586583	369620	29633	36025	23775	25195	63176
2009	0	3468	113424	192641	149075	1193781	914748	1929631	142931	262037	423972	238174	45519	9337	10153	70538
2010	0	75981	61673	101948	209295	189784	1064866	711951	1421939	175010	180164	340781	179039	12558	11602	49773
2011	0	126972	249809	61706	104634	234330	210165	755382	543212	642787	90515	117230	136509	45082	6628	11638
2012	0	2680	13083	211630	49999	119627	281908	263330	747839	314694	357902	53109	44982	64273	12420	3604
2013	0	1	20715	60364	276901	71287	112558	283658	242243	591912	169525	145318	24936	10614	9725	2299
2014	0	265	1441	28301	57838	257529	50424	71721	194814	147083	381317	83050	57315	12746	1809	7501
2015	0	647	3244	16139	55749	52369	152347	34046	65728	156075	103393	201141	24310	49373	3369	6397
2016	0	197	2351	45483	43416	112147	85937	164454	52267	73576	174655	96476	179051	38546	32880	8379

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
2017	0	618	16390	64275	305483	114976	248192	162566	289931	98836	133145	276874	107473	220368	22357	49442
2018	0	1261	22414	25638	59802	264182	150759	179628	109121	180968	85954	99061	212052	113841	136096	39249
2019	0	769	2205	148669	64237	185336	557804	146597	217346	119855	167569	133910	104730	220400	91773	121229
2020	0	1299	8252	49455	544337	70633	150932	412498	118081	156696	94975	188852	100408	96557	132619	103350
2021	204	3644	2368	25015	110359	1432164	162903	203923	345729	117846	127846	73558	68834	60477	40165	113929
2022	0	8136	26087	22384	91375	148378	1365208	97514	203324	248904	72439	79165	63398	73962	38289	63347
2023	227	2390	13211	65245	27707	114076	185653	1226711	95835	145315	136172	53353	41885	29823	23431	39914
2024	0	5566	5781	51156	93803	14890	91503	169131	756703	58913	86923	55293	25782	17005	9450	19245

Table 4.4.4.1. Norwegian spring spawning herring. Weight at age in the catch (kg).

	age															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1950	0.007	0.025	0.058	0.110	0.188	0.211	0.234	0.253	0.266	0.280	0.294	0.303	0.312	0.32	0.323	0.334
1951	0.009	0.029	0.068	0.130	0.222	0.249	0.276	0.298	0.314	0.330	0.346	0.357	0.368	0.377	0.381	0.394
1952	0.008	0.026	0.061	0.115	0.197	0.221	0.245	0.265	0.279	0.293	0.308	0.317	0.327	0.335	0.339	0.349
1953	0.008	0.027	0.063	0.120	0.205	0.230	0.255	0.275	0.290	0.305	0.320	0.330	0.34	0.347	0.351	0.363
1954	0.008	0.026	0.062	0.117	0.201	0.225	0.250	0.269	0.284	0.299	0.313	0.323	0.333	0.341	0.345	0.356

	age															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1955	0.008	0.027	0.063	0.119	0.204	0.229	0.254	0.274	0.289	0.304	0.318	0.328	0.338	0.346	0.350	0.362
1956	0.008	0.028	0.066	0.126	0.215	0.241	0.268	0.289	0.304	0.320	0.336	0.346	0.357	0.365	0.369	0.382
1957	0.008	0.028	0.066	0.127	0.216	0.243	0.269	0.290	0.306	0.322	0.338	0.348	0.359	0.367	0.371	0.384
1958	0.009	0.030	0.070	0.133	0.227	0.255	0.283	0.305	0.321	0.338	0.355	0.366	0.377	0.386	0.390	0.403
1959	0.009	0.030	0.071	0.135	0.231	0.259	0.287	0.310	0.327	0.344	0.360	0.372	0.383	0.392	0.397	0.409
1960	0.006	0.011	0.074	0.119	0.188	0.277	0.337	0.318	0.363	0.379	0.360	0.420	0.411	0.439	0.450	0.447
1961	0.006	0.010	0.045	0.087	0.159	0.276	0.322	0.372	0.363	0.393	0.407	0.397	0.422	0.447	0.465	0.452
1962	0.009	0.023	0.055	0.085	0.148	0.288	0.333	0.360	0.352	0.350	0.374	0.384	0.374	0.394	0.399	0.414
1963	0.008	0.026	0.047	0.098	0.171	0.275	0.268	0.323	0.329	0.336	0.341	0.358	0.385	0.353	0.381	0.386
1964	0.009	0.024	0.059	0.139	0.219	0.239	0.298	0.295	0.339	0.350	0.358	0.351	0.367	0.375	0.372	0.433
1965	0.009	0.016	0.048	0.089	0.217	0.234	0.262	0.331	0.360	0.367	0.386	0.395	0.393	0.404	0.401	0.431
1966	0.008	0.017	0.040	0.063	0.246	0.260	0.265	0.301	0.410	0.425	0.456	0.460	0.467	0.446	0.459	0.472
1967	0.009	0.015	0.036	0.066	0.093	0.305	0.305	0.310	0.333	0.359	0.413	0.446	0.401	0.408	0.439	0.430
1968	0.010	0.027	0.049	0.075	0.108	0.158	0.375	0.383	0.364	0.382	0.441	0.410		0.517	0.491	0.485
1969	0.009	0.021	0.047	0.072		0.152	0.296		0.329	0.329	0.341					0.429
1970	0.008	0.058	0.085	0.105	0.171		0.216	0.277	0.298	0.304	0.305	0.309				0.376
1971	0.011	0.053	0.121	0.177	0.216	0.250		0.305	0.333		0.366	0.377	0.388			

	age															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1972	0.011	0.029	0.062	0.103	0.154	0.215	0.258		0.322							
1973	0.006	0.053	0.106	0.161	0.213		0.255									
1974	0.006	0.055	0.117			0.249										
1975	0.009	0.079	0.169	0.241			0.381									
1976	0.007	0.062	0.132	0.189	0.250			0.323								
1977	0.011	0.091	0.193	0.316	0.350				0.511							
1978	0.012	0.100	0.210	0.274	0.424	0.454				0.613						
1979	0.010	0.088	0.181	0.293	0.359	0.416	0.436				0.553					
1980	0.012			0.266	0.399	0.449	0.460	0.485				0.608				
1981	0.010	0.082	0.163	0.196	0.291	0.341	0.368	0.380	0.397							
1982	0.010	0.087	0.159	0.256	0.312	0.378	0.415	0.435	0.449	0.448						
1983	0.011	0.090	0.165	0.217	0.265	0.337	0.378	0.410	0.426	0.435	0.444					
1984	0.009	0.047	0.145	0.218	0.262	0.325	0.346	0.381	0.400	0.413	0.405	0.426				0.415
1985	0.009	0.022	0.022	0.214	0.277	0.295	0.338	0.360	0.381	0.397	0.409	0.417	0.435			0.435
1986	0.007	0.077	0.097	0.055	0.249	0.294	0.312	0.352	0.374	0.398	0.402	0.401	0.410	0.410		0.410
1987	0.010	0.075	0.091	0.124	0.173	0.253	0.232	0.312	0.328	0.349	0.353	0.370	0.385	0.385	0.385	
1988	0.008	0.062	0.075	0.124	0.154	0.194	0.241	0.265	0.304	0.305	0.317	0.308	0.334	0.334	0.334	

Year	age 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1989	0.010	0.060	0.204	0.188	0.264	0.260	0.282	0.306			0.422	0.364				
1990	0.007		0.102	0.230	0.239	0.266	0.305	0.308	0.376	0.407	0.412	0.424				
1991		0.015	0.104	0.208	0.250	0.288	0.312	0.316	0.330	0.344						
1992	0.007		0.103	0.191	0.233	0.304	0.337	0.365	0.361	0.371	0.403			0.404		
1993	0.007		0.106	0.153	0.243	0.282	0.320	0.330	0.365	0.373	0.379					
1994			0.102	0.194	0.239	0.280	0.317	0.328	0.356	0.372	0.390	0.379	0.399	0.403		
1995			0.102	0.153	0.192	0.234	0.283	0.328	0.349	0.356	0.374	0.366	0.393	0.387		
1996			0.136	0.136	0.168	0.206	0.262	0.309	0.337	0.366	0.360	0.361	0.367	0.379		
1997			0.089	0.167	0.184	0.207	0.232	0.277	0.305	0.331	0.328	0.344	0.343	0.397	0.357	
1998			0.111	0.150	0.216	0.221	0.249	0.277	0.316	0.338	0.374	0.372	0.366	0.396	0.377	0.406
1999			0.096	0.173	0.228	0.262	0.274	0.292	0.307	0.335	0.362	0.371	0.399	0.396	0.400	0.404
2000			0.124	0.175	0.222	0.242	0.289	0.303	0.310	0.328	0.349	0.383	0.411	0.410	0.419	0.409
2001			0.105	0.166	0.214	0.252	0.268	0.305	0.308	0.322	0.337	0.363	0.353	0.378	0.400	0.427
2002			0.056	0.128	0.198	0.255	0.281	0.303	0.322	0.323	0.334	0.345	0.369	0.407	0.410	0.435
2003		0.062	0.068	0.169	0.218	0.257	0.288	0.316	0.323	0.348	0.354	0.351	0.363	0.372	0.376	0.429
2004	0.022	0.066	0.143	0.18	0.227	0.26	0.29	0.323	0.355	0.375	0.383	0.399	0.395	0.405	0.429	0.439
2005		0.092	0.106	0.181	0.235	0.266	0.290	0.315	0.344	0.367	0.384	0.372	0.384	0.398	0.402	0.413

	age															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
2006		0.055	0.102	0.171	0.238	0.268	0.292	0.311	0.330	0.365	0.374	0.376	0.388	0.396	0.398	0.407
2007	0.000	0.074	0.137	0.162	0.228	0.271	0.316	0.332	0.342	0.358	0.361	0.381	0.390	0.400	0.405	0.399
2008	0.000	0.026	0.106	0.145	0.209	0.254	0.296	0.318	0.341	0.353	0.363	0.367	0.395	0.396	0.386	0.413
2009		0.040	0.156	0.184	0.220	0.251	0.291	0.311	0.338	0.347	0.363	0.375	0.382	0.375	0.375	0.387
2010		0.059	0.107	0.177	0.218	0.261	0.279	0.311	0.325	0.343	0.362	0.370	0.388	0.391	0.376	0.441
2011		0.011	0.098	0.200	0.257	0.273	0.300	0.316	0.340	0.348	0.365	0.371	0.387	0.374	0.403	0.401
2012		0.034	0.126	0.211	0.272	0.301	0.308	0.331	0.335	0.351	0.354	0.370	0.389	0.389	0.382	0.388
2013		0.048	0.163	0.237	0.276	0.300	0.331	0.339	0.351	0.357	0.370	0.373	0.394	0.391	0.389	0.367
2014		0.057	0.179	0.233	0.271	0.293	0.322	0.342	0.353	0.367	0.365	0.374	0.375	0.378	0.418	0.371
2015		0.059	0.146	0.203	0.272	0.323	0.331	0.358	0.370	0.372	0.383	0.382	0.392	0.386	0.383	0.391
2016		0.048	0.111	0.212	0.255	0.290	0.333	0.339	0.361	0.367	0.370	0.381	0.378	0.388	0.383	0.395
2017		0.092	0.143	0.205	0.241	0.292	0.322	0.350	0.360	0.382	0.392	0.391	0.396	0.399	0.407	0.394
2018		0.068	0.127	0.207	0.240	0.276	0.321	0.348	0.371	0.380	0.399	0.404	0.400	0.407	0.408	0.418
2019		0.135	0.186	0.209	0.235	0.269	0.298	0.327	0.345	0.376	0.387	0.403	0.409	0.423	0.417	0.449
2020		0.131	0.170	0.204	0.236	0.274	0.306	0.317	0.342	0.358	0.374	0.395	0.402	0.408	0.415	0.444
2021	0.050	0.122	0.130	0.195	0.229	0.256	0.278	0.319	0.325	0.363	0.364	0.384	0.386	0.397	0.412	0.431
2022		0.086	0.161	0.224	0.231	0.268	0.287	0.316	0.345	0.356	0.382	0.397	0.417	0.423	0.431	0.468

	age															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
2023	0.102	0.190	0.127	0.183	0.232	0.247	0.278	0.300	0.332	0.358	0.367	0.394	0.409	0.422	0.426	0.458
2024		0.038	0.125	0.16	0.229	0.279	0.288	0.305	0.316	0.379	0.385	0.394	0.404	0.428	0.459	0.435

Table 4.4.4.2. Norwegian spring spawning herring. Weight at age in the stock (kg).

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1950	0.001	0.008	0.047	0.100	0.204	0.230	0.255	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1951	0.001	0.008	0.047	0.100	0.204	0.230	0.255	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1952	0.001	0.008	0.047	0.100	0.204	0.230	0.255	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1953	0.001	0.008	0.047	0.100	0.204	0.230	0.255	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1954	0.001	0.008	0.047	0.100	0.204	0.230	0.255	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1955	0.001	0.008	0.047	0.100	0.195	0.213	0.260	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1956	0.001	0.008	0.047	0.100	0.205	0.230	0.249	0.275	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1957	0.001	0.008	0.047	0.100	0.136	0.228	0.255	0.262	0.290	0.305	0.315	0.325	0.330	0.340	0.345	0.364
1958	0.001	0.008	0.047	0.100	0.204	0.242	0.292	0.295	0.293	0.305	0.315	0.330	0.340	0.345	0.352	0.363
1959	0.001	0.008	0.047	0.100	0.204	0.252	0.260	0.290	0.300	0.305	0.315	0.325	0.330	0.340	0.345	0.358
1960	0.001	0.008	0.047	0.100	0.204	0.270	0.291	0.293	0.321	0.318	0.320	0.344	0.349	0.370	0.379	0.378
1961	0.001	0.008	0.047	0.100	0.232	0.250	0.292	0.302	0.304	0.323	0.322	0.321	0.344	0.357	0.363	0.368

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1962	0.001	0.008	0.047	0.100	0.219	0.291	0.300	0.316	0.324	0.326	0.335	0.338	0.334	0.347	0.354	0.358
1963	0.001	0.008	0.047	0.100	0.185	0.253	0.294	0.312	0.329	0.327	0.334	0.341	0.349	0.341	0.358	0.375
1964	0.001	0.008	0.047	0.100	0.194	0.213	0.264	0.317	0.363	0.353	0.349	0.354	0.357	0.359	0.365	0.402
1965	0.001	0.008	0.047	0.100	0.186	0.199	0.236	0.260	0.363	0.350	0.370	0.360	0.378	0.387	0.390	0.394
1966	0.001	0.008	0.047	0.100	0.185	0.219	0.222	0.249	0.306	0.354	0.377	0.391	0.379	0.378	0.361	0.383
1967	0.001	0.008	0.047	0.100	0.180	0.228	0.269	0.270	0.294	0.324	0.420	0.430	0.366	0.368	0.433	0.414
1968	0.001	0.008	0.047	0.100	0.115	0.206	0.266	0.275	0.274	0.285	0.350	0.325	0.363	0.408	0.388	0.378
1969	0.001	0.008	0.047	0.100	0.115	0.145	0.270	0.300	0.306	0.308	0.318	0.340	0.368	0.360	0.393	0.397
1970	0.001	0.008	0.047	0.100	0.209	0.272	0.230	0.295	0.317	0.323	0.325	0.329	0.380	0.370	0.380	0.391
1971	0.001	0.015	0.080	0.100	0.190	0.225	0.250	0.275	0.290	0.310	0.325	0.335	0.345	0.355	0.365	0.390
1972	0.001	0.010	0.070	0.150	0.150	0.140	0.210	0.240	0.270	0.300	0.325	0.335	0.345	0.355	0.365	0.390
1973	0.001	0.010	0.085	0.170	0.259	0.342	0.384	0.409	0.404	0.461	0.520	0.534	0.500	0.500	0.500	0.500
1974	0.001	0.010	0.085	0.170	0.259	0.342	0.384	0.409	0.444	0.461	0.520	0.543	0.482	0.482	0.482	0.482
1975	0.001	0.010	0.085	0.181	0.259	0.342	0.384	0.409	0.444	0.461	0.520	0.543	0.482	0.482	0.482	0.482
1976	0.001	0.010	0.085	0.181	0.259	0.342	0.384	0.409	0.444	0.461	0.520	0.543	0.482	0.482	0.482	0.482
1977	0.001	0.010	0.085	0.181	0.259	0.343	0.384	0.409	0.444	0.461	0.520	0.543	0.482	0.482	0.482	0.482
1978	0.001	0.010	0.085	0.180	0.294	0.326	0.371	0.409	0.461	0.476	0.520	0.543	0.500	0.500	0.500	0.500

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1979	0.001	0.010	0.085	0.178	0.232	0.359	0.385	0.420	0.444	0.505	0.520	0.551	0.500	0.500	0.500	0.500
1980	0.001	0.010	0.085	0.175	0.283	0.347	0.402	0.421	0.465	0.465	0.520	0.534	0.500	0.500	0.500	0.500
1981	0.001	0.010	0.085	0.170	0.224	0.336	0.378	0.387	0.408	0.397	0.520	0.543	0.512	0.512	0.512	0.512
1982	0.001	0.010	0.085	0.170	0.204	0.303	0.355	0.383	0.395	0.413	0.453	0.468	0.506	0.506	0.506	0.506
1983	0.001	0.010	0.085	0.155	0.249	0.304	0.368	0.404	0.424	0.437	0.436	0.493	0.495	0.495	0.495	0.495
1984	0.001	0.010	0.085	0.140	0.204	0.295	0.338	0.376	0.395	0.407	0.413	0.422	0.437	0.437	0.437	0.437
1985	0.001	0.010	0.085	0.148	0.234	0.265	0.312	0.346	0.370	0.395	0.397	0.428	0.428	0.428	0.428	0.428
1986	0.001	0.010	0.085	0.054	0.206	0.265	0.289	0.339	0.368	0.391	0.382	0.388	0.395	0.395	0.395	0.395
1987	0.001	0.010	0.055	0.090	0.143	0.241	0.279	0.299	0.316	0.342	0.343	0.362	0.376	0.376	0.376	0.376
1988	0.001	0.015	0.050	0.098	0.135	0.197	0.277	0.315	0.339	0.343	0.359	0.365	0.376	0.376	0.376	0.376
1989	0.001	0.015	0.100	0.154	0.175	0.209	0.252	0.305	0.367	0.377	0.359	0.395	0.396	0.396	0.396	0.396
1990	0.001	0.008	0.048	0.219	0.198	0.258	0.288	0.309	0.428	0.370	0.403	0.387	0.440	0.440	0.440	0.44
1991	0.001	0.011	0.037	0.147	0.210	0.244	0.300	0.324	0.336	0.343	0.382	0.366	0.425	0.425	0.425	0.425
1992	0.001	0.007	0.030	0.128	0.224	0.296	0.327	0.355	0.345	0.367	0.341	0.361	0.430	0.470	0.470	0.46
1993	0.001	0.008	0.025	0.081	0.201	0.265	0.323	0.354	0.358	0.381	0.369	0.396	0.393	0.374	0.403	0.4
1994	0.001	0.010	0.025	0.075	0.151	0.254	0.318	0.371	0.347	0.412	0.382	0.407	0.410	0.410	0.410	0.41
1995	0.001	0.018	0.025	0.066	0.138	0.230	0.296	0.346	0.388	0.363	0.409	0.414	0.422	0.410	0.410	0.426

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1996	0.001	0.018	0.025	0.076	0.118	0.188	0.261	0.316	0.346	0.374	0.390	0.390	0.384	0.398	0.398	0.398
1997	0.001	0.018	0.025	0.096	0.118	0.174	0.229	0.286	0.323	0.370	0.378	0.386	0.360	0.393	0.391	0.391
1998	0.001	0.018	0.025	0.074	0.147	0.174	0.217	0.242	0.278	0.304	0.310	0.359	0.340	0.344	0.385	0.369
1999	0.001	0.018	0.025	0.102	0.150	0.223	0.240	0.264	0.283	0.315	0.345	0.386	0.386	0.386	0.382	0.395
2000	0.001	0.018	0.025	0.119	0.178	0.225	0.271	0.285	0.298	0.311	0.339	0.390	0.398	0.406	0.414	0.427
2001	0.001	0.018	0.025	0.075	0.178	0.238	0.247	0.296	0.307	0.314	0.328	0.351	0.376	0.406	0.414	0.425
2002	0.001	0.010	0.023	0.057	0.177	0.241	0.275	0.302	0.311	0.314	0.328	0.341	0.372	0.405	0.415	0.438
2003	0.001	0.010	0.055	0.098	0.159	0.211	0.272	0.305	0.292	0.331	0.337	0.347	0.356	0.381	0.414	0.433
2004	0.001	0.010	0.055	0.106	0.149	0.212	0.241	0.279	0.302	0.337	0.354	0.355	0.360	0.371	0.400	0.429
2005	0.001	0.010	0.046	0.112	0.156	0.234	0.267	0.295	0.330	0.363	0.377	0.414	0.406	0.308	0.420	0.452
2006	0.001	0.010	0.042	0.107	0.179	0.232	0.272	0.297	0.318	0.371	0.365	0.393	0.395	0.399	0.415	0.428
2007	0.001	0.010	0.036	0.086	0.155	0.226	0.265	0.312	0.310	0.364	0.384	0.352	0.386	0.304	0.420	0.412
2008**	0.001	0.010	0.044	0.077	0.146	0.212	0.269	0.289	0.327	0.351	0.358	0.372	0.411	0.353	0.389	0.393
2009***	0.001	0.010	0.044	0.077	0.141	0.215	0.270	0.306	0.336	0.346	0.364	0.369	0.411	0.353	0.389	0.393
2010****	0.001	0.01	0.044	0.077	0.188	0.22	0.251	0.286	0.308	0.333	0.344	0.354	0.373	0.353	0.389	0.393
2011	0.001	0.01	0.044	0.118	0.185	0.209	0.246	0.277	0.310	0.322	0.339	0.349	0.364	0.363	0.389	0.393
2012	0.001	0.01	0.044	0.138	0.185	0.256	0.273	0.290	0.305	0.330	0.342	0.361	0.390	0.377	0.389	0.393

	AGE															
Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
2013	0.001	0.01	0.044	0.138	0.204	0.267	0.305	0.309	0.320	0.328	0.346	0.350	0.390	0.377	0.389	0.393
2014	0.001	0.01	0.044	0.138	0.198	0.274	0.301	0.326	0.333	0.339	0.347	0.344	0.362	0.362	0.389	0.393
2015	0.001	0.01	0.044	0.138	0.187	0.243	0.299	0.326	0.319	0.345	0.346	0.354	0.382	0.376	0.389	0.393
2016	0.001	0.01	0.054	0.115	0.186	0.247	0.293	0.320	0.334	0.353	0.354	0.352	0.361	0.370	0.380	0.388
2017	0.001	0.01	0.054	0.115	0.190	0.247	0.282	0.322	0.338	0.351	0.359	0.361	0.361	0.368	0.380	0.386
2018	0.001	0.01	0.054	0.115	0.149	0.225	0.260	0.289	0.312	0.343	0.359	0.361	0.369	0.368	0.377	0.386
2019	0.001	0.01	0.054	0.104	0.151	0.203	0.277	0.311	0.331	0.355	0.353	0.363	0.381	0.376	0.385	0.382
2020	0.001	0.01	0.054	0.104	0.150	0.203	0.266	0.301	0.328	0.343	0.358	0.366	0.374	0.367	0.384	0.391
2021	0.001	0.01	0.054	0.104	0.160	0.209	0.266	0.284	0.302	0.325	0.352	0.366	0.384	0.376	0.404	0.391
2022	0.001	0.01	0.054	0.104	0.125	0.168	0.243	0.287	0.303	0.323	0.352	0.366	0.384	0.376	0.404	0.391
2023	0.001	0.01	0.054	0.118	0.125	0.202	0.255	0.280	0.311	0.336	0.337	0.345	0.384	0.376	0.404	0.391
2024	0.001	0.01	0.054	0.118	0.169	0.202	0.248	0.272	0.285	0.314	0.334	0.324	0.384	0.376	0.404	0.391
2025	0.001	0.01	0.054	0.118	0.145	0.221	0.248	0.269	0.282	0.297	0.334	0.321	0.342	0.376	0.404	0.391

**** mean weight at ages 11 and 13 are mean of 5 previous years at the same age. These age groups were not present in the catches of the wintering survey from which the stock weight are derived.**

****** derived from catch data from the wintering area north of 69°N during December 2008 – January 2009 for age groups 4—11.**

********derived from catch data from the wintering area north of 69°N during January 2010 for age groups 4—12.**

Table 4.4.5.1. Norwegian Spring-spawning herring. Maturity at age.

Year/Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1950	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1
1951	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1
1952	0	0	0	0	0.1	0.6	1	1	1	1	1	1	1	1	1	1
1953	0	0	0	0	0.3	0.4	0.9	1	1	1	1	1	1	1	1	1
1954	0	0	0	0	0.1	0.7	0.9	1	1	1	1	1	1	1	1	1
1955	0	0	0	0.1	0.4	0.4	1	1	1	1	1	1	1	1	1	1
1956	0	0	0	0	0.5	0.7	0.6	1	1	1	1	1	1	1	1	1
1957	0	0	0	0	0.3	0.8	0.8	0.7	1	1	1	1	1	1	1	1
1958	0	0	0	0	0.3	0.5	0.9	0.9	1	1	1	1	1	1	1	1
1959	0	0	0	0	0.7	0.8	1	0.9	1	1	1	1	1	1	1	1
1960	0	0	0	0	0.3	0.9	0.9	1	1	1	1	1	1	1	1	1
1961	0	0	0	0	0.1	0.8	1	0.9	1	1	1	1	1	1	1	1
1962	0	0	0	0	0.1	0.7	1	1	1	1	1	1	1	1	1	1
1963	0	0	0	0	0.1	0.4	1	1	1	1	1	1	1	1	1	1
1964	0	0	0	0	0.1	0.4	0.8	1	1	1	1	1	1	1	1	1
1965	0	0	0	0	0.5	0.4	0.9	0.8	1	1	1	1	1	1	1	1
1966	0	0	0	0	0.5	0.7	0.9	1	1	1	1	1	1	1	1	1
1967	0	0	0	0	0.3	0.8	1	1	1	1	1	1	1	1	1	1
1968	0	0	0	0	0	0.7	0.9	1	1	1	1	1	1	1	1	1
1969	0	0	0	0.1	0.2	0.3	1	1	1	1	1	1	1	1	1	1
1970	0	0	0	0	0.4	0.3	0.4	1	1	1	1	1	1	1	1	1
1971	0	0	0	0	0.1	0.7	1	1	1	1	1	1	1	1	1	1
1972	0	0	0	0	0.4	0.3	1	1	1	1	1	1	1	1	1	1
1973	0	0	0	0.1	0.6	1	1	1	1	1	1	1	1	1	1	1
1974	0	0	0	0	0.6	0.9	1	1	1	1	1	1	1	1	1	1
1975	0	0	0	0.1	0.5	0.9	1	1	1	1	1	1	1	1	1	1
1976	0	0	0	0.1	0.9	0.9	1	1	1	1	1	1	1	1	1	1
1977	0	0	0	0.3	0.8	1	1	1	1	1	1	1	1	1	1	1

Year/Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1978	0	0	0	0.2	0.9	1	1	1	1	1	1	1	1	1	1	1
1979	0	0	0	0.1	0.9	1	1	1	1	1	1	1	1	1	1	1
1980	0	0	0	0.1	0.9	1	1	1	1	1	1	1	1	1	1	1
1981	0	0	0	0.1	1	1	1	1	1	1	1	1	1	1	1	1
1982	0	0	0	0.1	0.8	1	1	1	1	1	1	1	1	1	1	1
1983	0	0	0	0.1	0.9	1	1	1	1	1	1	1	1	1	1	1
1984	0	0	0	0.1	0.7	1	1	1	1	1	1	1	1	1	1	1
1985	0	0	0	0.1	0.8	0.9	1	1	1	1	1	1	1	1	1	1
1986	0	0	0	0	0.5	0.9	0.9	1	1	1	1	1	1	1	1	1
1987	0	0	0	0	0.1	0.8	0.9	0.9	1	1	1	1	1	1	1	1
1988	0	0	0	0	0.2	0.7	0.9	1	1	1	1	1	1	1	1	1
1989	0	0	0	0	0.4	0.8	1	1	1	1	1	1	1	1	1	1
1990	0	0	0	0.2	0.5	0.9	1	1	1	1	1	1	1	1	1	1
1991	0	0	0	0	0.9	0.9	1	1	1	1	1	1	1	1	1	1
1992	0	0	0	0	0.8	1	1	1	1	1	1	1	1	1	1	1
1993	0	0	0	0	0.5	1	1	1	1	1	1	1	1	1	1	1
1994	0	0	0	0	0.1	0.9	1	1	1	1	1	1	1	1	1	1
1995	0	0	0	0	0	0.6	1	1	1	1	1	1	1	1	1	1
1996	0	0	0	0	0	0.5	0.9	1	1	1	1	1	1	1	1	1
1997	0	0	0	0.1	0	0.4	0.9	1	1	1	1	1	1	1	1	1
1998	0	0	0	0	0.6	0.4	0.9	1	1	1	1	1	1	1	1	1
1999	0	0	0	0	0.3	0.9	0.9	1	1	1	1	1	1	1	1	1
2000	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1
2001	0	0	0	0	0.3	0.9	0.9	1	1	1	1	1	1	1	1	1
2002	0	0	0	0	0.1	0.9	1	1	1	1	1	1	1	1	1	1
2003	0	0	0	0	0.2	0.7	1	1	1	1	1	1	1	1	1	1
2004	0	0	0	0	0.3	0.9	1	1	1	1	1	1	1	1	1	1
2005	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1
2006	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1

Year/Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
2007	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1
2008	0	0	0	0	0.1	0.7	0.9	1	1	1	1	1	1	1	1	1
2009	0	0	0	0	0.1	0.4	0.9	1	1	1	1	1	1	1	1	1
2010	0	0	0	0	0.2	0.4	0.7	1	1	1	1	1	1	1	1	1
2011	0	0	0	0	0.4	0.7	0.8	0.9	1	1	1	1	1	1	1	1
2012	0	0	0	0	0.5	0.9	0.9	1	1	1	1	1	1	1	1	1
2013	0	0	0	0	0.4	0.8	1	1	1	1	1	1	1	1	1	1
2014	0	0	0	0	0.3	0.9	0.9	1	1	1	1	1	1	1	1	1
2015	0	0	0	0	0.3	0.9	1	1	1	1	1	1	1	1	1	1
2016	0	0	0	0	0.1	0.5	0.9	1	1	1	1	1	1	1	1	1
2017	0	0	0	0	0.2	0.6	0.8	1	1	1	1	1	1	1	1	1
2018	0	0	0	0	0.2	0.8	0.9	1	1	1	1	1	1	1	1	1
2019	0	0	0	0	0.2	0.8	1	1	1	1	1	1	1	1	1	1
2020	0	0	0	0	0.1	0.8	1	1	1	1	1	1	1	1	1	1
2021	0	0	0	0	0.4	0.6	1	1	1	1	1	1	1	1	1	1
2022	0	0	0	0	0.4	0.8	0.9	1	1	1	1	1	1	1	1	1
2023	0	0	0	0	0.4	0.8	1	1	1	1	1	1	1	1	1	1
2024	0	0	0	0	0.4	0.8	1	1	1	1	1	1	1	1	1	1
2025	0	0	0	0	0.4	0.8	1	1	1	1	1	1	1	1	1	1

Table 4.4.7.1. Norwegian Spring-spawning herring. Estimated indices (mean of bootstrap with 1000 iterations in StoX) from the acoustic surveys on the spawning grounds in February-March. Numbers in billions.

Year	3	4	5	6	7	8	9	10	11	12+
1988	0.377	0.3055	8.2025	0.0833	0.0347	0.011	0.0378	0.0218	0.0424	NA
1989	0.0168	0.3462	0.0919	4.0566	0.0974	0.0141	0.0051	0.0559	NA	0.0579
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1994	0.0999	0.0513	0.8561	0.4834	0.0653	0.0126	0.1472	0.0475	1.8602	0.0072
1995	0.4385	4.7186	3.2205	1.9768	0.3	0.0193	NA	0.1067	0.0548	2.3565
1996	0.1711	1.9614	7.8753	2.3093	0.8849	0.306	NA	0.0004	0.1349	1.7868
1997	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1998	0.3254	1.0155	3.0552	12.8887	8.1655	1.9029	0.6082	0.1713	0.0391	1.767
1999	1.6147	0.3744	1.3765	2.6903	9.4105	7.0768	1.6884	0.4988	0.1304	0.7637
2000	0.7001	2.6348	0.1023	0.4797	1.1326	4.2443	2.8291	0.506	0.0527	0.2262
2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2005	0.2326	0.6733	2.0666	5.9001	8.3967	0.5948	0.5357	0.164	0.1026	2.3239
2006	0.0984	6.1785	0.536	0.8704	3.272	3.2534	0.1102	0.0848	0.0185	0.4251
2007	0.3525	1.6051	12.2812	0.7116	0.6582	2.883	3.1955	0.1377	0.2193	0.9921
2008	0.0437	2.5105	2.7095	9.0624	0.5191	0.4591	1.6371	1.5678	0.1647	0.3931
2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Year	3	4	5	6	7	8	9	10	11	12+
2015	0.5426	2.8651	0.7271	3.2608	0.3789	0.6792	2.7676	0.8055	7.4645	2.3635
2016	0.2046	0.2395	0.5989	0.3816	2.2591	0.2531	0.5652	3.0288	0.6912	5.3395
2017	0.0941	1.1138	0.6381	0.9144	0.4288	1.3311	0.1793	0.2113	2.0389	3.6904
2018	0.1531	1.764	2.8064	0.4597	0.8401	0.6364	1.1166	0.4447	0.3761	3.4257
2019	0.3723	0.3091	0.9292	3.7935	0.7592	0.8614	0.6708	1.0515	0.7431	4.6509
2020	0.0339	3.2436	0.5664	1.2237	3.2902	0.569	0.6048	0.3447	0.6265	1.9069
2021	0.1089	0.2861	10.1324	0.7341	0.7364	1.9597	0.4146	0.4533	0.3088	2.0189
2022	0.0686	0.1608	0.7659	6.3995	0.3164	0.5693	1.5118	0.2655	0.4903	1.5907
2023	0.2054	0.1885	0.5685	0.5941	6.0058	0.3555	1.0629	1.352	0.3014	2.3874
2024	1.3766	1.3472	0.2838	0.6223	0.6877	6.8522	0.17	0.3952	1.0057	0.793
2025	0.1862	1.2926	0.7443	0.0712	0.6285	0.7449	4.8808	0.294	0.2422	0.6284

Table 4.4.7.2. Norwegian spring-spawning herring. Acoustic estimates (billion individuals) of immature herring in the Barents Sea in May/June from IESNS. Values in the years 2009–2024 are estimated with StoX (mean of bootstrap with 1000 iterations). "Fleet 4".

	age				
Year	1	2	3	4	5
1991	24.3	5.2			
1992	32.6	14	5.7		
1993	102.7	25.8	1.5		
1994	6.6	59.2	18	1.7	
1995	0.5	7.7	8	1.1	
1996*	0.1	0.25	1.8	0.6	0.03
1997**	2.6	0.04	0.4	0.35	0.05
1998	9.5	4.7	0.01	0.01	0
1999	49.5	4.9	0	0	0
2000	105.4	27.9	0	0	0
2001	0.3	7.6	8.8	0	0
2002	0.5	3.9	0	0	0
2003***					
2004***					

	age				
Year	1	2	3	4	5
2005	23.3	4.5	2.5	0.4	0.3
2006	3.7	35.0	5.3	0.87	0
2007	2.1	3.7	12.5	1.9	0
2008^					
2009	0.289	0.300	0.233	0.060	
2010	5.196	1.380	0.000	0.000	
2011	1.166	3.920	0.041	0.000	
2012	0.787	0.030	0.000	0.000	
2013	0.107	2.190	0.211	0.070	
2014	4.239	3.110	1.728	0.127	0.043
2015	0.345	11.760	1.183	0.206	0.000
2016	1.826	5.620	1.568	0.101	0.038
2017	14.522	3.080	0.000	0.000	
2018	7.329	17.420	0.827	0.009	
2019	0.113	2.370	17.481	0.044	
2020***					
2021	0.021	0.002	0.086	0.002	
2022***					
2023***					
2024	1.103	32.189	3.968	0.457	0.055

***Average of Norwegian and Russian estimates**

****Combination of Norwegian and Russian estimates as described in 1998 WG report, since then only Russian estimates**

*****No surveys**

^Not a full survey

Table 4.4.7.3. Norwegian spring-spawning herring. Estimates from the international acoustic survey on the feeding areas in the Norwegian Sea in May (IESNS). Numbers in millions. Values are estimated indices by StoX (mean of bootstrap with 1000 iterations).

Year	3	4	5	6	7	8	9	10	11	12+
1996	1.312	25.024	20.369	5.49	1.898	0.39	NA	NA	0.104	2.384
1997	1.794	3.867	23.247	15.542	2.343	1.909	0.363	0.082	0.047	2.205
1998	0.824	1.782	5.551	16.641	11.426	2.273	1.049	0.167	NA	0.932
1999	2.068	0.46	1.13	3.348	12.113	6.227	1.36	0.448	0.024	1.365
2000	0.673	2.001	0.205	0.824	2.468	7.034	4.339	1.181	0.148	0.436
2001	3.942	1.944	1.405	0.157	0.358	3.558	5.138	1.21	0.111	0.313
2002	5.83	9.727	1.353	0.904	0.413	1.033	2.032	1.777	0.862	0.155
2003	7.874	12.651	11.666	1.781	1.184	0.635	0.499	2.493	2.999	2.256
2004	1.531	3.55	11.767	10.922	0.998	0.81	0.404	0.141	0.403	2.714
2005	11.957	1.588	2.352	9.771	6.94	0.822	0.448	0.401	0.383	2.037
2006	0.508	13.073	0.625	2.158	5.707	5.654	0.639	0.614	0.258	1.567
2007	2.47	4.993	22.776	0.952	1.704	6.694	6.109	0.405	0.245	1.694
2008	0.472	8.604	7.069	13.929	1.562	2.166	4.822	2.643	0.467	1.05
2009	1.808	2.444	13.167	9.115	9.642	2.176	1.43	2.456	1.273	0.741
2010	0.771	2.941	2.287	9.446	5.968	5.342	0.706	0.731	0.876	0.546
2011	0.691	1.401	3.315	2.419	8.755	3.774	4.071	0.598	0.786	1.061
2012	3.572	0.457	0.726	1.76	2.43	3.995	1.867	2.095	0.284	1.122
2013	0.531	3.204	0.368	1.269	2.019	3.271	4.659	2.729	1.551	1.601
2014	1.3	0.787	2.856	0.741	1.151	2.873	2.439	2.77	1.151	1.383
2015	0.466	1.4	1.184	3.65	1.372	1.25	3.26	2.598	4.454	2.011
2016	3.689	1.551	2.267	1.78	2.693	0.985	1.109	1.896	1.948	4.532
2017	1.049	4.518	1.259	1.567	0.845	1.47	0.348	0.754	1.045	4.836
2018	1.033	2.062	5.787	0.993	1.472	0.594	1.354	0.366	0.692	5.183
2019	2.783	0.729	2.285	4.9	1.224	1.278	1.016	1.277	0.87	3.911
2020	0.494	13.22	0.543	1.046	2.567	0.763	0.649	0.462	0.72	2.474
2021	1.127	1.284	11.916	0.7	1.021	2.037	0.496	0.569	0.468	3.04
2022	0.382	1.209	1.285	9.633	1.151	1.64	2.064	0.577	0.339	1.021
2023	0.583	0.341	0.996	1.218	9.459	0.462	0.558	1.11	0.304	1.202

Year	3	4	5	6	7	8	9	10	11	12+
2024	2.718	2.008	0.584	1.353	2.057	5.979	0.37	0.631	0.574	0.513
2025	4.597	6.24	1.396	0.929	1.096	1.159	3.34	0.343	0.498	0.658

Table 4.4.7.4. Norwegian spring-spawning herring. Acoustic estimates (billion individuals) of immature herring in the Norwegian and Russian Barents Sea ecosystem surveys in August-October (BESS).

Year/Age	2	3
2004	36.495	0.901
2005	16.167	6.973
2006	5.535	1.62
2007	2.595	6.378
2008	1.626	3.987
2009	0.433	1.807
2010	0.315	0.234
2011	1.504	0.006
2012	1.078	1.285
2013	5.029	0.092
2014	1.822	6.825
2015	9.023	3.214
2016	1.573	3.089
2017	2.138	3.465
2018	6.035	1.299
2019	0.209	6
2020	0.231	1.816
2021	0.12	0.36
2022	0.882	
2023	32.92	4.443
2024	43.995	22.109

Table 4.4.8.1 Norwegian spring-spawning herring. Relative standard error of estimated catch-at-age used by SAM.

Year/Age	2	3	4	5	6	7	8	9	10	11	12+
1988	0.387	0.2	0.275	0.093	0.382	0.519	0.445	0.331	0.39	0.563	0.402
1989	0.274	0.559	0.521	0.453	0.112	0.528	0.807	0.842	0.537	0.696	0.714
1990	0.324	0.304	0.574	0.354	0.365	0.127	0.709	0.677	0.621	0.59	0.635
1991	0.535	0.397	0.566	0.691	0.33	0.391	0.129	0.584	0.927	1.304	0.668
1992	0.701	0.347	0.25	0.471	0.725	0.353	0.45	0.127	0.586	0.855	0.681
1993	0.418	0.263	0.166	0.178	0.394	0.52	0.259	0.304	0.103	NA	NA
1994	0.402	0.251	0.164	0.107	0.142	0.323	0.402	0.239	0.243	0.088	0.458
1995	0.736	0.206	0.109	0.089	0.088	0.126	0.324	0.321	0.193	0.181	0.077
1996	0.258	0.246	0.085	0.064	0.077	0.103	0.168	0.452	0.415	0.196	0.079
1997	0.288	0.154	0.119	0.061	0.059	0.083	0.112	0.202	0.297	0.251	0.097
1998	0.181	0.192	0.124	0.107	0.061	0.069	0.106	0.155	0.229	0.274	0.126
1999	0.47	0.152	0.243	0.153	0.101	0.063	0.071	0.116	0.166	0.331	0.133
2000	0.332	0.18	0.092	0.245	0.164	0.103	0.068	0.074	0.129	0.191	0.153
2001	0.618	0.168	0.143	0.101	0.236	0.172	0.115	0.08	0.095	0.189	0.212
2002	0.201	0.133	0.088	0.122	0.112	0.259	0.174	0.12	0.087	0.11	0.182
2003	0.486	0.187	0.112	0.084	0.139	0.141	0.284	0.188	0.129	0.092	0.119
2004	0.226	0.278	0.174	0.101	0.084	0.163	0.151	0.269	0.213	0.141	0.087
2005	0.295	0.1	0.173	0.14	0.088	0.077	0.158	0.158	0.238	0.197	0.089
2006	0.224	0.187	0.084	0.182	0.14	0.084	0.082	0.177	0.186	0.257	0.105
2007	0.397	0.127	0.107	0.061	0.146	0.124	0.084	0.095	0.221	0.274	0.143
2008	0.157	0.241	0.093	0.086	0.056	0.133	0.122	0.091	0.107	0.259	0.148
2009	0.162	0.135	0.147	0.07	0.077	0.059	0.15	0.121	0.102	0.125	0.152
2010	0.201	0.168	0.131	0.135	0.073	0.085	0.066	0.139	0.138	0.11	0.122
2011	0.123	0.201	0.167	0.126	0.13	0.083	0.093	0.088	0.176	0.16	0.133
2012	0.343	0.13	0.216	0.159	0.118	0.12	0.083	0.113	0.108	0.212	0.157
2013	0.293	0.203	0.118	0.191	0.163	0.117	0.124	0.09	0.141	0.149	0.22
2014	0.687	0.264	0.206	0.121	0.216	0.191	0.134	0.148	0.106	0.181	0.184
2015	0.54	0.319	0.208	0.213	0.146	0.247	0.197	0.145	0.168	0.133	0.181
2016	0.595	0.224	0.227	0.163	0.179	0.142	0.213	0.189	0.139	0.172	0.121

Year/Age	2	3	4	5	6	7	8	9	10	11	12+
2017	0.318	0.198	0.114	0.161	0.123	0.143	0.116	0.17	0.153	0.118	0.104
2018	0.286	0.273	0.203	0.12	0.147	0.138	0.164	0.138	0.179	0.17	0.096
2019	0.607	0.147	0.198	0.136	0.092	0.148	0.129	0.159	0.141	0.153	0.093
2020	0.4	0.217	0.093	0.192	0.147	0.103	0.16	0.145	0.173	0.136	0.101
2021	0.594	0.275	0.164	0.066	0.143	0.132	0.109	0.16	0.156	0.189	0.117
2022	0.271	0.286	0.175	0.148	0.067	0.171	0.132	0.123	0.19	0.184	0.125
2023	0.342	0.197	0.265	0.162	0.136	0.07	0.172	0.149	0.152	0.211	0.153
2024	0.449	0.215	0.173	0.328	0.175	0.141	0.083	0.204	0.178	0.209	0.191

Table 4.4.8.2 Norwegian spring-spawning herring. Relative standard error of NASF used by SAM.

Year/Age	3	4	5	6	7	8	9	10	11	12+
1988	0.333	0.345	0.199	0.426	0.488	0.581	0.482	0.524	0.473	NA
1989	0.545	0.338	0.419	0.224	0.415	0.56	0.649	0.453	NA	0.451
1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1994	0.413	0.459	0.291	0.32	0.442	0.569	0.389	0.465	0.256	0.618
1995	0.325	0.219	0.233	0.253	0.346	0.534	NA	0.409	0.455	0.246
1996	0.379	0.254	0.2	0.247	0.29	0.345	NA	0.904	0.394	0.258
1997	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1998	0.342	0.283	0.235	0.184	0.199	0.255	0.308	0.379	0.479	0.258
1999	0.262	0.334	0.269	0.24	0.194	0.204	0.26	0.318	0.396	0.297
2000	0.301	0.241	0.412	0.321	0.278	0.223	0.238	0.318	0.457	0.363
2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2005	0.361	0.303	0.251	0.211	0.198	0.309	0.315	0.382	0.412	0.246
2006	0.414	0.209	0.315	0.29	0.233	0.233	0.407	0.424	0.537	0.327

Year/Age	3	4	5	6	7	8	9	10	11	12+
2007	0.337	0.262	0.186	0.3	0.304	0.238	0.234	0.393	0.364	0.284
2008	0.471	0.243	0.24	0.196	0.316	0.323	0.261	0.263	0.382	0.331
2009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2015	0.284	0.206	0.269	0.201	0.304	0.272	0.207	0.264	0.171	0.214
2016	0.342	0.332	0.279	0.304	0.216	0.329	0.282	0.204	0.271	0.182
2017	0.395	0.248	0.276	0.257	0.297	0.239	0.351	0.34	0.22	0.196
2018	0.361	0.226	0.207	0.293	0.261	0.276	0.247	0.295	0.305	0.199
2019	0.305	0.316	0.256	0.195	0.267	0.26	0.273	0.25	0.268	0.187
2020	0.476	0.201	0.282	0.243	0.201	0.282	0.278	0.31	0.277	0.223
2021	0.385	0.321	0.161	0.268	0.268	0.222	0.299	0.294	0.317	0.221
2022	0.419	0.358	0.266	0.176	0.315	0.282	0.233	0.326	0.29	0.231
2023	0.342	0.347	0.282	0.279	0.178	0.308	0.25	0.238	0.318	0.214
2024	0.238	0.239	0.322	0.277	0.272	0.174	0.354	0.302	0.252	0.264
2025	0.348	0.241	0.268	0.416	0.276	0.268	0.186	0.319	0.331	0.276

Table 4.4.8.3 Norwegian spring-spawning herring. Relative standard error of IESNS bar used by SAM.

Year/Age	2
1991	0.499
1992	0.507
1993	0.512
1994	0.519
1995	0.503
1996	0.476
1997	0.462
1998	0.499

Year/Age	2
1999	0.499
2000	0.513
2001	0.502
2002	0.497
2003	NA
2004	NA
2005	0.498
2006	0.515
2007	0.497
2008	0.479
2009	0.477
2010	0.489
2011	0.497
2012	0.456
2013	0.493
2014	0.495
2015	0.506
2016	0.500
2017	0.495
2018	0.509
2019	0.493
2020	NA
2021	0.438
2022	NA
2023	NA
2024	0.514
2025	NA

Table 4.4.8.4 Norwegian spring-spawning herring. Relative standard error of IESNS used by SAM.

Year/Age	3	4	5	6	7	8	9	10	11	12+
1996	0.295	0.186	0.193	0.236	0.278	0.354	NA	NA	0.431	0.269
1997	0.281	0.25	0.189	0.201	0.27	0.278	0.358	0.446	0.483	0.272
1998	0.316	0.281	0.236	0.199	0.211	0.271	0.305	0.402	NA	0.311
1999	0.275	0.346	0.302	0.255	0.209	0.232	0.293	0.347	0.531	0.293
2000	0.326	0.276	0.39	0.316	0.267	0.227	0.245	0.3	0.409	0.348
2001	0.249	0.277	0.292	0.406	0.359	0.253	0.239	0.298	0.427	0.366
2002	0.234	0.216	0.293	0.312	0.351	0.306	0.276	0.281	0.314	0.406
2003	0.223	0.207	0.21	0.281	0.299	0.329	0.341	0.267	0.26	0.271
2004	0.288	0.253	0.21	0.212	0.307	0.317	0.352	0.412	0.353	0.264
2005	0.209	0.286	0.269	0.216	0.228	0.317	0.347	0.353	0.355	0.275
2006	0.34	0.206	0.33	0.273	0.235	0.235	0.329	0.331	0.377	0.287
2007	0.267	0.24	0.189	0.31	0.283	0.229	0.232	0.352	0.38	0.283
2008	0.344	0.22	0.227	0.204	0.287	0.273	0.241	0.265	0.345	0.305
2009	0.281	0.268	0.206	0.218	0.216	0.273	0.291	0.268	0.296	0.322
2010	0.32	0.26	0.271	0.217	0.233	0.237	0.324	0.322	0.313	0.337
2011	0.325	0.292	0.256	0.268	0.22	0.25	0.248	0.332	0.319	0.304
2012	0.253	0.346	0.323	0.282	0.268	0.248	0.279	0.274	0.372	0.302
2013	0.338	0.257	0.357	0.296	0.276	0.256	0.242	0.263	0.287	0.286
2014	0.295	0.319	0.261	0.322	0.301	0.261	0.268	0.263	0.301	0.292
2015	0.345	0.292	0.299	0.252	0.293	0.297	0.256	0.265	0.244	0.276
2016	0.251	0.287	0.271	0.281	0.264	0.308	0.302	0.279	0.277	0.243
2017	0.305	0.244	0.297	0.287	0.315	0.29	0.36	0.321	0.305	0.241
2018	0.306	0.275	0.234	0.308	0.29	0.333	0.293	0.358	0.325	0.238
2019	0.263	0.322	0.271	0.241	0.298	0.296	0.306	0.296	0.314	0.249
2020	0.342	0.206	0.337	0.305	0.266	0.32	0.328	0.345	0.323	0.267
2021	0.302	0.296	0.209	0.324	0.306	0.275	0.342	0.335	0.345	0.259
2022	0.355	0.298	0.296	0.216	0.301	0.285	0.275	0.334	0.362	0.306
2023	0.333	0.361	0.307	0.298	0.217	0.345	0.336	0.302	0.368	0.299
2024	0.264	0.276	0.333	0.293	0.275	0.233	0.357	0.329	0.334	0.34

Year/Age	3	4	5	6	7	8	9	10	11	12+
2025	0.243	0.232	0.292	0.311	0.303	0.3	0.255	0.361	0.341	0.327

Table 4.4.8.5 Norwegian spring-spawning herring. Relative standard error of RFID used by SAM.

Year/Age	3	4	5	6	7	8	9	10	11	12+
2017	0.127	0.079	0.176	0.145	0.246	0.16	0.297	1.085	0.267	0.448
2018	0.171	0.137	0.077	0.195	0.169	0.238	0.183	0.311	0.295	0.11
2019	0.034	0.181	0.146	0.089	0.186	0.166	0.378	0.357	0.901	0.282
2020	0.166	0.038	0.206	0.151	0.116	0.265	0.284	0.314	0.271	0.196
2021	0.172	0.155	0.049	0.266	0.199	0.181	0.38	0.38	0.525	0.342
2022	0.418	0.17	0.15	0.047	0.27	0.194	0.227	0.375	0.454	0.341
2023	0.165	0.532	0.177	0.189	0.057	0.318	0.217	0.28	0.354	0.404

Table 4.5.1.1. Norwegian spring-spawning herring. Parameter estimates of the final SAM model fit. The estimates from the final 2024 benchmarked assessment are also shown.

Parameter	Estimate	Std. Error	Estimate 2024	Std. Error 2024
logFpar_0	-7.703	0.142	-7.737	0.146
logFpar_1	-7.031	0.093	-7.045	0.094
logFpar_2	-6.83	0.09	-6.839	0.09
logFpar_3	-6.724	0.089	-6.755	0.089
logFpar_4	-6.632	0.089	-6.641	0.09
logFpar_5	-6.465	0.092	-6.476	0.092
logFpar_6	-6.432	0.099	-6.417	0.099
logFpar_7	-6.382	0.11	-6.395	0.11
logFpar_8	-6.283	0.114	-6.29	0.113
logFpar_9	-7.435	0.336	-7.057	0.267
logFpar_10	-7.651	0.332	-7.348	0.277
logFpar_11	-14.894	0.338	-14.9	0.34
logFpar_12	-7.898	0.542	-7.938	0.551
logFpar_13	-6.908	0.345	-6.945	0.35
logFpar_14	-6.753	0.18	-6.781	0.181
logFpar_15	-6.592	0.17	-6.617	0.172

Parameter	Estimate	Std. Error	Estimate 2024	Std. Error 2024
logFpar_16	-6.384	0.173	-6.402	0.175
logFpar_17	-6.227	0.179	-6.242	0.181
logFpar_18	-9.503	0.31	-9.441	0.311
logFpar_19	-7.942	0.257	-7.858	0.276
logFpar_20	-7.473	0.133	-7.467	0.133
logFpar_21	-7.371	0.131	-7.334	0.129
logFpar_22	-7.208	0.131	-7.211	0.131
logFpar_23	-6.986	0.135	-7.015	0.136
logFpar_24	-6.762	0.138	-6.806	0.141
logFpar_25	-6.705	0.149	-6.736	0.149
logFpar_26	-6.253	0.127	-6.239	0.126
logFpar_27	-5.754	0.082	-5.765	0.082
logSdLogFsta_0	-1.065	0.129	-1.045	0.129
logSdLogN_0	-0.03	0.131	-0.006	0.133
logSdLogN_1	-1.617	0.079	-1.634	0.082
logSdLogObs_0	1.459	0.14	1.51	0.141
logSdLogObs_1	1.303	0.143	1.304	0.147
logSdLogObs_2	0.798	0.199	0.781	0.202
logSdLogObs_3	0.042	0.108	0.042	0.111
logSdLogObs_4	0.809	0.145	0.83	0.147
logSdLogObs_5	0.203	0.054	0.204	0.055
logSdLogObs_6	0.309	0.124	0.961	0.13
logSdLogObs_7	1.274	0.136	1.275	0.137
logSdLogObs_8	1.784	0.237	1.788	0.236
logSdLogObs_9	1.597	0.244	1.593	0.245
logSdLogObs_10	1.152	0.211	1.141	0.21
logSdLogObs_11	1.054	0.228	1.005	0.238
logSdLogObs_12	1.132	0.222	1.173	0.232
logSdLogObs_13	0.373	0.086	0.353	0.091

Parameter	Estimate	Std. Error	Estimate 2024	Std. Error 2024
logSdLogObs_14	0.211	0.181	0.172	0.181
logSdLogObs_15	0.379	0.199	0.388	0.199
logSdLogObs_16	1.133	0.275	1.132	0.275
transfIRARdist_0	-2.393	0.504	-2.349	0.504
rec_pars_0	9.196	0.181	9.209	0.186
itrans_rho_0	2.141	0.275	2.062	0.26

Table 4.5.1.2 Norwegian spring-spawning herring. Point estimates of Stock in numbers (millions).

Year/Age	2	3	4	5	6	7	8	9	10	11	12+
1988	461	1161	371	7724	98	31	18	59	25	21	26
1989	1845	182	899	291	5920	83	21	12	40	15	27
1990	9007	657	149	691	280	5485	63	17	10	29	29
1991	17882	3611	469	121	572	263	5491	51	13	7	41
1992	17925	7506	3085	337	100	483	247	5142	41	10	36
1993	36519	7431	6775	2542	246	87	438	250	4503	33	37
1994	37312	15797	6605	5897	1847	188	76	373	240	3639	50
1995	12963	16098	14674	6779	4230	1152	122	66	301	215	3049
1996	7336	5320	17082	16261	5651	2152	558	80	48	208	2282
1997	2299	2993	4646	16156	11664	3424	1299	276	61	42	1296
1998	15043	890	2267	3854	12576	7493	1868	616	147	40	757
1999	7907	6069	560	1386	2869	8641	5246	1143	330	71	518
2000	26073	3185	5221	342	859	2058	5449	3493	637	157	311
2001	26908	11240	2687	3610	276	607	1647	3709	1796	250	191
2002	13472	11565	11349	2271	2214	242	509	1267	2506	1075	241
2003	6326	5472	10478	10490	1635	1350	218	369	969	1978	959
2004	48553	2546	3873	8337	8762	1017	892	193	243	589	2247
2005	16352	21469	2107	2739	6669	6940	660	558	170	174	1942
2006	25632	6719	20236	1450	1961	5392	4638	421	337	115	1261
2007	7035	10920	6986	21350	1378	1595	4134	3046	248	189	768
2008	11417	2806	10604	6730	16338	1195	1281	2734	1697	178	579

Year/Age	2	3	4	5	6	7	8	9	10	11	12+
2009	5906	4562	2491	10652	6104	10428	824	1009	1651	879	467
2010	3269	2248	3617	2050	7660	4110	5913	604	634	970	724
2011	18691	1208	1780	2905	1943	5587	2821	3021	375	418	788
2012	3903	7047	950	1356	2483	1925	4359	1679	1703	233	629
2013	7834	1606	5338	815	1138	2325	1748	3789	1150	970	485
2014	5487	3112	1404	4247	711	934	2033	1390	3100	764	846
2015	15064	2159	2557	1287	3232	640	827	1936	1123	2573	1124
2016	5723	6127	1703	2126	1152	2260	544	681	1593	825	2476
2017	3626	2250	5305	1338	1804	919	1566	463	549	1158	2067
2018	51372	1357	2039	4895	1193	1391	688	1067	420	412	2447
2019	3862	23271	1125	1915	4406	974	1119	534	749	406	2028
2020	3518	1552	18824	945	1466	2847	645	670	366	564	1458
2021	1161	1411	1576	13766	917	1165	1654	444	442	238	1100
2022	4628	477	1335	1585	12923	666	1006	1098	302	274	842
2023	20173	1787	422	1215	1419	9344	477	708	667	206	657
2024	20739	8346	1847	384	1038	1333	5608	319	447	380	438
2025	9853	8312	7042	1475	349	843	951	3761	231	281	497

Table 4.5.1.3 Norwegian spring-spawning herring. Point estimates of Fishing mortality.

Year/Age	2	3	4	5	6	7	8	9	10	11	12+
1988	0.006	0.02	0.043	0.081	0.134	0.16	0.202	0.239	0.299	0.327	0.327
1989	0.003	0.009	0.019	0.036	0.058	0.068	0.084	0.099	0.125	0.14	0.14
1990	0.002	0.006	0.013	0.025	0.04	0.047	0.057	0.067	0.086	0.099	0.099
1991	0.001	0.004	0.009	0.019	0.03	0.036	0.042	0.049	0.063	0.074	0.074
1992	0.001	0.004	0.009	0.019	0.03	0.035	0.041	0.047	0.06	0.073	0.073
1993	0.002	0.006	0.016	0.034	0.055	0.064	0.072	0.08	0.102	0.126	0.126
1994	0.003	0.01	0.026	0.06	0.098	0.114	0.124	0.133	0.168	0.211	0.211
1995	0.005	0.016	0.043	0.101	0.171	0.209	0.225	0.241	0.305	0.395	0.395
1996	0.005	0.02	0.051	0.111	0.186	0.228	0.25	0.27	0.346	0.464	0.464
1997	0.007	0.025	0.066	0.13	0.206	0.261	0.299	0.327	0.418	0.546	0.546

Year/Age	2	3	4	5	6	7	8	9	10	11	12+
1998	0.007	0.025	0.063	0.114	0.167	0.207	0.245	0.28	0.361	0.461	0.461
1999	0.007	0.026	0.069	0.124	0.177	0.221	0.268	0.32	0.411	0.516	0.516
2000	0.008	0.031	0.082	0.144	0.198	0.243	0.299	0.371	0.479	0.606	0.606
2001	0.007	0.025	0.067	0.122	0.163	0.192	0.228	0.277	0.352	0.441	0.441
2002	0.006	0.024	0.062	0.115	0.159	0.185	0.221	0.264	0.333	0.423	0.423
2003	0.004	0.016	0.041	0.078	0.113	0.142	0.176	0.217	0.275	0.359	0.359
2004	0.004	0.013	0.033	0.061	0.093	0.125	0.165	0.205	0.262	0.352	0.352
2005	0.005	0.017	0.041	0.075	0.113	0.156	0.209	0.256	0.316	0.415	0.415
2006	0.005	0.018	0.041	0.074	0.11	0.153	0.199	0.237	0.282	0.355	0.355
2007	0.007	0.023	0.052	0.092	0.13	0.166	0.202	0.219	0.241	0.281	0.281
2008	0.009	0.029	0.065	0.113	0.159	0.198	0.238	0.26	0.278	0.315	0.315
2009	0.01	0.035	0.075	0.126	0.174	0.217	0.268	0.305	0.33	0.372	0.372
2010	0.01	0.034	0.072	0.119	0.166	0.214	0.29	0.344	0.383	0.437	0.437
2011	0.009	0.029	0.06	0.097	0.131	0.165	0.224	0.264	0.294	0.322	0.322
2012	0.008	0.028	0.06	0.098	0.13	0.157	0.203	0.232	0.25	0.258	0.258
2013	0.007	0.024	0.053	0.087	0.113	0.131	0.161	0.177	0.183	0.177	0.177
2014	0.005	0.016	0.037	0.062	0.081	0.092	0.113	0.125	0.132	0.125	0.125
2015	0.003	0.011	0.025	0.043	0.057	0.066	0.081	0.091	0.096	0.092	0.092
2016	0.004	0.013	0.031	0.055	0.077	0.089	0.11	0.122	0.129	0.127	0.127
2017	0.006	0.022	0.055	0.101	0.153	0.183	0.224	0.25	0.267	0.267	0.267
2018	0.004	0.015	0.039	0.074	0.116	0.144	0.182	0.211	0.233	0.25	0.25
2019	0.005	0.019	0.049	0.095	0.145	0.181	0.233	0.279	0.31	0.345	0.345
2020	0.004	0.017	0.045	0.087	0.132	0.169	0.227	0.284	0.323	0.366	0.366
2021	0.006	0.024	0.062	0.118	0.168	0.207	0.27	0.327	0.356	0.383	0.383
2022	0.005	0.02	0.053	0.097	0.131	0.166	0.225	0.279	0.305	0.331	0.331
2023	0.005	0.02	0.054	0.096	0.131	0.159	0.211	0.255	0.272	0.285	0.285
2024	0.004	0.015	0.041	0.072	0.1	0.125	0.163	0.199	0.211	0.215	0.215
2025	0.004	0.016	0.042	0.075	0.104	0.13	0.17	0.208	0.22	0.224	0.224

Table 4.5.1.4 Norwegian spring spawning herring. Final stock summary table. High and low represent approximate 95 % confidence limits.

Year	Recruitment (Age 2) millions	High	Low	Stock Size: SSB thousand tonnes	High	Low	Catches thousand tonnes	Fishing Pressure: F Ages 5-12	High	Low
1988	461	1101	193	1162	1641	823	135301	0.086	0.106	0.07
1989	1845	4065	837	1672	2390	1169	103830	0.058	0.073	0.047
1990	9007	18080	4487	2040	3000	1387	86411	0.045	0.056	0.036
1991	17882	34531	9260	2259	3307	1543	84683	0.041	0.051	0.033
1992	17925	34074	9430	2863	3946	2078	104448	0.044	0.055	0.036
1993	36519	67416	19783	3405	4389	2642	232457	0.077	0.093	0.064
1994	37312	67565	20605	3878	4778	3147	479228	0.117	0.138	0.099
1995	12963	23171	7252	4141	4946	3468	905501	0.193	0.223	0.167
1996	7336	12998	4140	4759	5588	4054	1220283	0.172	0.194	0.151
1997	2299	4191	1261	5595	6584	4755	1426507	0.194	0.218	0.172
1998	15043	25679	8813	5776	6813	4898	1223131	0.188	0.211	0.167
1999	7907	14081	4440	5391	6326	4594	1235433	0.238	0.267	0.211
2000	26073	46162	14726	4182	4896	3572	1207201	0.318	0.359	0.282
2001	26908	47348	15291	3582	4224	3039	766136	0.234	0.267	0.206
2002	13472	23844	7612	3218	3786	2736	807795	0.242	0.277	0.211
2003	6326	11488	3484	4318	5119	3641	789510	0.146	0.168	0.128
2004	48553	82772	28480	5665	6769	4741	794066	0.121	0.139	0.106
2005	16352	28632	9339	5733	6793	4839	1003243	0.164	0.187	0.144
2006	25632	43654	15051	5444	6414	4621	968958	0.177	0.201	0.156
2007	7035	12510	3957	7783	9175	6603	1266993	0.13	0.147	0.115
2008	11417	19392	6722	7730	9097	6569	1545656	0.173	0.195	0.154
2009	5906	10261	3399	7358	8673	6242	1687371	0.195	0.22	0.173
2010	3269	5846	1828	5695	6718	4827	1457015	0.234	0.266	0.206
2011	18691	31726	11011	4749	5648	3993	992997	0.189	0.216	0.166
2012	3903	7028	2167	4362	5210	3653	826000	0.187	0.213	0.163
2013	7834	13958	4396	4402	5270	3677	684743	0.155	0.178	0.135

Year	Recruitment (Age 2) millions	High	Low	Stock Size: SSB thousand tonnes	High	Low	Catches thousand tonnes	Fishing Pressure: F Ages 5-12	High	Low
2014	5487	9873	3049	4432	5325	3689	461306	0.101	0.117	0.088
2015	15064	25729	8820	4263	5106	3560	328740	0.076	0.088	0.066
2016	5723	9216	3554	3526	4203	2958	383174	0.101	0.116	0.088
2017	3626	5939	2214	3183	3728	2717	721566	0.208	0.237	0.183
2018	51372	78609	33573	3421	4002	2925	592899	0.149	0.169	0.131
2019	3862	6346	2350	3491	4067	2997	777165	0.204	0.231	0.18
2020	3518	5801	2134	3014	3507	2590	720937	0.218	0.248	0.192
2021	1161	2141	630	3715	4307	3205	851813	0.166	0.187	0.148
2022	4628	7792	2749	4491	5257	3837	813834	0.158	0.177	0.14
2023	20173	37653	10807	4129	4842	3521	680552	0.17	0.192	0.151
2024	20739	50414	8532	2948	3564	2438	460226	0.156	0.18	0.134
2025	9853	70922	1369	2723	3390	2187				
Average	14028	26369	7835	4224	5074	3525	779111	0.157	0.18	0.138

Table 4.8.1.1 Norwegian Spring-spawning herring. Input to short-term prediction. Stock size is in millions and weight in kg.

Input for	2025							
	Stockno.	Natural	Maturity	Proportion of M	Proportion of F	Weight	Exploitation	Weight
age	1-Jan.	mortality	ogive	before spawning	before spawning	in stock	pattern	in catch
2	9853	0.90	0.0	0	0	0.054	0,004	0,138
3	8312	0.15	0.0	0	0	0.118	0,016	0,189
4	7042	0.15	0.4	0	0	0.145	0,042	0,231
5	1475	0.15	0.8	0	0	0.221	0,075	0,264
6	349	0.15	0.9	0	0	0.248	0,104	0,284
7	843	0.15	1.0	0	0	0.269	0,13	0,307
8	951	0.15	1.0	0	0	0.282	0,17	0,331
9	3761	0.15	1.0	0	0	0.297	0,208	0,364
10	231	0.15	1.0	0	0	0.334	0,22	0,378
11	281	0.15	1.0	0	0	0.321	0,224	0,395
12	497	0.15	1.0	0	0	0,378	0,224	0,431

Input for	2026/2027							
	Stockno.	Natural	Maturity	Proportion of M	Proportion of F	Weight	Exploitation	Weight
age	1-Jan.	mortality	ogive	before spawning	before spawning	in stock	pattern	in catch
2	9853	0.90	0	0	0	0,054	0,003	0,138
3		0.15	0	0	0	0,118	0,017	0,189
4		0.15	0.1/0.2	0	0	0,146	0,047	0,231
5		0.15	0.7/0.7	0	0	0,208	0,092	0,264
6		0.15	1	0	0	0,250	0,141	0,284
7		0.15	1	0	0	0,274	0,17	0,307
8		0.15	1	0	0	0,292	0,196	0,331
9		0.15	1	0	0	0,315	0,216	0,364
10		0.15	1	0	0	0,334	0,203	0,378
11		0.15	1	0	0	0,330	0,251	0,395
12		0.15	1	0	0	0,385	0,251	0,431

Table 4.8.2.1 Norwegian spring spawning herring. Short-term prediction.

Basis:	
SSB (2025):	2.723 million t
Landings(2025):	435 010 (sum of national quotas)
SSB (2026):	3.012 million t
Fw5-12+(2025)	0.138
Recruitment(2025-2027):	9.853, 9.489, 9.942

The catch options:

Rationale	Catches (2026)	Basis	SSB (2027)*	P(SSB2027 <B_{lim})	% SSB change*	%TAC change	%CATCH change
Management strategy	533 914	0.123	3 823 805	0.50	27	33	23
F_{MSY} × SSB (2026) /MSY $B_{trigger}$	828 441	0.199	3 602 227	1.80	19.6	106	90
Zero Catch	0	0.00	4 241 460	0.00	41	-100	-100
F_{pa}	867 569	0.21	3 570 721	2.0	18.5	116	99
SSB_{2027}=B_{lim}	2 473 739	0.78	2 286 000	50	-24	516	469
SSB_{2027}=B_{pa}	1 308 259	0.33	3 177 000	10.8	5.5	226	201
Status quo	593 409	0.138	3 779 317	1.10	25	48	36

*95% confidence interval

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