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Joint report



Joint Russian Norwegian Arctic Fisheries Working Group (JRN-AFWG) Report 2026

Institute of Marine Research – IMR

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Executive Summary

On 30th March 2022 all Russian participation in ICES was temporally suspended. Although the announcement of the suspension stressed the role of ICES as a “multilateral science organization”, this suspension applied not only to research activities but also to the ICES work providing fisheries advice for the sustainable management of fish stocks and ecosystems. On 9th December 2024 Russia announced its intention to leave ICES, and this came into effect on 9th December 2025. As a result, since 2022 the ICES AFWG has provided advice only for saithe, coastal cod north, coastal cod south, and golden redfish. Northeast Arctic (NEA) cod, haddock, beaked redfish, Greenland halibut, and capelin assessments have been conducted outside of ICES in a bilateral Joint Russian-Norwegian Working Group on Arctic Fisheries (JRN-AFWG) and should not be considered as ICES advice. Although this work has been conducted independently of ICES, the methodologies agreed at ICES benchmarks and agreed HCRs (Harvest Control Rules) have been followed in providing this advice.

The chapter numbering in this report is not continuous (Chapter 2,5 and 7 are missing). This is done in order to be consistent with the chapter numbering in ICES AFWG reports.

In 2026 we are giving annual advice for NEA cod, NEA haddock, beaked redfish, and a two-year advice for Greenland halibut. The beaked redfish typically has a two-year advice, however this stock is in the process of a benchmark model revision. Therefore, we issue single year advice this year, with the intention of reverting to two-year advice next year following the results of the benchmark.

In 2025 TAC quota was set above advice for cod, haddock and Greenland halibut. In 2026 the quota was above advice for cod and Greenland halibut. We note that cod, in particular, is in an extremely sensitive situation, with projected future recruitment to the fishery estimated to be very low in the medium term. Therefore, any future TAC over advice poses a real risk of reversing the projected modest upturn in the stock.

Advice on fishing opportunities for NEA cod

The NEA cod stock is continuing to decline following a prolonged period of moderate to poor recruitment, and is currently below B_{pa} but above B_{lim}. The stock is forecast to rise next year as moderate recruitment enters the fishable stock. However, projections for recruitment in the following years are very low. As a result, the stock is projected to stabilize a little above B_{pa} , provided the advice is followed. The yearclasses entering the fishery now are therefore critical to the medium-term development of the stock, and overfishing these would pose a risk of an extended period of stock below precautionary levels.

There was a model revision this year, to better account for the different levels of uncertainty at different magnitudes of catches. This is the same method as used for haddock and now the ICES NEA saithe assessment and has improved both the fit to the data and slightly improved the model retro. This revision has slightly revised up the stock estimate.

Following the agreed HCR, the advice for 2027 is that catches should be no more than 312 667 tonnes, up from an advice of 269 440 tonnes and a quota of 285 000 tonnes in 2026. Provided that this advice is followed, then projections indicate that the stock should start to rise slightly and then stabilize at moderately low but safe levels. It should be stressed that this quota advice is higher than would be expected from the current state of the stock (which would give a quota advice of 272 528 tonnes) because the HCR accounts for the projected increase in the stock. F urther quota above advice could be expected to delay any recovery for this stock, and potentially lead to further decline.

Advice on fishing opportunities for NEA haddock

Following a period of low recruitment, the stock is rising as a result of relatively good yearclasses in 2021 and 2022 currently entering the fishery.

Following the agreed HCR, the advice is that catches in 2027 should not exceed 180 336 tonnes, up from an advice and quota of 153 293 tonnes in 2026. Provided that these incoming yearclasses are not heavily caught at small sizes, then then this should lead to a continued increase in stock and catches as long as the advice is followed. In recent years there has been a rise in the catch of small haddock, and if this is not curtailed then there is a risk that a large part of the incoming yearclasses could be fished before reaching a size to give optimum yield.

Advice on fishing opportunities for Greenland halibut

The stock is on a downward trajectory towards B_{pa}. However, improved recruitment is now entering the adult and the fishable biomass. This gives a potential to reverse the downward trend provided fishing pressure is kept at appropriate levels. The total biomass is project to rise slightly in 2026 if the advice is followed, although it will take several more years for the female SSB to begin to rise. There has been an upwards retrospective revision for the Greenland halibut stock, as a result of which the stock is now assessed as being above B_{pa}, compared with the 2024 assessment which projected the stock to fall below B_{pa} in the course of 2024.

The advice is that catches in 2027 should be no more than 19 610 tonnes, and catches in 2028 should be no more than 19 914. These are higher than the advice of 12 431 tonnes for 2025 and 14 891 tonnes for 2026, but lower than the TAC (19 000 for both years) and lower again than the estimated catches of 20 652 tonnes in 2025. We stress that we present a total quota advice, which includes catches in international waters and a small area of UK waters. This stock has a history of quota and catches being set above advice, and then catches above the TAC, which has led to the decline of the stock.

Advice on fishing opportunities for beaked redfish

The stock is at a high level, with SSB relatively stable. Recent recruitment is slightly down on the peak levels around 2020, but is still at good levels and well above the low levels seen in the late 1990s and early 2000s. The stock is fished at a moderate fishing pressure in line with advice.

The current model is considered rather uncertain (largely due to lack of a coherent survey coverage and limited age data), with a high degree of annual retrospective adjustments, and there is no accepted precautionary F_{msy} level. A benchmark revision is in process. Therefore, a single year’s advice is presented this year, instead of the typical two-year advice. The aim is to revert to two-year advice next year.

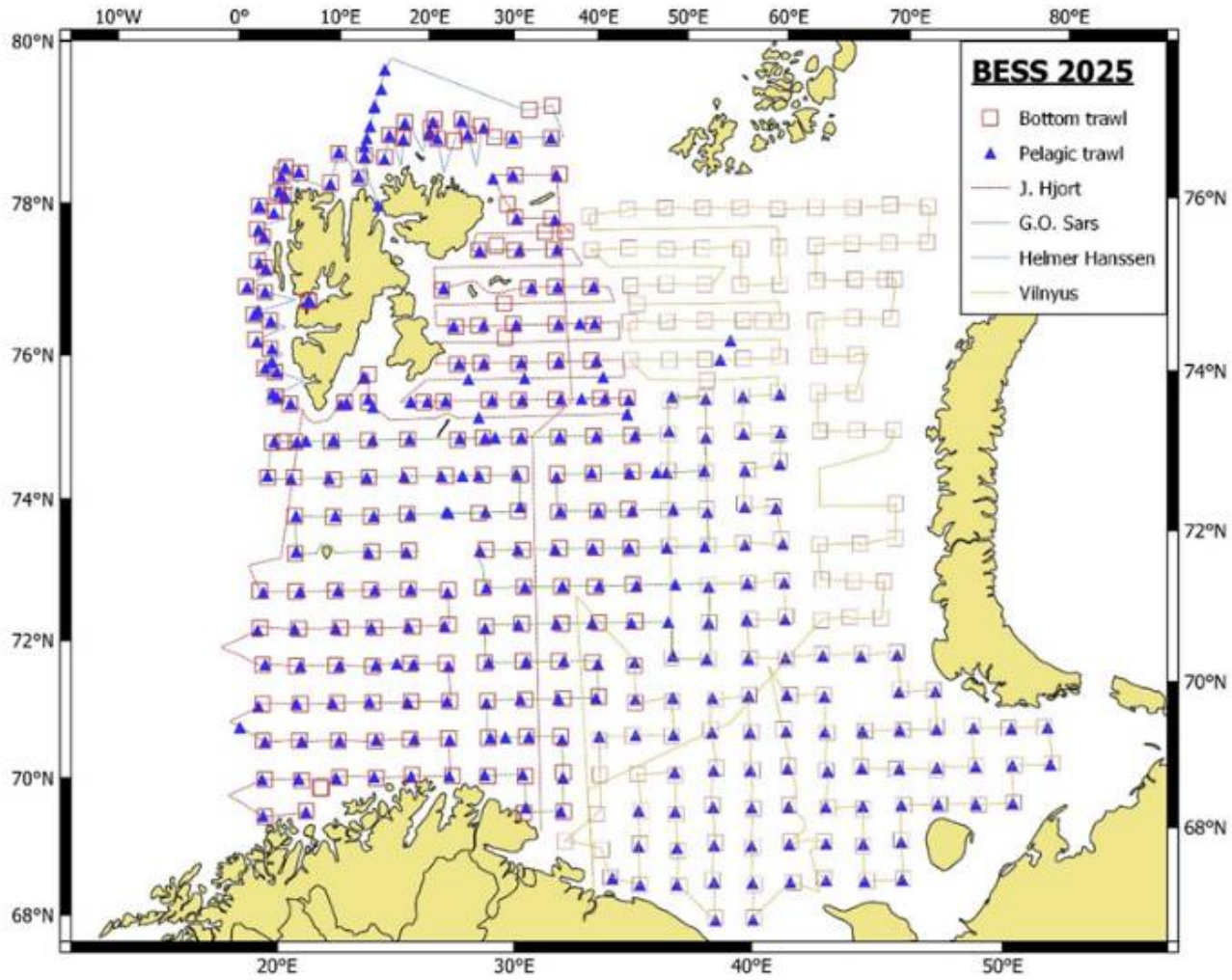
The catch advice is no more than 67 090 tonnes in 2027, compared to an advice of 67 191 tonnes in 2025 and 69 177 tonnes in 2026. TAC has historically been set following advice. It should be noted that because there is not an agreed precautionary F_{msy} value for this stock, a “status quo F” approach is used to set the advice. It is therefore possible that the significant changes in the quota advice could occur following the benchmark once an appropriate target fishing mortality can be evaluated.

1. Ecosystem considerations

The aim of this chapter is to identify important ecosystem information influencing the fish stocks. Ecosystem and climate changes, along with fishery, determine the stock dynamics of commercial species. Water temperature and ice conditions influence on distribution of the commercial fishes in the Barents Sea. Apart from this, temperature impacts on growth rate and mortality at the early stages (larvae, juveniles). Currents affect the strength of year-classes by providing transport of eggs, larvae and 0-group of commercial species from the spawning areas into the Barents Sea. Food availability is another important ecosystem driver that influence on the rate of growth and maturation of commercial fishes. It depends not only on the prey availability, but also on feeding competition. Mortality due to predation, including cannibalism, can greatly affect population abundance of commercial species. The impact of ecosystem changes on the dynamics of bycatches of juveniles and non-target species in mixed fisheries should also be taken into account.

The Barents Sea ecosystem survey (BESS):

The aim of the Barents Sea ecosystem survey (BESS) in August-October is to monitor the status and changes in the Barents Sea ecosystem. In 2018, and 2022, BESS coverage was incomplete, and in 2020 it was delayed, making the evaluation of the ecosystem status more uncertain. The 202 5 BESS was carried out during the period from 22nd August to 15th October by three Norwegian and one Russian research vessels. The temporal and spatial progression during the survey was good despite technical problems and bad weather (Figure 1.1a and b).


BESS 2025
Bottom trawl
Pelagic trawl
J. Hjort
G.O. Sars
Helmer Hanssen
Vilnyus
10°W
0°
10°E
20°E
30°E
40°E
50°E
60°E
70°E
80°E
80°N
78°N
76°N
74°N
72°N
70°N
68°N

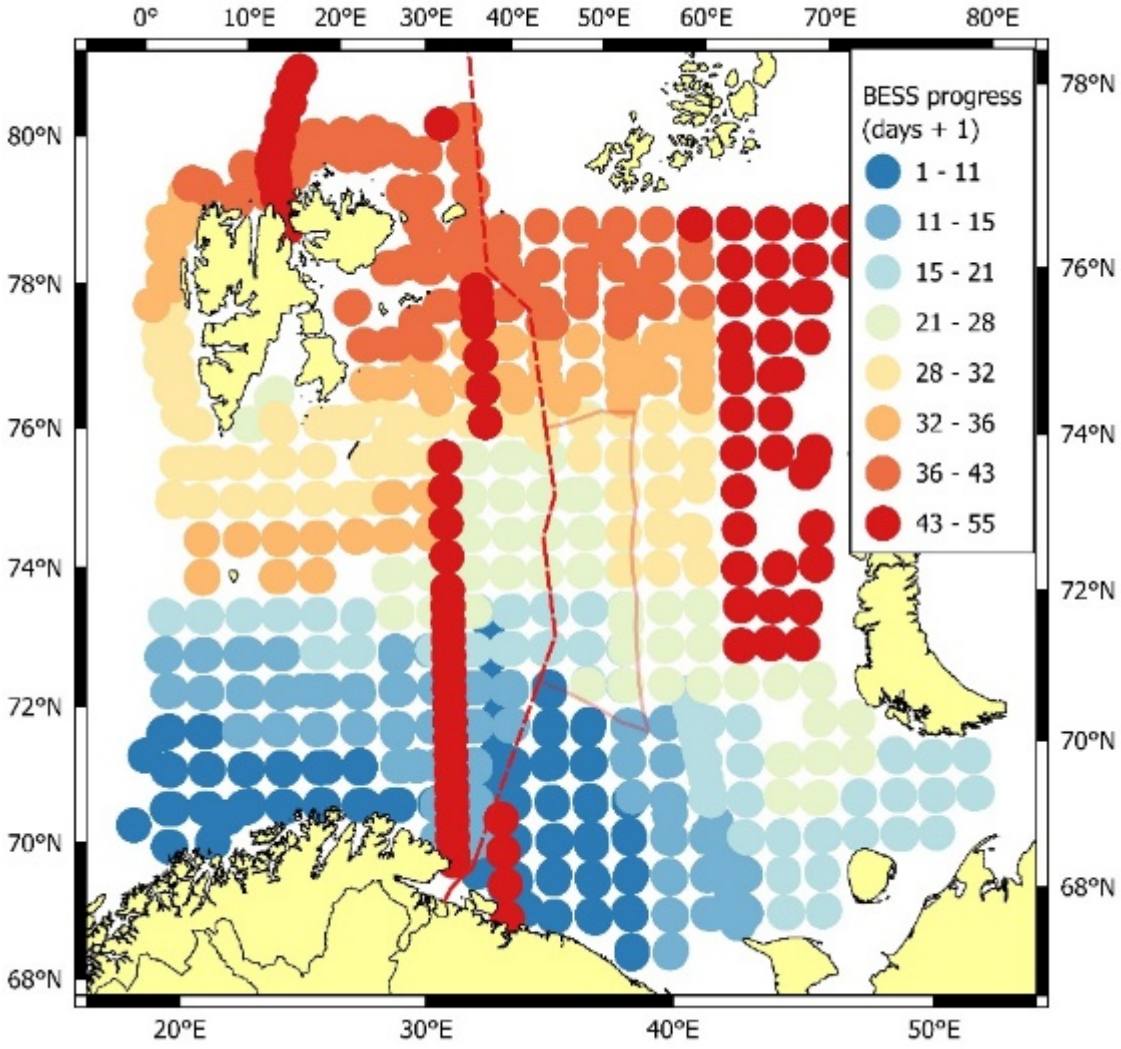


Figure 1.1. The spatial (left) and temporal (right) progression during the survey.

Current state and changes

Abiotic conditions

Sea Surface Temperature (SST) in both the southern and northern Barents Sea were slightly above or close to the seasonal average in the first half of 2025. During the summer, surface temperatures increased, and in August–September they were around 5°C above the seasonal average in the south and just over 3°C above the average in the north. This was associated with a marine heatwave. The sea surface remained warmer than the seasonal average for the rest of 2025.

The southwestern Barents Sea is strongly affected by the varying characteristics of the inflowing Atlantic Water (AW). The long-term time series from standard sections reveals an increasing temperature trend in the Atlantic Water since the late 1970s. Temperatures in the inflowing water decreased from 2015-2019/2021. The last 4-5 years the temperatures have increased, particularly in summer (Figure 1.2).

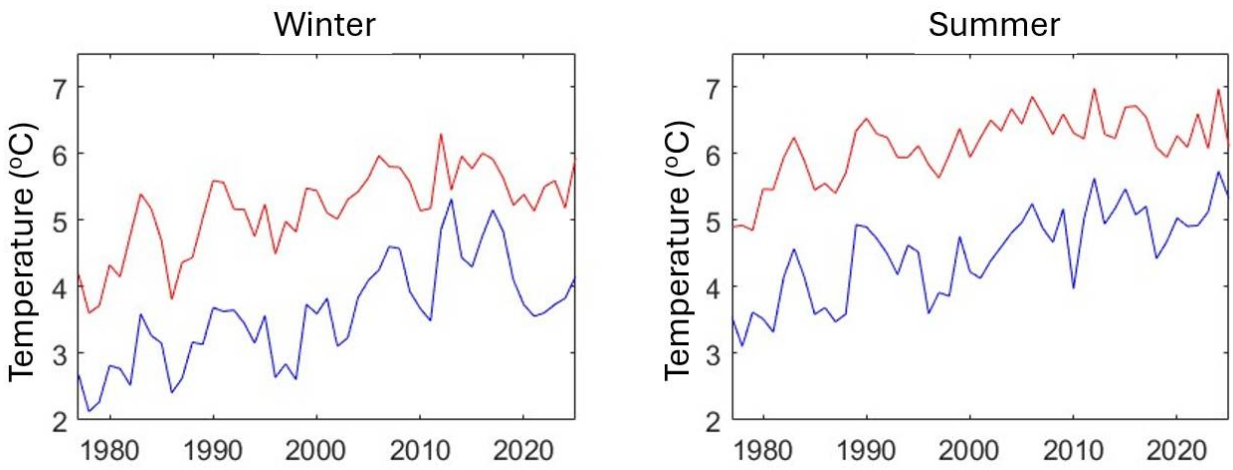


Figure 1.2. Temperature in the AW flowing into the Barents Sea in Fugløya-Bear Island (red) and Vardø-North (blue). Left panel shows winter while right panel shows summer.

The Barents Sea has been ice-free in summer since 2015. Winter sea ice extent decreased until 2016. There has been some recovery since, but not to 80s and 90s levels. The sea-ice area in the southern Barents Sea was below or close to the long-term average throughout 2025. In the northern Barents Sea, the ice cover was highly variable at the start of the year, but from June onwards it remained well below the long-term average.

The area of the Barents Sea occupied by bottom waters with a temperature of < 0°C amounted to 25% that was below the level of 2019-2022 and 2024 (Fig. 1.3). According to the expert evaluation, Atlantic water temperature in the Murman Current in 2026 is expected to remain typical of warm years. Due to high temperatures and low sea-ice extent in recent years, the ice coverage of the Barents Sea is expected to remain below normal. Lower-than-average ice coverage and longer duration of ice-free season increase the primary productivity of the Barents Sea.

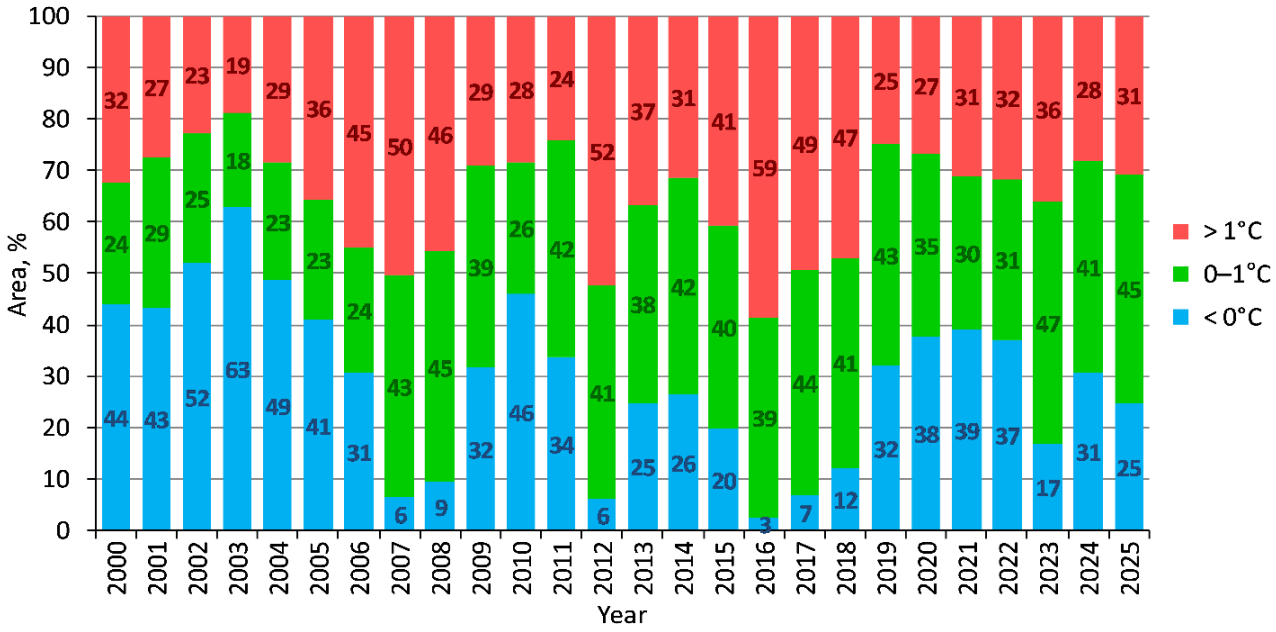


Figure 1.3. Area of bottom waters with different temperature ranges in the Barents Sea in September-October 2000-2025.

There is no trend in the volume transport across the Barents Sea Opening when investigating the full time series. However, there appear to be shifts between periods. The period 1997-2006 had highly varying volume transports. The period 2007-2020, on the other hand, was more stable, with the exception of the extreme years of 2015-2016. During 2021-2025, the volume transport has been rather weak compared to before, in particular in spring/early summer and fall.

Mesozooplankton

The total mesozooplankton biomass in autumn 2025 was similar to preceding years across the Barents Sea. In several subareas in the Norwegian sector, where size-fractioned biomass is available, the biomass of the mid-size fraction (typically representing older stages of large copepods like *Calanus* spp.) has been very low during 2020-2024. During the same period, the smallest size-fraction (typically representing young stages of intermediately sized copepods, as well as smaller species) increased markedly. In 2025, however, the size-fractioned biomasses were more similar to earlier in the time series.

The changes in the biomasses of the intermediate and small zooplankton size-fractions may reflect a combination of factors including the predation pressure from the large fish stocks, possibly a lower advection of mesozooplankton with inflowing waters into the BS in recent years, as well as variability in local production rates.

Krill and amphipod biomass indices have been at low levels in recent years.

Prey stocks

Euphausiids, amphipods and shrimp are important prey for most commercial fish in the Barents Sea. In 2025 the total biomass of euphausiids was lower than the long-term mean (1980-2025). According to the most recent stock assessment, the shrimp stock is declining.

Capelin, polar cod and young herring are the main forage pelagic fish in the Barents Sea, which are important

prey for most predators in the area, including commercial demersal species. These species are very sensitive to various changes in the ecosystem, the influence of predators, fishing, or the plankton . Total biomass of the main pelagic species during 1986–2025 has fluctuated between ca. 0.5 and 9 million tonnes; largely driven by fluctuations in the capelin stock (Fig. 1.4). After several years with biomass above average, the total biomass of pelagic fish was below average in 2025. The biomass in 2025 was also completely dominated by herring which are distributed in the south, implying that there is low biomass in the north of the Barents Sea. The biomass of herring is dominated by the 2021 and 2022 year-classes.

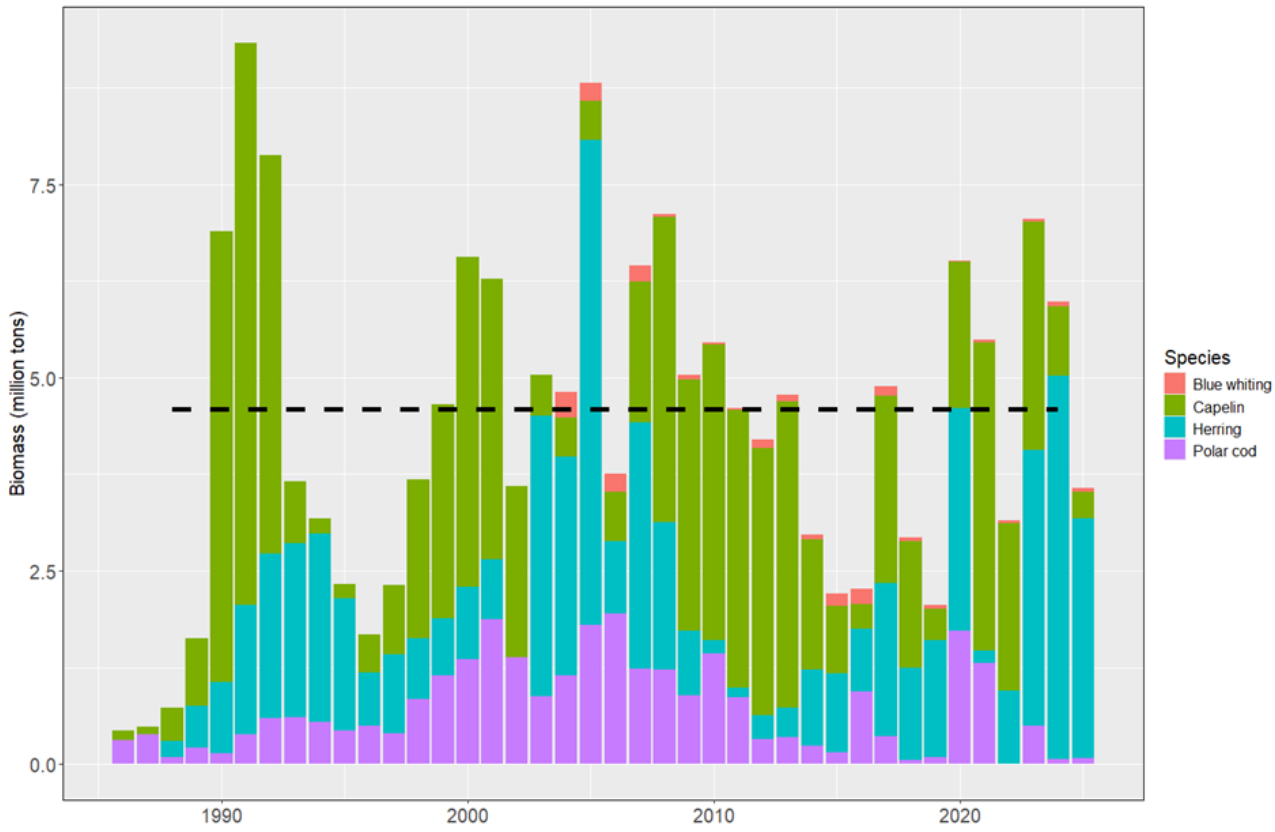


Figure 1.4. Total biomass of pelagic fish (excluding 0-group) in the Barents Sea in 1986-202 5 . Note that herring survey estimates are available from 1999 and blue whiting estimates from 2004. Biomass estimates for herring between 1988 and 1998 are derived from the NSS-herring assessment (age 1-3). The dashed line denotes average biomass summed over all the included pelagic species for 1988-2024.

The major stock collapses of capelin in the 1980s, 1990s and 2000s were all mainly caused by recruitment failures (Gjøsæter et al. 2016), and the fluctuations in stock size between 2014 and 2019 were also associated with poor recruitment. The relatively high stock biomass between 2019 and 2023 was mainly an effect of the very strong 2019 year-class and above average 2020 year-class. Recruitment after that has been poor for capelin and the stock is at very low level in 2025.

The recent strong recruitment to the polar cod stock in 2016 and 2020 lead to sudden increases in stock size, but the stock sizes decreased again rapidly and is presently low (Fig. 1.4). Polar cod are predicted to experience decrease in habitat and abundance with a warmer and more ice-free Barents Sea, and the reasons for the occasional very high polar cod recruitment recently are not known.

The fluctuating amounts of young herring and blue whiting in the Barents Sea (Fig. 1.4) are directly connected to the recruitment fluctuation in these stocks, since the Barents Sea serves as nursery area for the juvenile herring and juvenile blue whiting, especially when these stocks recruit rich year classes.

Specification of the ecosystem impact on the assessed species:

Cod

The cod stock has been decreasing until 2026, but a slight increase is predicted in the coming years. The main effect of the ecosystem impact on cod stock dynamics is manifested in the change in the abundance of its recruitment. There have not been any strong year-classes of cod since 2005 despite high cod SSB and above average sea temperatures. Recruitment has previously been shown to be positively correlated with both those factors, but in recent years this is no longer the case. Meso-zooplankton is important for survival of larvae and 0-group cod, so their distribution must overlap with areas of relatively high plankton biomasses. Despite a large number of studies (see e.g. summary in Ottersen et al., 2014 and Johannesen et al. 2026), the underlying mechanism of the impact of the Barents Sea ecosystem on cod recruitment is still not well understood.

Cod diet

Cod is a main predator among fishes in the Barents Sea. Its diet was relatively stable in recent years; capelin was the main prey. The diet composition of cod in 2025 was similar to 2024 (Fig. 1.5), but the proportion of cod and haddock in the diet decreased from 2024 to 2025 (Fig. 1.8 and 1.9). Since 2013 the importance of snow crab in cod diet increased considerably and has since then consisted of 3-7 % by weight (Fig. 1.6). It should be noted that in 2022-2023 an unexpected increase of red king crab up to 3-5 % by weight in the diet was observed (Fig. 1.5), but cod consume only crab legs, empty carapaxes after molting or individuals with soft carapax immediately after molting. Fig. 1.7 shows the consumption by cod in the period 1984-2025. Consumption of most prey has decreased in recent years due to decreasing cod abundance. Total prey consumption in 2025 was slightly lower than in 2024.

Fig. 1.8 and 1.9 show the proportion of cod and haddock in the diet of cod. The proportion of cod and haddock in cod diet decreased from 2024 to 2025.

Individual growth of cod decreased from 2024 to 2025 for age groups 3-5. These are the age groups which are most dependent on capelin as food, so this is likely related to the low capelin abundance.

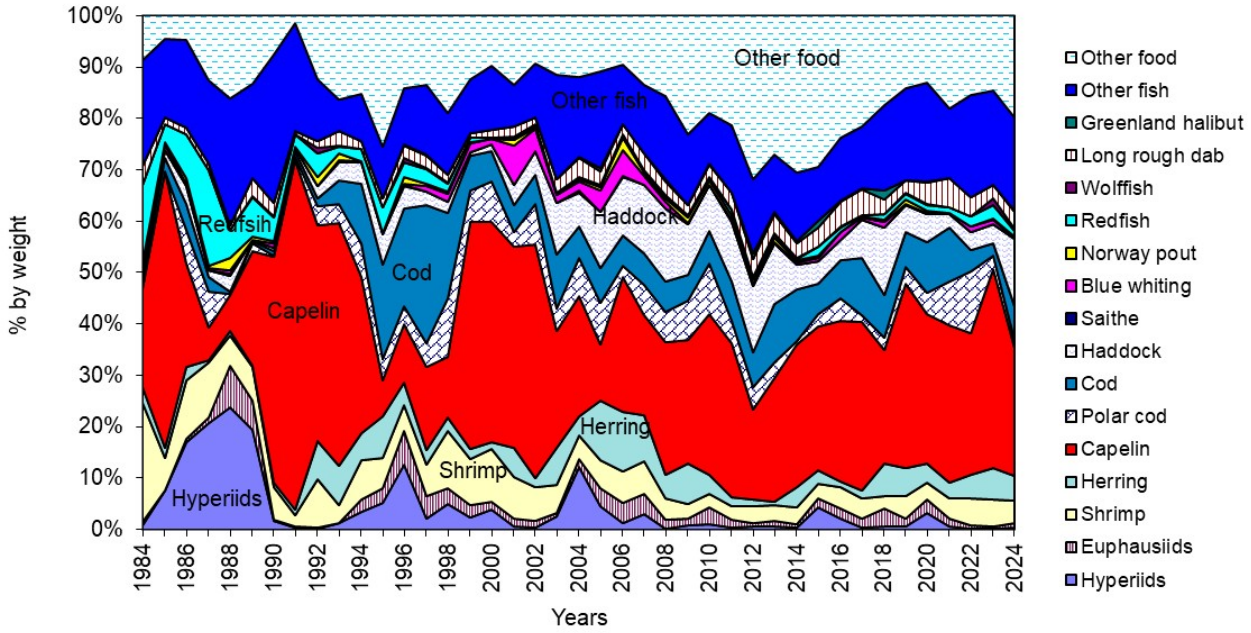


Figure 1.5. Diet consumption of cod in the Barents Sea in 1984-2024, % by weight. Could not be updated this year.

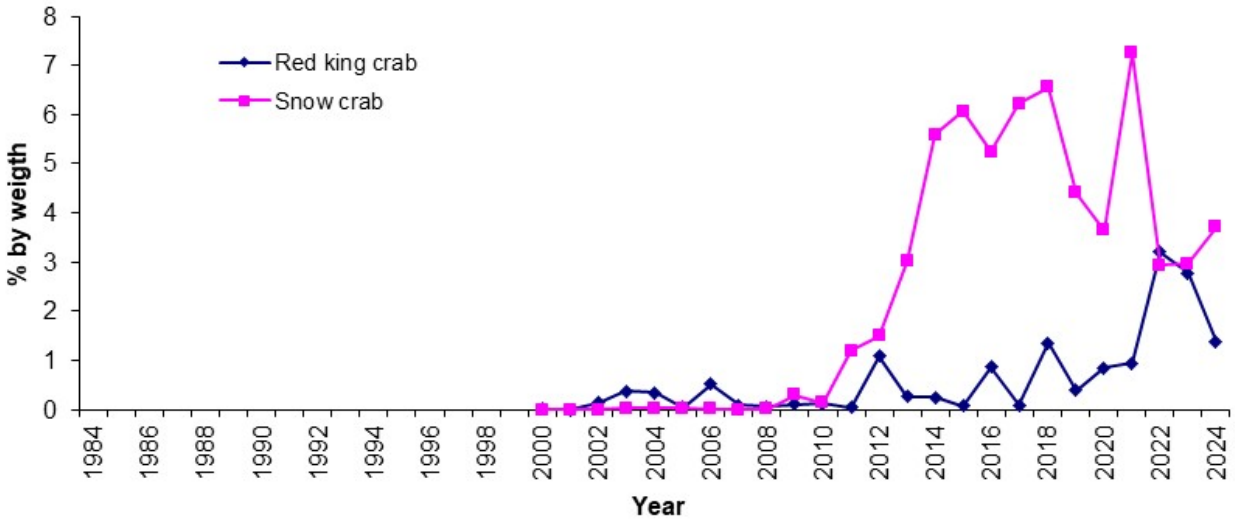


Figure 1.6. Importance of snow crab and red king crab in diet of cod in 1984-2024, % by weight. Could not be updated this year.

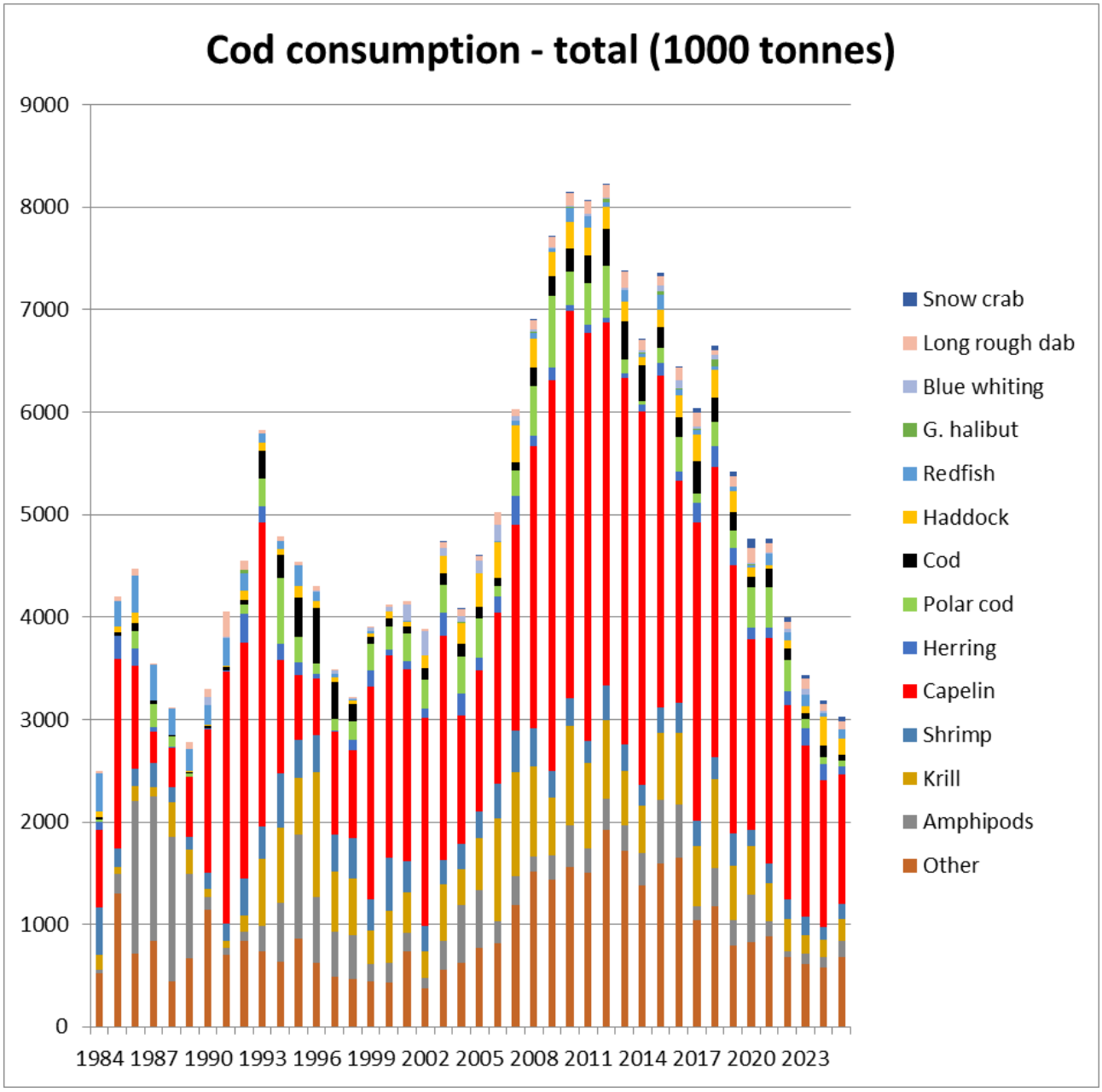


Figure 1.7. Consumption of various prey items by cod in 1984-2025. Norwegian calculations.

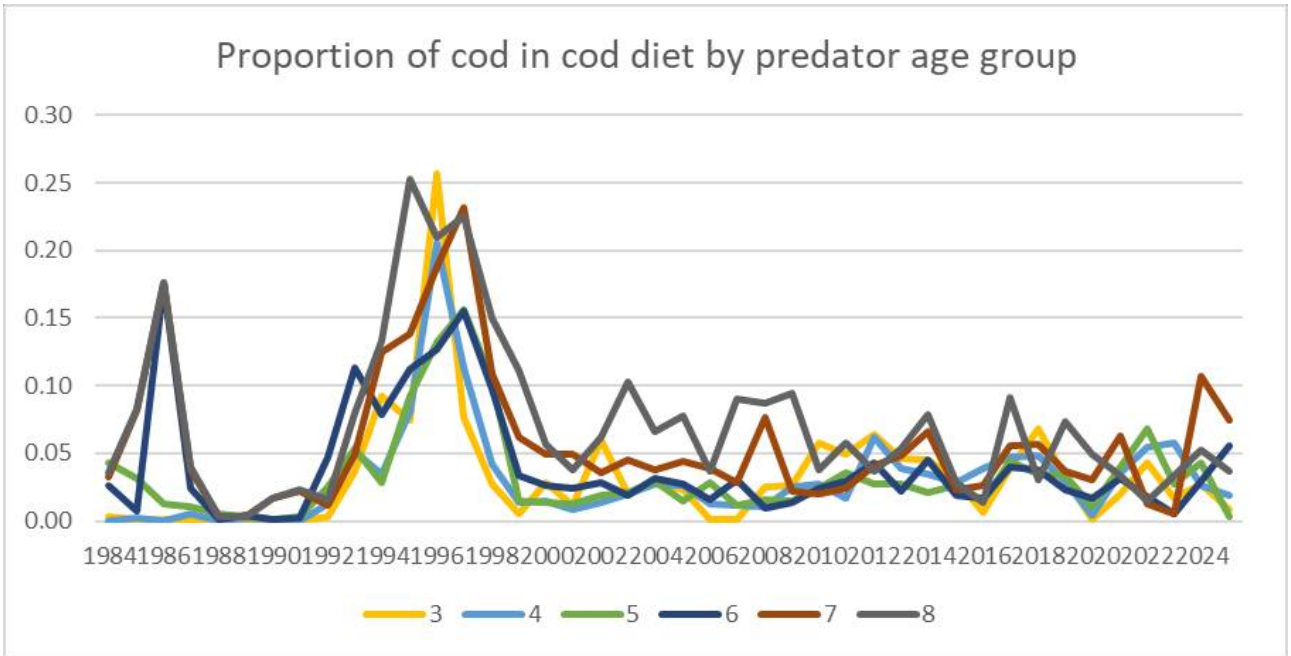


Figure 1.8. Proportion of cod in cod diet by predator age group.

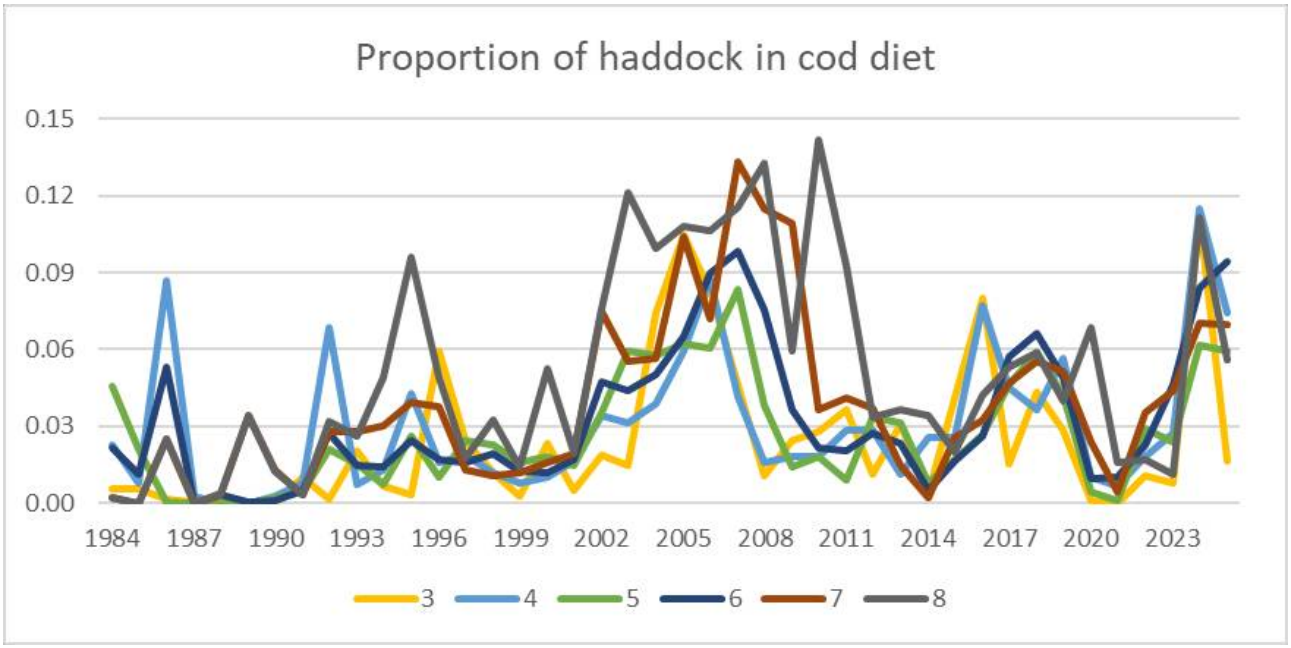


Figure 1.9. Proportion of haddock in cod diet by predator age group.

Haddock

Warm conditions are necessary, but not sufficient conditions to ensure good recruitment and growth. Plankton bloom (timing and strength) and influx are important for year-class formation. The year-classes 2018-2020 were poor, but the reasons are not fully explored. The year-classes 2021-2024 appear to be average, or above average. There is a downward trend in the condition factor of haddock (Fig. 1.10). Older haddock include a high

proportion of benthic invertebrates in their diet, but the availability of this prey group is not known. The low cod stock should lead to less predation on haddock by cod, and therefore lower mortality on both pre-recruits and younger haddock recruited into the fishery.

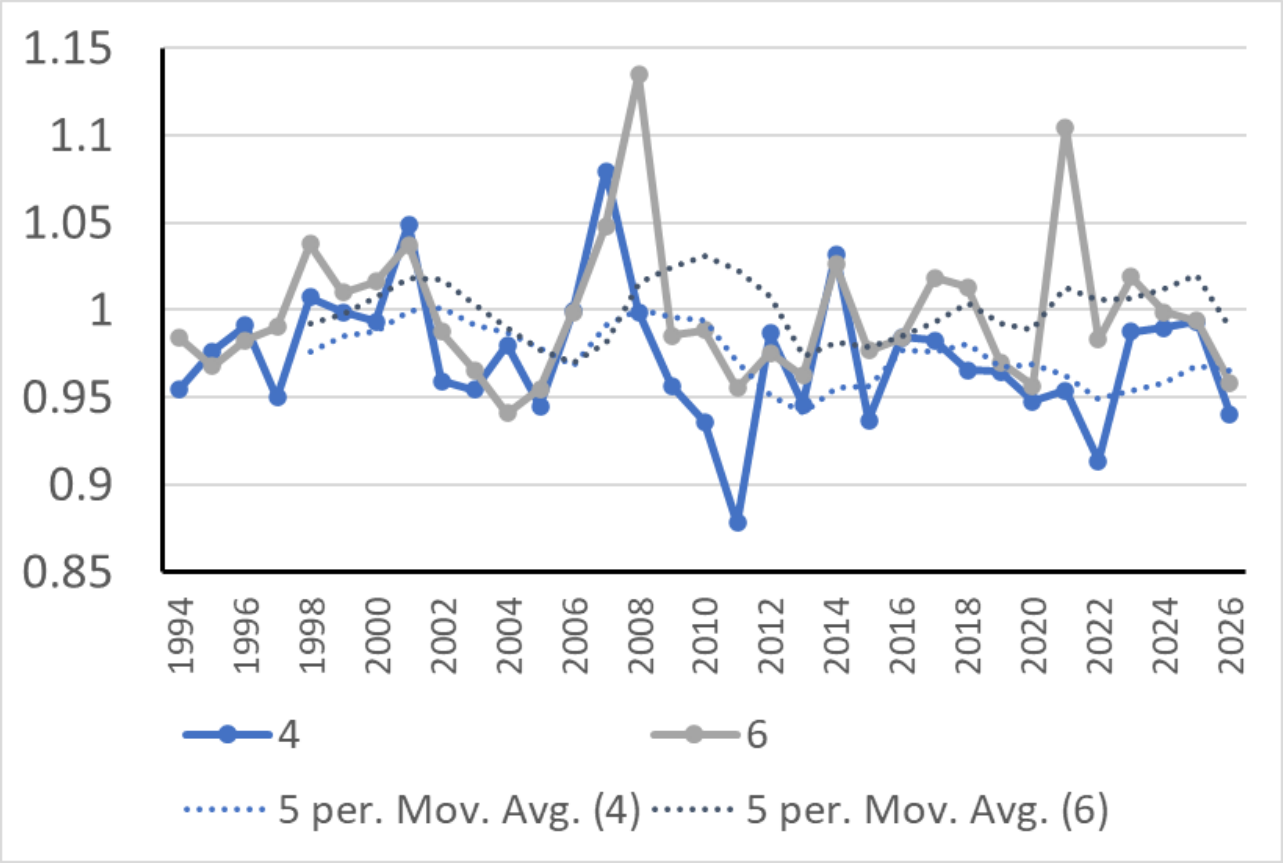


*Figure 1.10. Fulton's K (100*weight (g) /length (cm)^3) for 4 and 6 year old haddock calculated from average weights and lengths from the winter survey 1994-2026.*

Haddock diet

The diet composition of haddock is presented in Fig. 1.11. Haddock is a benthivorous species and feeds mainly on polychaets, echinoderms and molluscs (on average up to 43 % by weight). However, euphausiids and fish (including capelin and herring) can be important prey items (on average up to 13 % and 17 % by weight respectively).

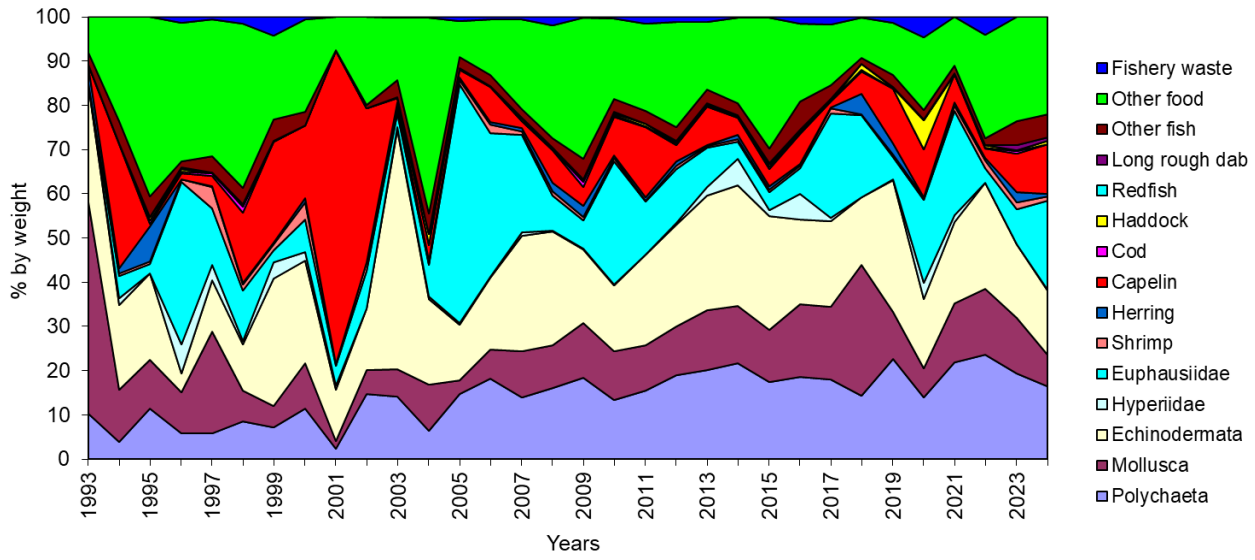


Figure 1.11. Diet composition of haddock in the Barents Sea in 1993-2024, % by weight. Could not be updated this year.

Greenland halibut

The distribution of the Northeast Arctic Greenland halibut stock is very uneven in the Barents Sea and adjacent waters and strongly depends on the migrations that it makes throughout its life. The highest densities of adult fish are observed in spawning grounds on the slope of the continental shelf. Juveniles are widely distributed along the northern part of the shelf and the northern part of the Barents Sea. Their abundance in the Barents Sea may be affected by water temperature and currents, although the effect of these factors is not fully understood and uncertain. Growth and maturation of the Greenland halibut depend on prey abundance. Greenland halibut feeds on zooplankton, shrimp, capelin, herring, polar cod and other small fishes. Cod can be both predator and food competitor for Greenland halibut, but spatial overlap is observed mainly between cod and Greenland halibut juveniles. Cannibalism can also be observed in areas with the overlapping of adults and juveniles. Mammals can consume Greenland halibut in the spawning areas.

Beaked redfish

As a boreal species, it is benefiting from the warming in the Barents Sea. Its stock has increased in recent years, but stock assessment of this species characterized by high uncertainty. Feeding condition for beaked redfish, which feeds on zooplankton and small fish (capelin), in 2023-202 4 were likely ~~to be~~ relatively good, but decreased in 2025. Cod and Greenland halibut are main predators for the beaked redfish. However, as abundance of these species is low , the predation pressure on redfish probably is relatively low. In 2021-2024, the total number of redfish juveniles, mostly *S. mentella* , caught as bycatch in the international shrimp fishery was high (see Figure 1.14), but decreased to a low level in 2025. This strongly depends on the overlap between the distribution areas of redfish juveniles and shrimp fishery areas. The stock size and distribution of shrimp as well as currents and temperature affect this.

Marine mammals

In the Barents Sea about 15 cetacean species, 7 seal species and the polar bear can potentially be observed. The white-beaked dolphin is the most common cetacean species to be seen within the Barents Sea as it is distributed all over the area. Among the large baleen whales, especially minke whales, but also fin whales, are distributed over large parts of the Barents Sea, and are seasonally present at relatively high numbers.

Humpback whales have much more aggregated distributions north and west of Hopen and around Bear Island, and these locations are also shared by the other baleen whale species.

As in previous years, the most frequently observed and widely distributed species was the white-beaked dolphin (*Lagenorhynchus albirostris*) with higher sighting frequency north of 73°N. While the number of registered individuals of this species was higher compared to previous years, it was not distributed as far to the east and northeast as previously. White-beaked dolphins formed the largest aggregations in the Great Bank and Central Bank in areas of capelin concentrations, where groups of up to 55 individuals were recorded.

Consistent with previous years, other dominant species observed during the survey included the baleen whales minke (*Balaenoptera acutorostrata*), humpback (*Megaptera novaeangliae*), and fin (*Balaenoptera physalus*) whale.

This year the number of minke whale registrations was higher than in 2024. This species was mainly sighted in the areas west of 40°E. One large aggregation of 41 minke whales was observed in the Great Bank area, along with groups of fin and humpback whales and coinciding with capelin aggregations.

Compared to previous years, the main aggregations of humpback whales were recorded in a more restricted area within 76–78° N and 25–39° E, coinciding with capelin concentrations. With group sizes of 25-40 and up to 100 humpback whales, larger groups of this species were observed in this area than in previous years. Overall, while the number of groups observed was lower in 2025 than in 2024, groups tended to be larger, and the total number of registered humpback whales (total number of individuals) was higher than in 2023 and 2024.

The distribution of fin whales was relatively similar to previous years, but they were not as widely distributed towards the east as in previous years. The main aggregations of this species were recorded in the same areas where minke and humpback whales were concentrated.

Food web and species interactions

The Barents Sea food web is a relatively well-studied, cold-water marine ecosystem characterized by strong seasonal productivity and top-down control by predators (Blanchard et al. 2002, Wassmann et al. 2011 **)** . At its base, the food web starts with phytoplankton, which bloom in spring and are grazed by zooplankton such as *Calanus finmarchicus* . These in turn support a variety of pelagic fish like capelin (*Mallotus villosus*), herring, polar cod and the early life-stages of demersal fish. Demersal fish (e.g., cod, *Gadus morhua*) feed on both pelagic and benthic prey, while marine mammals (such as harp seals and whales) and seabirds (e.g., auks) act as apex predators. The web is influenced by climate-driven changes in ice cover and inflow of Atlantic waters, affecting species composition and productivity.

A model for assessing the food web of marine mammals and fish in Barents Seas developed by Planque et al. (2024) is shown in Figure 1.12. Marine mammals consume large quantities of food, comprised of fish, including cod and lower trophic level species that support commercial fish stocks.

Table 1.1. The North-east arctic COD stock's consumption of various prey species in 1984-2025 (1000 tonnes) based on Norwegian consumption calculations. Same data as for Figs. 1.5 and 1.7.

Year	Other	Amphipods	Krill	Shrimp	Capelin	Herring	Polar cod	Cod	Haddock	Redfish	G. halibut	Blue whiting	Long rough dab	Snow crab	Total
1984	527	30	141	465	755	84	16	23	56	380	0	0	25	0	2503
1985	1301	191	65	188	1841	227	3	31	56	252	0	2	48	0	4205

1986	712	1493	144	172	1002	172	163	77	111	354	0	0	68	0	4470
1987	836	1412	90	241	306	39	231	27	6	350	1	0	11	0	3551
1988	447	1411	335	150	383	8	100	10	3	258	0	5	6	0	3115
1989	671	822	235	123	587	3	37	8	10	221	0	0	67	0	2784
1990	1146	122	77	160	1399	7	5	16	14	188	0	81	86	0	3302
1991	701	65	73	165	2462	7	11	23	16	268	7	8	243	0	4049
1992	833	95	154	362	2306	279	93	47	88	175	25	2	96	0	4554
1993	735	252	647	317	2968	161	278	269	72	94	2	2	28	0	5823
1994	640	576	730	528	1110	155	637	233	51	79	0	1	44	0	4783
1995	860	1015	554	373	631	121	253	378	117	199	2	0	37	0	4540
1996	623	643	1220	357	553	47	103	541	67	95	0	10	37	0	4297
1997	494	437	585	362	1007	5	117	355	45	33	0	34	15	0	3489
1998	466	431	550	391	859	106	179	165	37	9	0	14	18	0	3224
1999	441	173	324	305	2081	154	264	67	30	18	1	35	9	0	3903
2000	435	192	507	513	1974	62	223	85	60	8	0	41	21	0	4121
2001	738	181	396	298	1874	77	270	69	52	6	1	159	32	0	4153
2002	381	96	262	245	2032	87	284	110	128	1	0	241	16	0	3882
2003	554	290	545	243	2187	220	279	111	167	3	0	74	53	0	4726
2004	628	564	346	249	1256	215	357	127	199	3	11	57	65	1	4077
2005	767	564	510	267	1370	129	381	116	320	2	5	115	53	0	4598
2006	819	212	1007	332	1668	165	101	78	347	11	2	159	119	0	5020
2007	1183	292	1012	402	2015	273	250	86	359	43	0	43	72	0	6030
2008	1514	151	882	369	2749	101	494	178	282	56	12	17	89	0	6895
2009	1439	231	571	256	3818	118	706	187	243	27	3	5	112	2	7717
2010	1562	404	974	272	3779	51	325	232	256	134	9	14	128	7	8149
2011	1504	242	829	213	3982	80	410	274	268	111	0	26	117	8	8064
2012	1920	301	777	337	3541	49	505	362	213	50	32	8	121	7	8222
2013	1721	251	528	259	3571	50	135	368	196	107	1	21	163	15	7386
2014	1375	319	467	199	3643	70	31	351	86	31	10	18	104	9	6712
2015	1590	624	661	247	3231	127	143	208	174	138	40	58	82	33	7355
2016	1656	512	696	295	2166	94	341	189	218	56	5	86	115	9	6440
2017	1046	128	589	251	2912	193	88	310	268	44	3	24	137	50	6043
2018	1176	375	862	223	2829	199	237	241	271	33	67	46	52	42	6650
2019	792	249	532	310	2618	179	162	183	206	44	0	2	99	48	5425
2020	824	469	472	160	1860	105	406	100	82	26	11	12	151	87	4766
2021	887	139	372	197	2200	97	396	187	25	112	0	13	94	39	4760
2022	675	67	313	195	1885	144	299	115	75	82	4	29	72	43	3998

2023	612	106	178	180	1668	166	99	55	68	106	0	57	108	29	3431
2024	579	97	170	131	1426	163	64	113	283	33	6	25	67	25	3181
2025	685	155	208	155	1257	80	55	63	149	92	0	7	73	50	3029

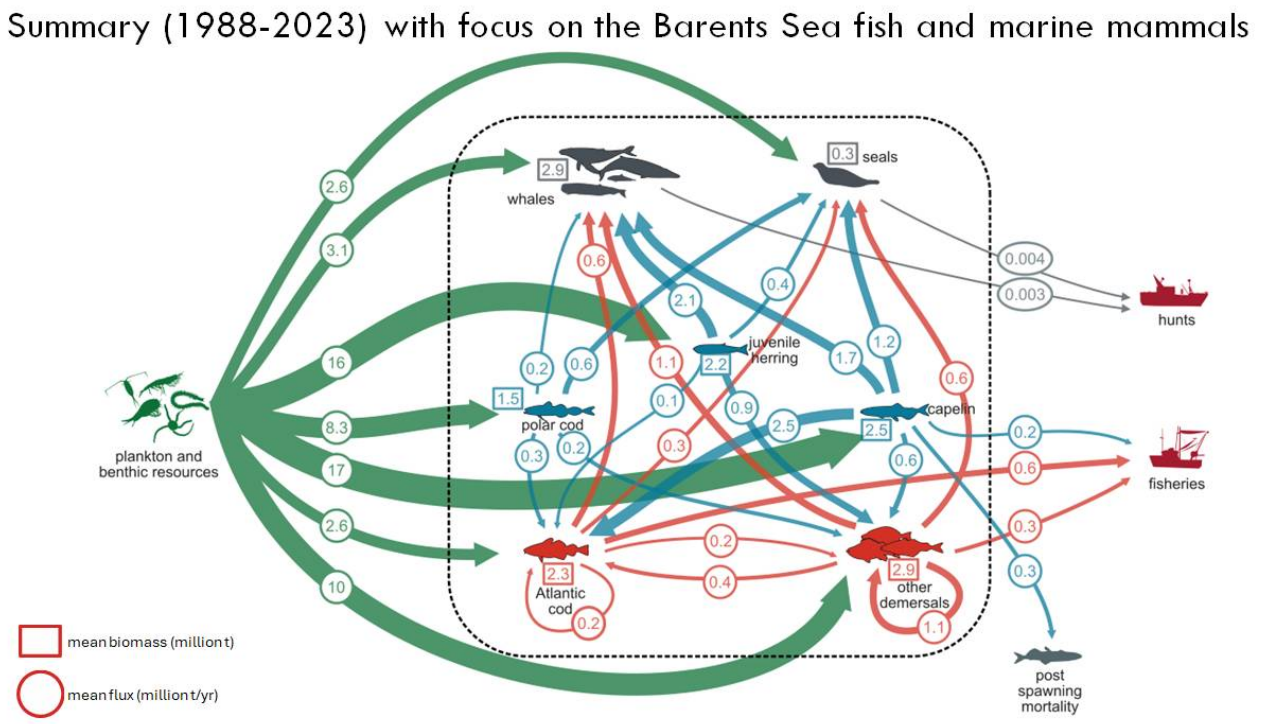


Fig. 1.12. Results from a food-web assessment model for marine mammals, fish, and fisheries in the Barents and Norwegian Seas (Planque et al. 2024). Note the legends in lower left corner of the figure.

According to Mauritzen et al. (2022) marine mammals consume about 535 000 tons of gadoid species annually in the Barents Sea. We should get more information about the gadoid species composition and size of this prey in their diet to better evaluate the mortality caused by marine mammals compared to cannibalism, fishing mortality and other natural mortalities. For Northeast Arctic cod, total cannibalism during the record high spawning stock biomasses (SSB) during 2011-2015 was up to 368 000 tons (2013), while cannibalism in 2025 was estimated to 63 000 tons (Table 1.1).

The number of recruits produced per unit cod spawning stock biomass has dropped to a low level since 2006. T he average number of recruits R3 per kg spawning stock biomass 1981-2006 was 1.67 and from 2007-2023 was 0.37, numbers from this year’s assessment. A similar drop is not apparent in the number of recruits at the 0-group stage (Figure 1.13). The reasons for the change are not clear. It might be caused by northwards shifts in spawning grounds, reduced plankton transport to the Barents Sea, or other ecosystem changes related to warming of the ocean (Johannesen et al. 2026).

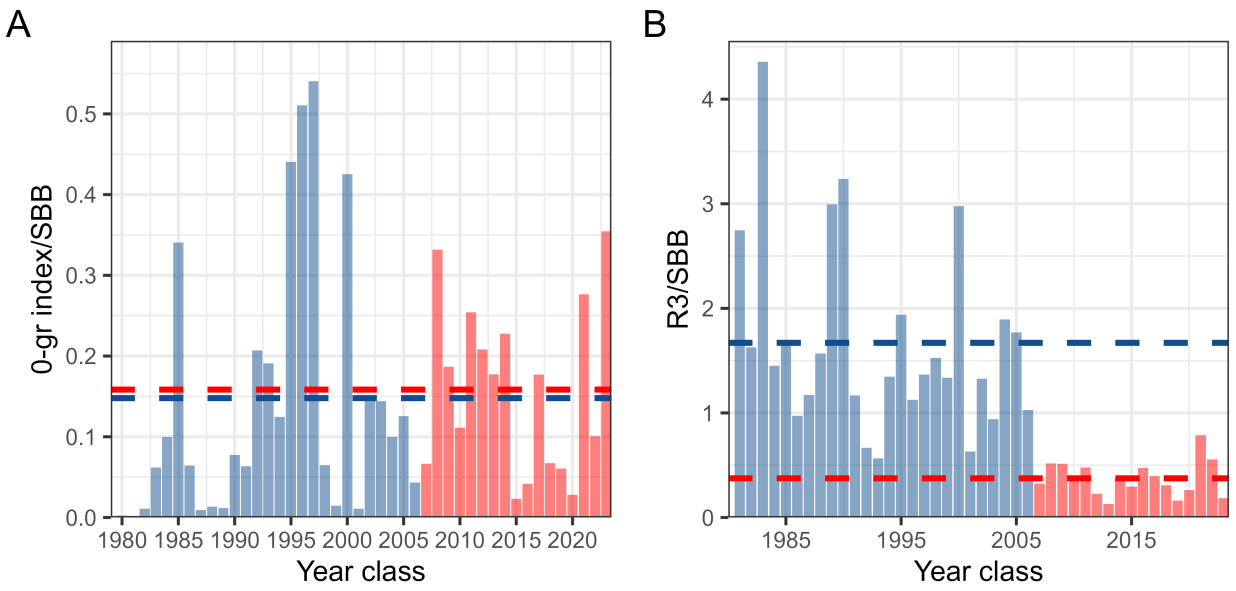


Fig. 1.13. Recruitment success (R/SSB) of the cod year-classes 1981-2006 (blue) and 2007-2023 (red) illustrating the low survival of promising year-classes of cod produced by record high SSBs during 2011-2015. A: 0-group cod index/SSB and B: R3/SSB (recruits per kg spawning stock biomass). The dashed lines show the averages for the year-classes 1981-2006 in blue and 2007-2023 in red. Updated from Johannesen et al. 2026.Caption

1.2 Discards and young fish bycatch in mixed fishery

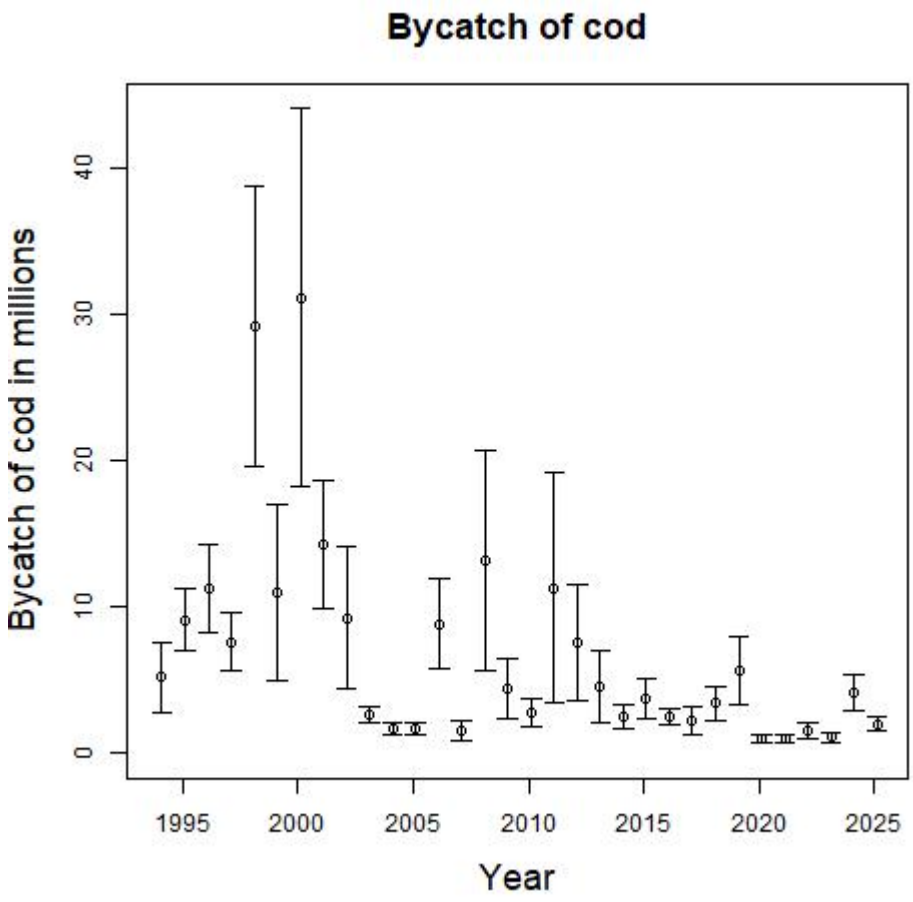
In this report, the terms ‘landings’ and ‘catches’ are, somewhat incorrectly, used as synonyms, as discards are in no cases used in the assessments. This does not mean, however, that discards have not occurred, but the WG has no information on the likely extent. Available information indicates low discard rates at present (less than 5% of catch), and it therefore is assumed that discards are negligible in the context of the precision of the advice.

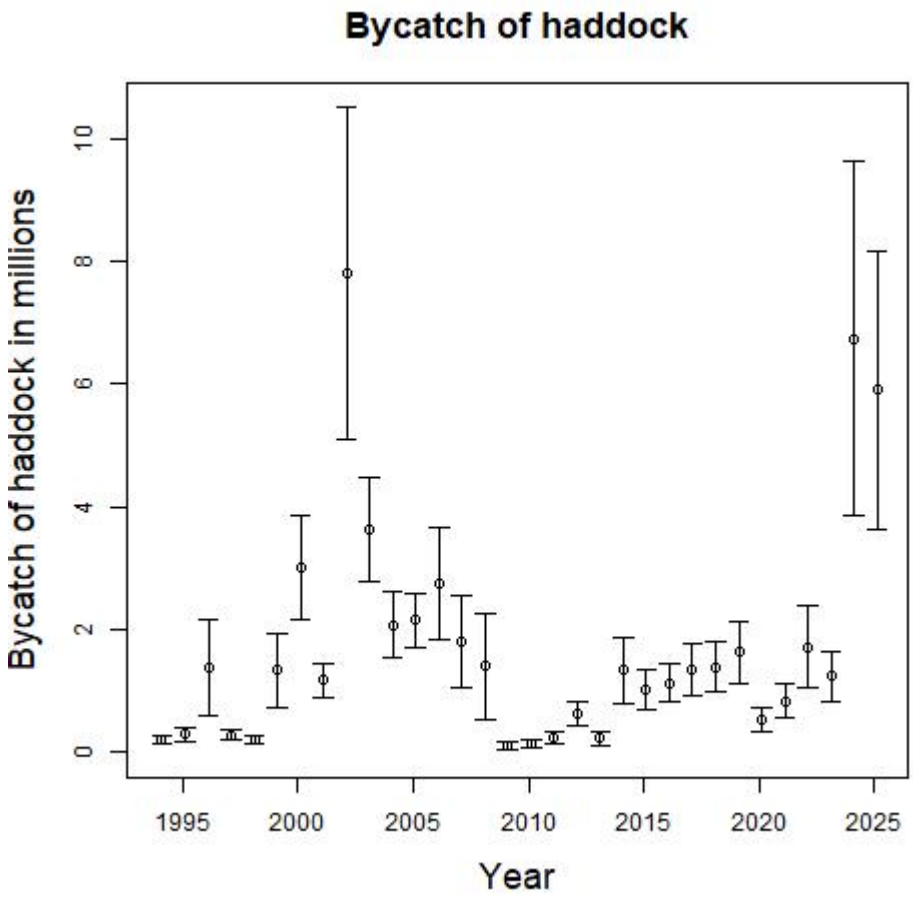
We would note that there have been historical periods with significant mis-reporting, and for further information on under- and misreporting, we refer to the 2016 and 2022 AFWG reports.

Bycatch estimates (1994–2025) of redfish, cod, haddock, Greenland halibut and polar cod juveniles in the commercial shrimp fishery in the Barents Sea are presented in Figure 1. 14 . These estimates are obtained with a spatio-temporal model based on a procedure elaborated in Breivik et al. (2017). In Breivik et al. (2017) an extensive validation study indicates that the procedure obtains bycatch estimates with approximately correct uncertainty. The bycatch estimates illustrated in Figure 1. 14 are available for each quarter in each main statistical area (not shown in report). Note the increase in bycatch of redfish juveniles in recent years. In the Barents Sea , genetic analyses of redfish juveniles collected from bycatches in the shrimp fishery some years ago showed that 97% of the redfish juveniles were *S. mentella* (K. Nedreaas, *pers.comm* .). Most of the redfish bycatch are 8-15 cm and 1-3 years old *S. mentella* with an average weight of about 22 g. A bycatch of 10 million redfish hence corresponds to 220 tons bycatch compared to 92 000 tons eaten by cod in 2025. On the other hand, 10 million 2-year-old redfish bycatch (i.e., 1/3 of the total bycatch) is about 4% of the assessed total stock number of 2 year olds (Howell et al. 2024). The current stock assessment of *S. mentella* is less accurate with regards to small fish since it mainly focuses on the fished part of the stock. The natural mortality of the smallest redfish caught as bycatch is also likely higher than M=0.05 used in the current stock assessment.

The time-series in Figure 1.14 are obtained by scaling the estimated bycatch in the Norwegian shrimp fishery with the international fishery in e.g., each season and ICES area. The scaling procedure assumes that the Norwegian fishery is representative of the international shrimp fishery with regards to bycatch. This assumption is necessary because the international catch data are available only to a low spatio-temporal resolution. If the international vessels to a relatively high degree trawl at locations not trawled by Norwegian vessels, the bycatch estimates illustrated in Figure 1. 14 may be biased. The estimated bycatches do not include larger fish kept in escapement bags in some countries' shrimp fisheries in international waters (the "Loop-hole").

The same spatio-temporal model may also be used as a tool to open closed areas.




Bycatch of haddock
Bycatch of haddock in millions
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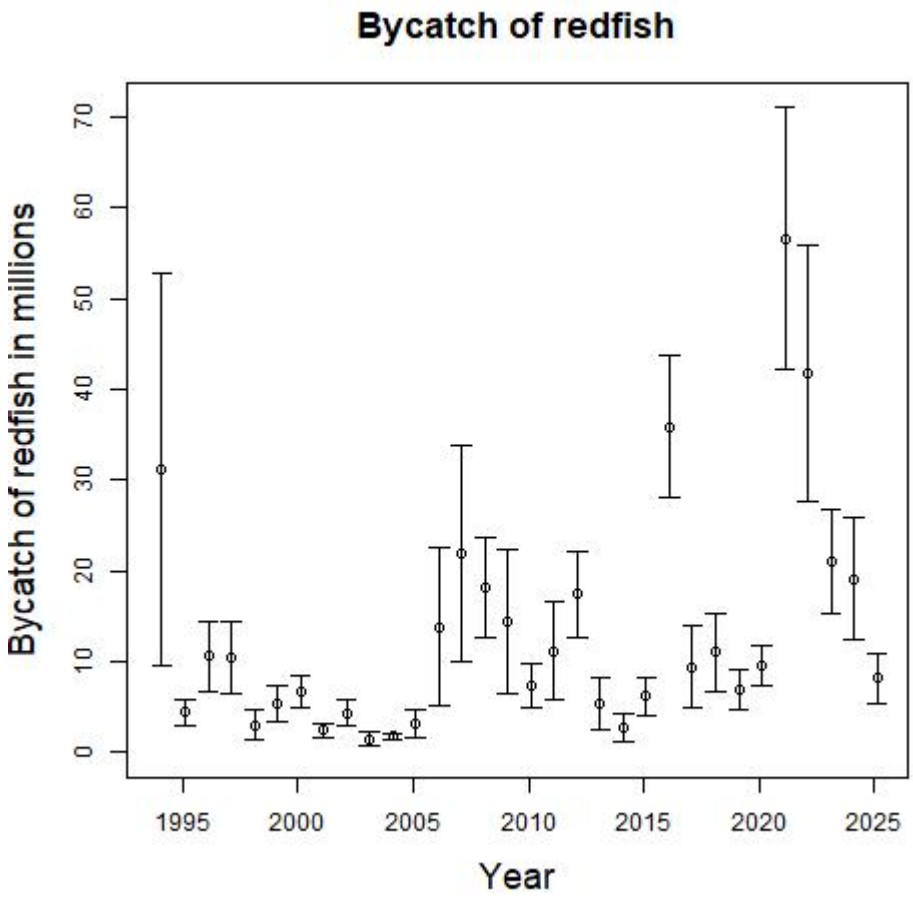
6
8
10
1995
2000
2005
2010
2015
2020
2025
Year


Bycatch of redfish
Bycatch of redfish in millions
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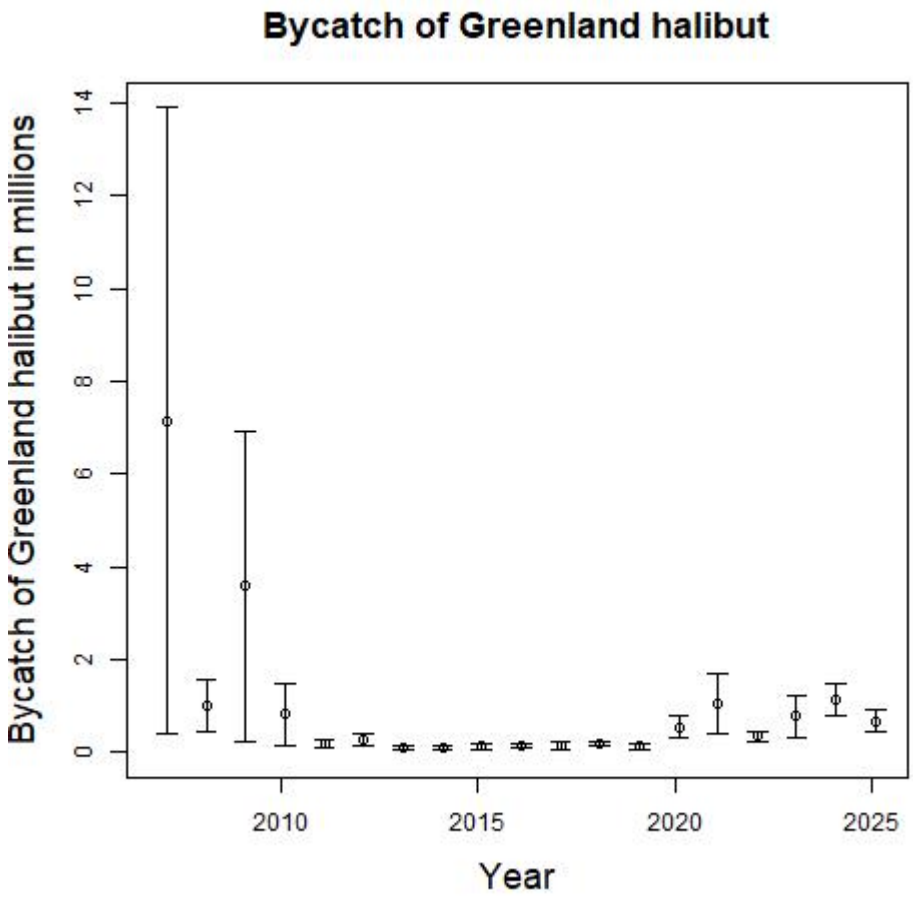
Bycatch of Greenland halibut
Bycatch of Greenland halibut in millions
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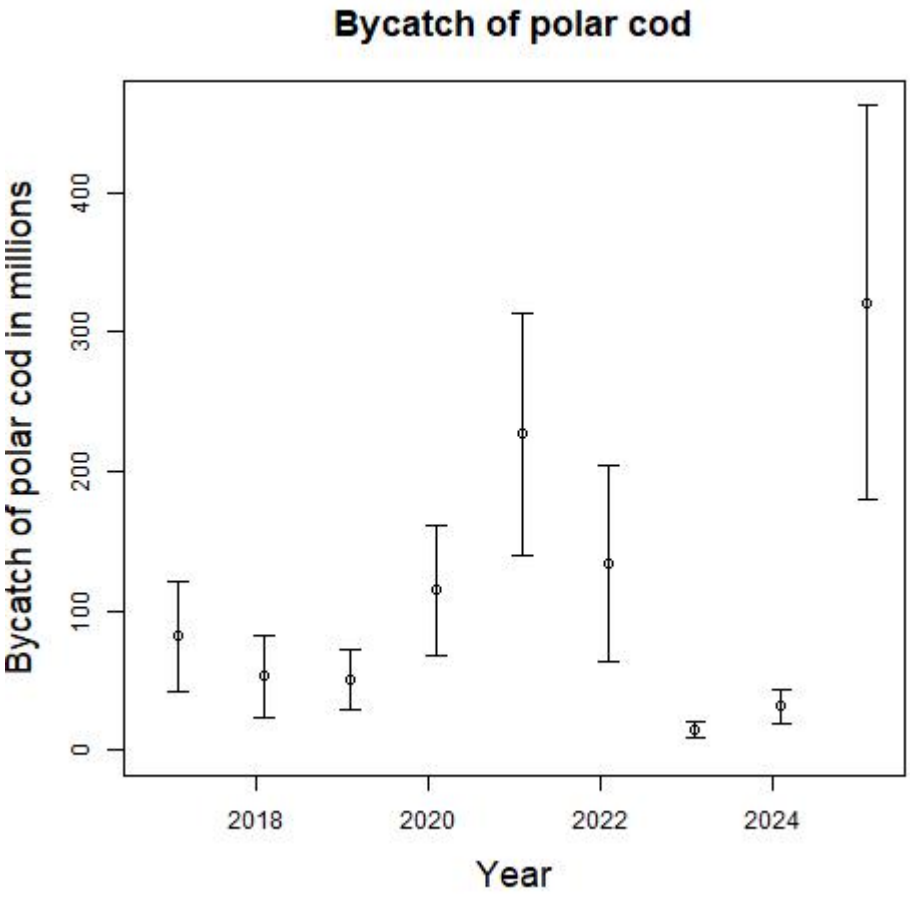

Fig. 1.14. Estimated bycatch of cod, haddock, redfish, Greenland halibut and polar cod (Boreogadus saida) in the Barents Sea international shrimp fishery. Intervals are 90% confidence intervals.

1.3 Sampling of commercial catches – age and length sampling

Tables 1.2–1.5 show the development of the Norwegian, Russian, Spanish and German sampling of commercial catches in the period 2008–2025. The tables show the total sampling effort, but do not show how well the sampling covers the fishery. Indices of coverage should be developed to indicate this. The main reason for the general strong decrease in numbers of Norwegian samples in the first part of this period is the termination of the port sampling program in northern Norway. This program is now up and running again. It should be considered whether catch sampling carried out by different countries fishing by trawl for the same time and area could be coordinated and data shared on a detailed level to a greater extent than is done today. It is also possible for Norway to provide stock coordinators in other countries with samples collected by the Norwegian Coastguard during their inspections of foreign vessels.

Table 1.2. Age and length sampling by Norway of commercial catches in 2008–2025. Number of samples and average number of fish per sample. Also, number of age samples and aged individuals per 1 000 t caught. For comparison, also the EU DCF requirements are shown.

Year	No of unique vessels	No of length samples	No of length-measured individuals	No of unique vessels (***)	No of age samples	No of aged individuals	Landing tonnes	Length-samples per 1000 t	Age samples per 1000 t	Aged individuals per 1000 t	EU co pe
NEA-cod + coastal cod											
2008	336	2526	51263		464	16026	196067	12.9	2.4	81.7	12
2009	272	2669	53350		417	14170	224816	11.9	1.9	63.0	12
2010	175	2542	39733		338	7671	263816	9.6	1.3	29.1	12
2011	273	2305	46227		434	10043	331535	7.0	1.3	30.3	12
2012	356	3132	57954		618	14710	363207	8.6	1.7	40.5	12
2013	266	2917	81583	84	1275	13940	464258	6.3	2.7	30.0	12
2014	556	2063	254627	306	1170	14815	465554	4.4	2.5	31.8	12
2015	498	1654	130514	89	1392	16500	413741	4.0	3.4	39.9	12
2016	482	2500	91590	401	1398	17027	403907	6.2	3.5	42.2	12
2017	413	2615	91366	348	1458	15471	408423	6.4	3.6	37.9	12
2018	873	3163	122788	346	1545	15535	369897	8.6	4.2	42.0	12
2019	842	3093	135375	337	1457	12519	322233	9.6	4.5	38.9	12
2020	389	1869	53587	259	653	12431	334773	5.6	2.0	37.1	12
2021	536	1236	43538	273	738	14708	379931	3.3	1.9	38.7	12
2022	459	1100	26623	250	643	12860	350445	3.1	1.8	36.7	12
2023	637	1550	39991	260	610	12204	290227	5.3	2.1	42.0	12
2024	578	802	34306	295	574	11324	202307	4.0	2.8	56.0	12
2025 372 786 31262 280 585 11601 169598 4.6 3.4 68.4 125											
NEA-haddock											
2008	285	2177	45038		281	9474	72553	30.0	3.9	130.6	12
2009	233	2255	41481		206	6010	104882	21.5	2.0	57.3	12
2010	154	2155	38045		232	5458	123517	17.4	1.9	44.2	12
2011	227	2028	39663		312	7225	158293	12.8	2.0	45.6	12
2012	258	2609	47995		386	8191	159008	16.4	2.4	51.5	12
2013	89	2142	62193	86	965	5718	99127	21.6	9.7	57.7	12
2014	425	1479	114560	126	825	7297	91333	16.2	9.0	79.9	12
2015	397	1380	76574	47	967	8394	95086	14.5	10.2	88.3	12
2016	237	1986	47032	208	391	8202	108718	18.3	3.6	75.4	12
2017	215	2108	57461	150	1084	8805	113206	18.6	9.6	77.8	12
2018	536	2435	85303	130	1088	8397	93839	25.9	11.6	89.5	12
2019	497	2269	83378	123	1003	7652	93860	24.2	10.7	81.5	12
2020	142	1055	32009	70	342	6589	88108	12.0	3.9	74.8	12
2021	154	1197	31310	81	418	8087	100673	11.9	4.2	80.3	12

Year	No of unique vessels	No of length samples	No of length-measured individuals	No of unique vessels (***)	No of age samples	No of aged individuals	Landing tonnes	Length-samples per 1000 t	Age samples per 1000 t	Aged individuals per 1000 t	EU co pe
2022	198	1500	31594	70	382	7644	88866	16.9	4.3	86.0	12
2023	251	1334	26689	71	395	7909	91325	14.6	4.3	86.6	12
2024	235	861	31262	97	371	6886	71226	12.1	5.2	96.7	12
2025	166	665	19972	130	348	6735	66659	10.0	5.2	101.0	12
Beaked redfish (S. mentella) **											
2008	13	178	1038		0	0	2214	80.4	0.0	0.0	12
2009	12	319	1841		2	40	2567	124.3	0.8	15.6	12
2010	11	284	3664		11	320	2245	126.5	4.9	142.5	12
2011	9	255	3210		11	298	2690	94.8	4.1	110.8	12
2012	13	166	2187		13	241	2098	79.1	6.2	114.9	12
2013	14	184	383	5	13	390	1361	135.2	9.6	286.6	12
2014	11	36	4664	12	49	5	13402	2.7	3.7	0.4	12
2015	22	295	8324	5	19	174	19433	15.2	1.0	9.0	12
2016	23	285	5470	9	23	169	18191	15.7	1.3	9.3	12
2017	22	234	3507	7	29	177	17077	13.7	1.7	10.4	12
2018	26	407	7295	8	41	374	18594	21.9	2.2	20.1	12
2019	21	345	5884	6	38	329	23844	14.5	1.6	13.8	12
2020	29	475	10796	9	75	686	32950	14.4	2.3	20.8	12
2021	27	623	17001	6	53	970	43794	14.2	1.2	22.1	12
2022	27	488	10658	7	71	1238	40716	12.0	1.7	30.4	12
2023											
2024											
Greenland halibut											
2008	37	500	17394	16	16		7393	67.6	2.2		12
2009	30	721	34699	11	11		8446	85.4	1.3		12
2010	22	519	9222				7700	67.4			12
2011	24	498	9314	3	3		8348	59.7	0.4		12
2012	22	615	9765	1	4		9331	65.9	0.4		12
2013	26	497	10554	1	1		10404	47.8	0.1		12
2014	32	359	5140			1	10997	32.6		0.1	12
2015	50	390	11200	21	23	1024	10874	35.9	2.1	94.2	12
2016	77	338	8040	44	50	1179	12932	26.1	3.9	91.2	12
2017	59	427	10385	23	23	1379	13741	31.1	1.7	100.4	12
2018	68	437	9083	36	42	1633	14875	29.4	2.8	10.8	12

	Year	No of unique vessels	No of length samples	No of length-measured individuals	No of unique vessels (***)	No of age samples	No of aged individuals	Landing tonnes	Length-samples per 1000 t	Age samples per 1000 t	Aged individuals per 1000 t	EU co pe
	2019	61	394	9286	42	47	1884	14867	26.5	3.2	126.7	12
	2020	80	429	9110	48	56	277	14526	29.5	3.9	19.1	12
	2021	62	528	10804	33	34	1056	14008	37.7	2.4	75.4	12
	2022	56	446	8164	37	38	1	13800	32.3	2.8	0.1	12
	2023	65	329	7317	33	33	956	14198	23.2	2.3	67.3	12
	2024	77	354	9982	47	62	1824	11290	31.4	5.5	161.6	12
	2025	87	250	6822	56	56	30	9928	25.2	5.6	3.0	12
Capelin												
	2008	4	3	150		0	0	5000	0.6	0.0	0.0	12
	2009	18	97	7039		39	1039	233000	0.4	0.2	4.5	12
	2010	75	230	6191		47	1291	246000	0.9	0.2	5.2	12
	2011	115	315	8346		48	1313	273000	1.2	0.2	4.8	12
	2012	84	308	9337		29	843	181328	1.7	0.2	4.6	12
	2013	12	213	12215	47	47	773	156340	1.4	0.3	4.9	12
	2014	27	113	9054	1	8	1086	40021	2.8	0.2	27.1	12
	2015	65	722	83776	65	722	5393	71435	10.1	10.1	75.5	12
	2016	7	27	1863	7	27	649	0				12
	2017	21	43	2294	14	25	305	0				12
	2018	68	207	15022	33	76	823	123461	1.7	0.6	6.7	12
	2019	4	26	260	2	13	0	0				12
	2020							0				12
	2021							0				12
	2022	23		2256			673	42597				12
	2023	16		1539			480	37652				12
	2024	32		3200			960	117555				12
	2025			0			0	0				12

**In addition to age the otoliths are also used for identification of coastal cod.

**Age samples from surveys with commercial trawl come in addition.

***From 2013 No. of unique vessels are split by length and age samples.

****Only from large, meshed gillnets as basis for assessment.

Table 1.3. Age and length sampling by Russia of commercial catches and age sampling of surveys in 2008–2025. Also, length-measured individuals and aged individuals per 1000 t caught. For comparison also the EU DCF requirements are shown.

	Year	No of length-measured individuals (commercial catches)	No of aged individuals (commercial catches)	No of aged individuals (surveys)	Total no of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Aged individuals per 1000 t (commercial catches)	Total aged individuals per 1000 t	EU DCF for comparison per 1000 t
NEA-cod*										
	2008	380592	3097	7565	10662	190225	2001	16.3	56	125
	2009	178038	1075	7426	8501	229291	776	4.7	37.1	125
	2010	126502	1828	7670	9498	267547	473	6.8	35.5	125
	2011	122623	2376	5783	8159	310326	395	7.7	26.3	125
	2012***	140028	2040	7742	9782	329943	424	6.2	29.6	125
	2013	131455	1999	8103	10102	432314	304	4.6	23.4	125
	2014	114538	3110	7154	10264	433479	264	7.2	23.7	125
	2015***	105721	2486	6095	8581	381188	277	6.5	22.5	125
	2016	158006	5090	2704	7794	394107	401	12.9	19.8	125
	2017	161192	4918	6121	11039	396195	407	12.4	27.9	125
	2018	157048	3129	1982	5111	340364	461	9.2	15	125
	2019***	83018	2093	3737	5830	316813	262	6.6	18.4	125
	2020***	112950	3105	3858	6963	312683	361	9.9	22.3	125
	2021	147510	3050	2617	5667	352064	419	8.7	16.1	125
	2022	97732	2588	2557	5145	333697	293	7.8	15.4	125
	2023	77703	2863	2027	4890	276923	281	10.3	17.7	125
	2024	110653	2030	3236	5266	222661	497	9.1	23.7	125
	2025	25212	853	2478	3331	148384	170	5.7	22.4	125
NEA-haddock										
	2008	216959	2498	5677	8175	68792	3154	36.3	118.8	125
	2009	43254	489	5421	5910	85514	506	5.7	69.1	125
	2010	85445	834	5060	5894	111372	767	7.5	52.9	125
	2011	61990	1570	3584	5154	139912	443	11.2	36.8	125
	2012***	87880	1545	5034	6579	143886	611	10.7	45.7	125
	2013	42927	1205	4021	5226	85668	501	14.1	61	125
	2014	45447	899	3796	4695	78725	577	11.4	59.6	125
	2015***	31009	914	2972	3886	91864	338	9.9	42.3	125
	2016	55598	2691	1884	4575	115710	480	23.3	39.5	125
	2017	74297	3554	2614	6168	106714	696	33.3	57.8	125
	2018	61360	2274	1136	3410	90486	678	25.1	37.7	125
	2019***	44728	1923	1778	3701	76125	588	25.3	48.6	125
	2020***	69301	2356	1575	3931	89030	778	26.5	44.2	125

	2021	40370	1450	1504	2954	98296	411	14.8	30.1	125
	2022	33251	2068	1550	3618	82364	404	25.1	43.9	125
	2023	23466	1543	2031	3574	81751	287	18.9	43.7	125
	2024	74904	1561	1938	3499	64423	1163	24.2	54.3	125
	2025	19363	675	1747	2422	55327	350	12.2	43.8	125
S. mentella										
	2008	21446	471	3379	3850	7117	3013	66.2	541	125
	2009	29435	761	1447	2208	3843	7659	198	574.6	125
	2010	2776	100	2295	2395	6414	433	15.6	373.4	125
	2011	917	7	640	647	5037	182	1.4	128.4	125
	2012	7802	422	1146	1568	4101	1902	102.9	382.3	125
	2013	19092	1253	1625	2878	3677	5192	340.8	782.7	125
	2014	817	25	1297	1322	1704	479	14.7	775.8	125
	2015	771		1818	1818	1142	675	0	1591.9	125
	2016	27765	1076	85	1161	8419	3298	127.8	137.9	125
	2017	958	99	1000	1099	4952	193	20	221.9	125
	2018	21004	845	39	884	10497	2001	80.5	84.2	125
	2019	6881	400	469	869	13164	523	30.4	66	125
	2020	8718	340	612	952	13997	623	24.3	68	125
	2021	7587	400	215	615	14887	510	26.9	41.3	125
	2022	1402	257	142	399	16717	84	15.4	23.9	125
	2023	2335	313	96	409	13976	167	22.4	29.3	125
	2024	1650	75	391	466	16235	102	4.6	28.7	125
	2025	5057	201	108	309	15494	326	13.0	19.9	125
Greenland halibut										
	2008	106411	1519	3366	4885	5294	20100	286.9	922.7	125
	2009	77554	819	2282	3101	3335	23255	245.6	929.8	125
	2010	32090	416	2784	3200	6888	4659	60.4	464.6	125
	2011	9892	115	1541	1656	7053	1403	16.3	234.8	125
	2012	82943	2140	2506	4646	10041	8260	213.1	462.7	125
	2013	12608	555	2756	3311	10310	1223	53.8	321.1	125
	2014	24346	633	2106	2739	10061	2420	62.9	272.2	125
	2015	22116	575	2489	3064	12953	1707	44.4	236.5	125
	2016	11818	574	221	795	10576	1117	54.3	75.2	125
	2017	24061	1205	1579	2784	10713	2246	112.5	259.9	125
	2018	21893	954	308	1262	12072	1814	79	104.5	125

	2019	861	125	1552	1677	12198	71	10.2	137.5	125
	2020	1387	165	1853	2018	12266	113	13.5	164.5	125
	2021	3920	225	362	587	12396	316	18.2	47.4	125
	2022	2883	404	163	567	11746	245	34.4	48.3	125
	2023	22057	1411	262	1673	11317	1949	124.7	147.8	125
	2024	7153	452	1618	2070	9581	747	47.2	216.1	125
	2025	18477	512	327	839	8440	2189	60.7	99.4	125
Capelin										
	2008**	82625	1644	2341	3985	5000	16525	328.8	797.0	125
	2009	94541	900	2511	3411	73000	1295	12.3	46.7	125
	2010	67265	1072	4043	5115	77000	874	13.9	66.4	125
	2011	63784	1273	2271	3544	86531	737	14.7	41.0	125
	2012	20023	1130	1783	2913	68182	294	16.6	42.7	125
	2013	54708	1565	1007	2572	60413	906	25.9	42.6	125
	2014	13206	850	1249	2099	25720	513	33.0	81.6	125
	2015	27200	1000	1004	2004	115				125
	2016	8669	3954	1047	5001	0				125
	2017			4115	4115	6				125
	2018	14491	250	1050	1300	65934	220	3.8	19.7	125
	2019			1498	1498	34				125
	2020			1245	1245	19				125
	2021	0	0	1606	1606	8				125
	2022	13976	600	300	900	22649	617	26.5	39.7	125
	2023	15309	350	802	1152	23043	664	15.2	50.0	125
	2024	21342	550	1360	1910	51128	417	10.8	37.4	125
	2025	0	0	475	475					

*In addition, also used long-term mean age–length keys.

**Age samples from surveys with commercial trawl come in addition.

***In addition, used length samples from Russian vessels, sampled by the Norwegian Coast Guard in 2012, 2015, 2019, 2020, 2023 and 2025.

Table 1.4. Age and length sampling by Spain0F1 of commercial catches and length sampling of surveys in 2008–2024. Also, length-measured individuals and aged individuals per 1000 t caught. For comparison also the EU DCF requirements are shown.

Stock	Year	No of vessels	No of length-measured individuals (commercial catches)	No of aged individuals (commercial catches)	No of aged individuals (surveys)	Total no of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Aged individuals per 1000 t (commercial catches)	Total a indivi per 10
NEA-cod										
	2008	2	10108	610		610	9658	1047	63	63
	2009	2	8733	1834		1834	12013	727	153	153
	2010	2	28297	1735		1735	12657	2236	137	137
	2011	2	11633	964		964	13291	875	73	73
	2012	2	9849	998		998	12814	769	78	78
	2013	2	30295	2381		2381	15041	2014	158	158
	2014	2	27828	2306		2306	16479	1689	140	140
	2015	2	18568	1445		1445	18772	989	77	77
	2016	2	27937	1246		1246	14640	1908	85	85
	2017	2	33984	2018		2018	14414	2358	140	140
	2018	1	25933	911		911	14415	1799	63	63
	2019	1	5781	1117		1117	13939	415	80	80
	2020						11403			
	2021	2	23891	1314		1314	11080	2156	119	119
	2022	2	22791	345		345	12214	1866	28	28
	2023									
	2024									
NEA-haddock*										
	2009	1	2561				240			
	2010	1	3243				379			
	2011	1	1796				408			
	2012	2	3198				647			
	2013	1	660				413			
	2014	1	2460				370			
	2015	1	702				418			
	2016	2	701				357			
	2017	1	710				156			
	2018	1	154				169			
	2019						280			

Stock	Year	No of vessels	No of length-measured individuals (commercial catches)	No of aged individuals (commercial catches)	No of aged individuals (surveys)	Total no of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Aged individuals per 1000 t (commercial catches)	Total a individ per 10
	2020						45			
	2021						131			
	2022						187			
	2023									
	2024									
S. mentella										
	2008**	1	2275	28			987	2304	28	0
	2011*	1	86				1237			
	2012**	2	11579	476			1612	7183	295	0
	2014**	1	6177				1146	5390		
	2015**	1	6117				2371	2580		
	2016**	1	11806				3133	3768		
	2017**	1	5015				2624	1911		
	2018**	1	11638				2399	4851		
	2019**	1	11952				1908	6265		
	2020**						737			
	2021**	1	2074	157			280	7396		
	2022						277			
	2023									
	2024									
Greenland halibut										
	2008	2	11662				112	103826		
	2009	1	3383				210	16143		
	2010	1	5783				182	31800		
	2011	1	8541				169	50600		
	2012	1	4809				186	25907		
	2013	1	11988				190	63019		
	2014	1	12002				206	58262		
	2015	1	17552				111	158126		
	2016	1	15031				218	68837		
	2017									
	2018									

Stock	Year	No of vessels	No of length-measured individuals (commercial catches)	No of aged individuals (commercial catches)	No of aged individuals (surveys)	Total no of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Aged individuals per 1000 t (commercial catches)	Total a indivi per 10
	2019	1					49			
	2020						96			
	2021						125			
	2022						164			
	2023						72			
	2024									

*Sampling from bycatch in cod fishery.

**Sampling from pelagic redfish fishery.

***Sampling from Spanish Greenland halibut survey.

Table 1.5. Age and length sampling by Germany of commercial catches and age sampling of surveys in 2008–2024. Also, length-measured individuals and aged individuals per 1 000 t caught. For comparison also the EU DCF requirements are shown.

	Year	No of unique vessels	No of length samples	No of length-measured individuals	No of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Age-sampled individuals per 1000 t	EU DCF for comparison
NEA cod									
	2008	5	3	65800	2033	4955	13280	410	125
	2009	5	2	43107	2419	8585	5021	282	125
	2010	5	2	51923	3075	8442	6151	364	125
	2011	4	1	7318	769	4621	1584	166	125
	2012	4	2	16315	1924	8500	1919	226	125
	2013	4	2	29281	2043	7939	3688	257	125
	2014	4	1	23137	1291	6225	3717	207	125
	2015	4	1	39335	886	6427	6120	138	125
	2016	3	1	22109	1060	6636	3332	160	125
	2017	4	1	19942	785	5969	3341	132	125
	2018	4	2	43371	2283	7774	5579	294	125
	2019	2	1	17954	1444	8535	2104	169	125
	2020	2	1	21716	1021	9786	2219	104	125
	2021	2	1	21548	1393	5470	3939	255	125
	2022	2	1	14795	986	7171	2063	137	125
	2023								
	2024								

	Year	No of unique vessels	No of length samples	No of length-measured individuals	No of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Age-sampled individuals per 1000 t	EU DCF for comparison
NEA haddock									
	2008	5	3	5548	442	535	10370	826	125
	2009	5	2	23348	958	1957	11931	490	125
	2010	5	2	54704	1039	3539	15457	294	125
	2011	4	1	1925	160	1724	1117	93	125
	2012	4	2	4088	502	1111	3680	452	125
	2013	4	1	7040	478	501	14052	954	125
	2014	4	1	3113	261	340	9156	768	125
	2015	4	1	616	325	124	4968	2621	125
	2016	3	1	4807	544	170	28276	3200	125
	2017	4	1	3464	527	155	22348	3400	125
	2018	4	2	4345	497	391	11113	1271	125
	2019	2	1	5031	393	208	24188	1889	125
	2020	2	1	2979	356	283	10527	1258	125
	2021	2	1	2808	344	368	7630	935	125
	2022	2	1	3270	399	271	12066	1472	125
	2023								
	2024								
Redfish									
	2008	5	3	330	0	46	7174	0	125
	2009	8	2	0	0	100	0	0	125
	2010	6	2	0	0	52	0	0	125
	2011	6	1	7937	0	844	9404	0	125
	2012	9	2	4036	0	584	6911	0	125
	2013	4	1	1315	0	81	16235	0	125
	2014	4	1	571	0	451	1266	0	125
	2015	4	1	76	0	266	286	0	125
	2016	3	1	6095	0	497	12264	0	125
	2017	4	1	977	0	770	1269	0	125
	2018	4	2	3438	0	2508	1371	0	125
	2019	2	1	8958	0	1741	5145	0	125
	2020	3	1	4248	0	1998	2126	0	125
	2021	2	1	2261	0	743	3043	0	125
	2022	2	1	8525	0	896	9515	0	125

	Year	No of unique vessels	No of length samples	No of length-measured individuals	No of aged individuals	Landings tonnes	Length-measured individuals per 1000 t	Age-sampled individuals per 1000 t	EU DCF for comparison
	2023								
	2024								
Greenland halibut									
	2008	5	2	0	0	5	0	0	125
	2009	3	2	0	0	19	0	0	125
	2010	2	2	0	0	14	0	0	125
	2011	3	1	0	0	81	0	0	125
	2012	4	2	0	0	40	0	0	125
	2013	3	1	1298	0	49	26544	0	125
	2014	4	1	1076	0	34	31647	0	125
	2015	4	1	658	0	32	20563	0	125
	2016	3	1	365	0	9	40556	0	125
	2017	4	1	0	0	21	0	0	125
	2018	4	1	257	0	52	4942	0	125
	2019	2	1	511	0	45	11356	0	125
	2020	2	1	305	0	74	4122	0	125
	2021	2	1	160	0	88	2222	0	125
	2022	2	1	672	0	95	7074	0	125
	2023	2	1	161	0	76	2118	0	125
	2024								

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3. Cod in subareas 1 and 2 (Northeast Arctic)

3.1 Status of the fisheries

3.1.1 Historical development of the fisheries (Table 3.1)

From a level of about 900 000 t in the mid-1970s, total catch declined steadily to around 300 000 t in 1983—1985 (Table 3.1). Catches increased to above 500 000 t in 1987 before dropping to 212 000 t in 1990, the lowest level recorded in the post-war period. The catches increased rapidly from 1991 onwards, stabilizing at around 750 000 t in 1994—1997 but decreased to about 414 000 t in 2000. From 2000—2009, the reported catches were between 400 000 and 520 000 t. In addition, there were unreported catches (see below). Catches decreased from a peak of 986 000 t in 2014 to 693 000 t in 2019-2020 before increasing to 767 000 t in 2021 and decreasing again to 453 040 t in 2024 and 329 468 t in 2025.

The fishery is conducted both with an international trawler fleet and with coastal vessels using traditional fishing gears. Quotas were introduced in 1978 for the trawler fleets and in 1989 for the coastal fleets. In addition to quotas, the fishery is regulated by a minimum catch size, a minimum mesh size in trawls and Danish seines, a maximum bycatch of undersized fish, closure of areas having high densities of juveniles and by seasonal and area restrictions.

3.1.2 Reported catches prior to 2026 (Tables 3.1-3.4, Figure 3.1)

The provisional catch of cod in Subarea 1 and divisions 2.a and 2.b for 2025 reported to the working group is 369 566 t (including both NEA cod and NCC catches).

The historical practice (considering catches between 62°N and 67°N for the whole year and catches between 67°N and 69°N for the second half of the year to be Norwegian coastal cod) has been used for estimating the Norwegian landings of Northeast Arctic cod up to and including 2011 (Table 3.2). The catches of coastal cod subtracted from total cod catches in Subarea 1 and divisions 2.a and 2.b for the period 1960—2025 are given in Table 3.2. For 2012–2025 the Norwegian catches have been analyzed by an ECA-version designed for simultaneously providing estimates of catch numbers-at-age for each of the two stocks.

Coastal cod catches in 2025 for the southern and northern area combined were 40 098 tonnes and this amount was as in previous years subtracted from the total cod catch north of 62° N to get the figure for NEA cod used in that assessment (Table 3.1 and 3.2).

The time series for coastal cod catches are now inconsistent with the coastal cod catches presented in ICES AFWG 2026 Chapter 2, as the coastal cod catch time series were revised at WKBarFar (ICES 2021a), but not the NEA cod time series. At WKBarFar, the proposal for revision of NEA cod catch data series was rejected, as Norwegian data for many years and age groups (especially ages 12+ in years prior to 2013) were changed considerably and the reason for this was not sufficiently explained. WKBarFar recommended that when the revision of the historical Norwegian catch data is ready it should be submitted to ICES for review, ideally by a review attached to the AFWG.

The catch by area is shown in Table 3.1 and further split into trawl and other gears in Table 3.3. The distribution of catches by gears and areas in 2025 was similar to 2024. The nominal landings by country are given in Table 3.4.

There is information on cod discards (see ICES AFWG 2021 section 0.4, ICES 2021b) but it was not included in the assessment because these data are fragmented and different estimates are in contradiction with each other.

Moreover, the level of discards is relatively small in the recent period and including these estimates in the assessment should not change our perception of NEA cod stock size.

In summer/autumn 2018, a Norwegian vessel caught 441 t of cod in the Jan Mayen EEZ, which is a part of ICES area 2a, mostly by long-line. Cod is known to occasionally occur in this area, but rarely in densities which are suitable for commercial fisheries. The cod caught in this area in 2018 was large (65-110 cm), and otolith readings and genetics both showed this cod to be a mix of Northeast Arctic and Icelandic cod. Norway did in 2019-2020 carry out an experimental long-line fishery during four different periods in each year in order to investigate further the occurrence of cod in this area in space and time as well as stock identity. A description of this fishery as well as a historic overview of cod observations around Jan Mayen is given in Bogstad (2023).

Quotas, catches and advice for the period 2019-2026 for cod in the Jan Mayen area are given in Table 3.1a. These catches are not included in the catch statistics for Northeast Arctic cod. No directed fishery for cod was allowed in 2025, but 5 t were caught as bycatch in the Greenland halibut fishery.

3.1.3 Unreported catches of Northeast Arctic cod (Table 3.1)

In the years 2002—2008, certain quantities of unreported catches (IUU catches) have been added to the reported landings. More details on this issue are given in the Working group reports for that period.

There are no reliable data on level of IUU catches outside the periods 1990—1994 and 2002—2008, but it is believed that their level was not substantial enough to influence historical stock assessment.

According to reports from the Norwegian-Russian analysis group on estimation of total catches, the total catches of cod since 2009 were very close to officially reported landings.

3.1.4 TACs and advised catches for 2025 and 2026

The Joint Norwegian-Russian Fisheries Commission (JNRFC) agreed on a cod TAC of 340 000 t for 2025, and in addition 21 000 t Norwegian coastal cod. The total reported catch of 329 468 t in 2025 was 10 532 t below the agreed TAC. Since 2015, JNRFC has decided that Norway and Russia can transfer to next year or borrow from last year 10% of the cod country’s quota. That may lead to some deviation between agreed TAC and reported catch. As an extraordinary measure due to expected underfishing of the TAC in 2021, JNRFC decided that it should be possible to transfer 15% of the TAC between 2021 and 2022, but thereafter the maximum transfer was reset back to the agreed 10%.

The advice for 2026 given by JRN-AFWG in 2025 was 269 440 t based on the agreed harvest control rule. The quota established by JNRFC for 2026 was set to 285 000 t. In addition, the TAC for Norwegian Coastal Cod was set to the same value for 2026 as for 2025: 21 000 t.

3.2 Status of research3.2.1 Fishing effort and CPUE (Table A1, Figure 3.4a-b)

CPUE series of the Russian and Norwegian trawl fisheries are given in Table A1 and described in Kovalev (2025, WD 1) and Gundersen et al. (WD2). The Russian series have been combined by area and vessel type since last year (Kovalev 2025, WD 1). The data reflect the total trawl effort (Figure 3.4a and 3.4b), both for Norway and Russia. Norwegian data for 2011–2025 are not compatible with data for 2007 and previous years. Norwegian CPUE (double trawl which is now the main gear used) has declined from 2020 to 2021 and has then stabilized (Figure 3.4b). Russian CPUE has declined in a similar way as total stock biomass has decreased in recent years ($r^2 = 0.73$), while the 2025 CPUE shows a slight increase (Figure 3.4a).

3.2.2 Survey results - abundance and size at age (Tables 3.5, A2-A14, Figure 3.5)

Joint Barents Sea winter survey (bottom trawl and acoustics) Acronyms: BS-NoRu-Q1 (BTr) and BS-NoRu-Q1 (Aco)

The 2026 survey was carried out as planned with relatively good spatial coverage.

Before 2000 this survey was made without participation from Russian vessels, while in 2001—2005, 2008—2016 and 2018-2026, Russian vessels have covered important parts of the Russian zone. In 2006—2007 the survey was carried out only by Norwegian vessels. In 2007, 2016, and 2021-2026 the Norwegian vessels did not cover any part of the Russian EEZ. The methods for adjustment for incomplete area coverage are described in detail in Godiksen et al. (2025) and references therein. Table 3.5 shows areas covered in the time-series and the additional areas implied in the method used to adjust for missing coverage in the Russian Economic Zone.

Regarding the older part of this time-series it should be noted that the survey prior to 1993 covered a smaller area (Jakobsen *et al*. 1997), and the number of young cod (particularly 1- and 2-years old fish) was probably underestimated. Changes in the survey methodology through time are described in Appendix 2 in Godiksen et al. (2025). Note that the change from 35 to 22 mm mesh size in the codend in 1994 is not corrected for in the time-series. This mainly affects the age 1 indices.

It is likely that in some of the recent years the coverage in the February survey (BS-NoRu-Q1 (BTr) and BS-NoRu-Q1 (Aco)) has been incomplete, in particular for the younger ages. This could cause a bias in the assessment and recruitment estimation, but the magnitude is unknown. The coverage in 2026 was, however, quite extensive and better than in previous years. The 2014–2026 surveys covered considerably larger areas than earlier winter surveys and showed that most age groups of cod (particularly ages 1 and 2) were distributed far outside the standard survey area. The bottom trawl survey estimates including the extended area for 2014-2026 were used in the tuning data separately from the same index before 2014, as decided at WKBarFar 2021 (ICES 2021a).

The distribution of young cod (less than 35 cm, mainly ages 1-3, which are all weak year classes) in the 2025 and 2026 surveys demonstrated an atypical distribution (Fig. 3.5). The proportion of fish found in the northwestern part was much higher than usual and the proportion in the southeastern part was much lower than usual. The feeding conditions in Northern areas may be worse than in the southeast which could increase natural mortality and have negative impact on recruitment success.

Lofoten acoustic survey on spawners Acronym: Lof-Aco-Q1

The estimated abundance indices from the Norwegian acoustic survey off Lofoten and Vesterålen (the main spawning area for this stock) in March/April are given in Table A4. A description of the survey, sampling effort and details of the estimation procedure can be found in Korsbrekke (1997). The 2026 survey result in biomass terms was 74 thousand tonnes, which is above the 2025 level but below the 2024 level. The 2025 level was the lowest since 1988.

A pilot survey on spawning grounds north of the area covered by the Lofoten survey was carried out in 2023 (Korsbrekke 2024), at about the same time and in the same way as the Lofoten survey. The total abundance in that area was about 17% of that in the Lofoten area. The area covered by this pilot survey is mostly covered also by the winter survey, but with much larger distance between transects at that time. Such a survey was not carried out in 2024 or 2025. Extra coverage of this area in the winter survey should be considered as the fishery on spawning cod has shifted northwards in recent years. Such extended area coverage was planned for 2026 but was cancelled due to vessel problems.

Joint Ecosystem survey Acronym: Eco-NoRu-Q3 (Btr)

Swept area bottom trawl estimates from the joint Norwegian-Russian Ecosystem survey (BESS) in August-September for the period 2004–2025 are given in Table A14. This survey normally covers the entire distribution area of cod at that time of the year.

In 2014 this survey had an essential problem with area coverage in the north-west region because of difficult ice conditions. During the 2013 survey, a substantial part of population was distributed in the area covered by ice in 2014. Based on those observations AFWG decided in 2015 to exclude 2014 year from that tuning series in current assessment. In 2016 there was incomplete coverage in the international waters and close to the Murman coast. An adjustment for this incomplete coverage was made based on interpolation from adjacent areas (Kovalev *et al.* 2017, WD 12). At this time of the year, usually a relatively small part of the cod stock is found in the area which was not covered in 2016. In 2017 and 2019 the coverage was close to complete, although the far northeastern part of the survey area (west of the north island of Novaya Zemlya) was not covered due to military restrictions. In 2018, a large area in the eastern part of the Barents Sea was not covered. Thus, it was decided not to include 2018 data from this survey in the assessment.

The coverage in 2020 was less synoptic than usual, but it was decided to keep the results in the assessment. The 2021, 2023 and 2025 coverages were adequate.

In 2022 the coverage of the Russian EEZ was done much later than the coverage of the Norwegian EEZ, with the entire survey period being from 15 August to 3 December (van der Meeren and Prozorkevitch, 2023). Also, some areas were not covered. Indices based on the combined data have been calculated (Table A14), but due to the poor synopticity and incomplete coverage it was decided not to use the index for that year in the assessment. In 2024 the coverage was somewhat incomplete west of Svalbard (van der Meeren and Prozorkevitch, 2025), while the coverage was adequate in 2025.

The survey indices are calculated both by the BioFox and StoX calculation methods, and as in earlier years, the Biofox series was used in tuning. A research recommendation from WKBarFar was to unify these two methods for estimating indices from the Ecosystem survey. However, the benchmark decided to use weight at age from StoX in calculations of weight at age used in the assessment.

Russian autumn survey Acronym: RU-BTr-Q4

Abundance estimates from the Russian autumn survey (November-December) are given in Table A9 (acoustic estimates) and Table A10 (bottom trawl estimates). The entire bottom trawl time-series was in 2007 revised backwards to 1982 (Golovanov *et al* ., 2007, WD3), using the same method as in the revision presented in 2006, which went back to 1994. The new swept area indices reflect Northeast Arctic cod stock dynamics more precisely compared to the previous one - catch per hour trawling. The Russian autumn survey in 2006 was carried out with reduced area coverage. Divisions 2a and 2b were adequately investigated in the survey in contrast to Subarea 1, where the survey covered approximately 40% of the long-term average area coverage. The Subarea 1 survey indices were calculated based on actual covered area (40 541 sq. miles). The 2007 AFWG decided to use the “final" year class indices without any correction because of satisfactory internal correspondence between year class abundances at age 2—9 years according to the 2006 survey and ones due to the previous surveys.

This survey was not conducted in 2016, but was carried out in 2017, when 79% of the standard survey area was covered (Sokolov *et al* 2018, WD 11). The index shows a reliable internal consistency, and it was decided to use it in the assessment. This survey was not carried out in 2018-2025 and is discontinued.

Survey results - length and weight-at-age (Tables A5-A8, A11-A12, A15, A16)

Length-at-age is shown in Table A5 for the Joint Barents Sea winter survey, in Table A7 for the Lofoten survey and in Table A11 for the Russian survey in October-December. Weight-at-age is shown in Table A6 for the Joint Barents Sea winter survey, in Table A8 for the Lofoten survey, Table A12 for the Russian survey in October-December and Table A15 for the Ecosystem survey (calculated using StoX). Table A16 presents combined data on Weight-at-age from Joint Barents Sea winter survey and Lofoten survey.

Length and weight at age in the Joint Barents Sea winter survey decreased for ages 3-5, but was fairly stable for the other age groups. Weight at age in the Lofoten survey in 2026 was similar to 2025. The weight at age in the Ecosystem survey in 2025 decreased for ages 1-7 compared to 2024.

3.2.3 Age reading

Cooperation and quality assurance on age reading started in the early 1990s and helps to maintain a good agreement of age readings made by Norwegian and Russian experts. The joint Norwegian-Russian work on cod otolith reading has for many years included regular exchanges of otoliths and age readers (see ICES 2021b chapter 0.7). The results of fifteen years of annual comparative age readings are described in Yaragina *et al* . (2009). Zuykova *et al* . (2009) re-read old otoliths and found no significant difference in contemporary and historical age determination and subsequent length at age. However, age at first maturation in the historical material as determined by contemporary readers is somewhat younger (from -0.6 years for the 1940-1950s to -0.28-0 years for the 1970-1980s) than that determined by historical readers. Taking this difference into account would thus affect the spawning stock-recruitment relationship and thus the biological reference points.

The overall percentage agreement for the 2017–2018 exchange was 87.7% (Zuykova et al. 2020). The main reason for cod ageing discrepancies between Russian and Norwegian specialists remains the same, representing the latest summer growth zone, and different interpretations of the false zones. The general trend is that the Russian readers assign slightly lower ages than the Norwegian readers compared to the modal age for age groups 7 years and older. This is opposite of what we have seen in previous readings, where the Russian readers have tended to be slightly overestimating the age compared to the Norwegian readers for younger fish (1-5 years), underestimating for older fish (>10 years) and reading without significant difference for ages 6-9 years. The trend with bias in NEA cod age determination registered for some years of the period 1992–2018 between experts of both countries is a solid argument to continue comparative cod age reading between PINRO and IMR to monitor the situation.

In lack of a system for transferring otoliths between IMR and the Polar Branch of VNIRO, cod and haddock otoliths from 2019-2024 have not been exchanged between the parties, and regular calibration of age readings has been on hold. From 2025, in the absence of a system for transferring otolith samples between IMR and the Polar Branch of VNIRO, the scientists have exchanged images of cod and haddock otoliths (100 and 110 specimens respectively from Norwegian catches). Images of otoliths will temporarily be used instead of a physical exchange of otoliths until a system for exchange is in place. Norwegian otoliths collected in 2024 have been embedded in epoxy, cut and photographed by Norwegian specialists, and images have been shared with the Polar Branch of VNÌRO according to the agreed plans of the long-term cooperation.

Specialists at the Polar Branch of VNIRO have annotated the cod and haddock otoliths in the Paint 3D program using the agreed technique and workshops were held online in 2025. During these virtual workshops, the annotated otolith images and their corresponding ages were discussed between all IMR and VNIRO readers. The results were positive and two detailed documents (WD 7-8, 2025) were presented at JRN-AFWG. Based on the discussion, it was concluded that the age-determination methodology used by specialists from both

institutes remains the same, however, the initial agreement rate for cod and haddock otoliths collected in 2024 was slightly lower than the results of the comparison of the otoliths themselves collected in 2017-2018.

A similar exchange of data and subsequent online workshop will take place in 2026-2027.

3.3 Data available for use in assessment

Data for the period 1946–1983 are taken from the AFWG 2001 report (ICES 2001) and were not revised at the WKBarFar benchmark in 2021.

3.3.1 Catch-at-age (Table 3.6)

For 2025, age compositions from all ICES areas (1, 2a, 2b) were available from Norway, Russia and Spain. Germany provided age compositions from ICES area 2b.

There is a concern about the biological sampling from parts of both the Norwegian and Russian fishery that may be too low or missing. Also, the split between NEA cod and coastal cod may be affected by the sampling coverage. Data from Norwegian Coast Guard vessels' length measurements onboard Russian vessels in some quarters of 2025 were used for calculation of age composition of Russian catches in Division 1, and areas 2a and 2b.

3.3.2 Survey indices available for use in assessment (Table 3.13, A3, A13, A14)

The following survey data series were available:

Fleet code	Name	Place	Season	Age	Years
Fleet 15*	Joint bottom trawl survey	Barents Sea	Feb-Mar	3–12+	1981–2013, 2014-2026
Fleet 16	Joint acoustic survey	Barents Sea+Lofoten	Feb-Mar	3–12+	1985–2026
Fleet 18	Russian bottom trawl surv.	Barents Sea	Oct-Dec	3–12+	1982–2017
Fleet 007	Ecosystem surv.	Barents Sea	Aug-Sep	3–12+	2004–2025**

*Survey indices for Fleet 15 were divided by two series (before and after 2014) in model tuning as decided at WKBarFar 2021.

**2014, 2018 and 2022 data not used in the assessment

The tuning fleet file is shown in Table 3.13. Note that the joint acoustic survey (sum of Barents Sea and Lofoten acoustic survey indices) is given in Table A13.

Survey indices for Fleet 15 have been multiplied by a factor 100, while survey indices for Fleets 007, 16 and 18 have been multiplied by a factor 10 (Table A3, A14). This is done to keep the dynamics of the surveys even for very low indices, because some models (e.g. XSA) add 1.0 to the indices before the logarithm is taken.

3.3.3 Weight-at-age (Tables 3.7-3.9, A6, A8, A12, A16).

Catch weights

For 2025, weight-at-age in the catch for areas 1, 2a and 2b was provided by Norway, Russia, Spain and Germany (2b only) (Table 3.7). For ages up to and including 11, observations are used. Following the WKBarFar 2021 decision, weight at age in catch for the years 1983-present for ages 12-15+ are calculated by a cohort-based von Bertalanffy approach used to replace previous fixed values.

Stock weights

For ages 1—11 stock weights-at-age at the start of year y ($W_{a,y}$) for 1983—2025 are calculated combining, when available, weight at age from the Winter, Lofoten, Russian autumn and Ecosystem surveys. The details are given in the Stock Annex. For ages 12-15+ a similar approach as for weight at age in the catch was used. For older age groups, stock weights are higher than catch weights. The reason for this should be investigated.

3.3.4 Natural mortality including cannibalism (Table 3.12, Table 3.17)

A natural mortality (M) of 0.2 + cannibalism was used. Cannibalism is assumed to only affect natural mortality of ages 3-6.

2025 data are available, and 2024 data have been updated.

The method used for calculation of prey consumption by cod described by Bogstad and Mehl (1997) is used to calculate the consumption of cod by cod for use in cod stock assessment. The consumption is calculated based on cod stomach content data taken from the joint PINRO-IMR stomach content database (methods described in Mehl and Yaragina 1992). On average about 9000 cod stomachs from the Barents Sea have been analyzed annually in the period 1984—2025.

These data are used to calculate the per capita consumption of cod by cod for each half-year (by prey age groups 0—6 and predator age groups 1–11+). It was assumed that the mature part of the cod stock is found outside the Barents Sea for three months during the first half of the year. Thus, consumption by cod in the spawning period was omitted from the calculations.

An iterative procedure was applied to include the per capita consumption data in the SAM run. It is described in detail in Stock Annex.

For the cod assessment data from annual sampling of cod stomachs has been used for estimating cannibalism, since the 1995 assessment. The argument has been raised that the uncertainties in such calculations are so large that they introduce too much noise in the assessment. A rather comprehensive analysis of the usefulness of this was presented in Appendix 1 in the 2004 AFWG report (ICES 2004). The conclusion was that it improves the assessment.

The data on cod cannibalism for the historical period (1946—1983) was included in assessment during the benchmark to make the time-series consistent (ICES 2015a, WKARCT 2015). These estimates were based on hindcasted values of NEA cod natural mortality at ages 3—5 using PINRO database on food composition from cod stomach for the historical period (Yaragina *et al* . 2018).

3.3.5 Maturity-at-age (Tables 3.10-3.11)

Historical (pre–1982) Norwegian and Russian time-series on maturity ogives were reconstructed by the 2001 AFWG meeting (ICES 2001). The Norwegian maturity ogives were constructed using the Gulland method for individual cohorts, based on information on age at first spawning from otoliths. For the time period 1946—1958 only the Norwegian data were available. The Russian proportions mature-at-age, based on visual examinations of gonads, were available from 1959.

Since 1982 Russian and Norwegian survey data have been used (Table 3.10). For the years 1985—2026, Norwegian maturity-at-age ogives have been obtained by combining the Barents Sea winter survey and the Lofoten survey. Russian maturity ogives from the autumn survey as well as from commercial fishery for November-February are available from 1984 until present. The Norwegian maturity ogives tend to give a higher percent mature-at-age compared to the Russian ogives, which is consistent with the generally higher growth rates observed in cod sampled by the Norwegian surveys. The percent mature-at-age for the Russian and

Norwegian surveys have been arithmetically averaged for all years, except 1982—1983 when only Norwegian observations were used and 1984 when only Russian observations were used.

Russian data for the autumn survey for 2018 and later years were not available as the survey was not conducted. In WD15, 2019, updated correction factors to allow for this when calculating the combined maturity-at-age in 2019 were calculated, based on historical differences between Norwegian and Russian data. These correction factors were then applied to the Norwegian data for 2020-2026.

The approach used for calculating maturity at age is the same as previously used and consistent with the approach used to estimate the weight-at-age in the stock, except that no data from the Ecosystem survey are used. However, since survey data, both abundance indices and proportion mature, have been revised, the entire time series of ogives back to 1994 was revised at the benchmark. The proportions of mature cod for age 13–15 are set to 1 for the period 1984–present.

Maturity-at-age for cod has been variable the last years, particularly for ages 6–9. According to the combined data, maturity at age increased slightly from 2025 to 2026 for age groups 6-10 (Table 3.11).

A revision of the pre-1982 Norwegian maturity time series should be considered in the future (Kjesbu et al. 2025).

3.4 Assessment using SAM

3.4.1 SAM settings (Table 3.14)

The SAM model settings optimized by WKBarFar are shown in Table 3.14. This year the “predvarobs” option, which allows for a functional relationship between observation variance and the corresponding prediction was included in SAM. An estimated relationship between observation variance and predicted value for each individual observation allows the model to assign smaller (or larger) variance to predicted larger log-observations. This relation is different from the usual assumption of constant variance of log-observations within age groups. The prediction–variance link was implemented and compared to the usual constant variance assumption for the official assessments of North East Arctic cod and haddock by Breivik et al. (2021). For both of these stocks, the prediction–variance link is found to give a significant improvement and for Northeast Arctic haddock it was implemented at the latest benchmark and has been in use since then. In 2026, this option was also implemented in the ICES NEA saithe assessment (ICES, 2026) and gave a better fit.

The inclusion of the “predvarobs” option gave a marked improvement in the fit to the data and a similar retrospective pattern. The total stock biomass in 2026 increased by about 60 kt compared to the run without “predvarobs”.

3.4.2 SAM diagnostics (Figure 3.2 a-e)

Residuals for the SAM run are shown in Figure 3.2a, while model retrospective plots of F, SSB and recruitment are shown in Figure 3.2b. Historical retrospective pattern for final SAM run are shown in Figure 3.2c. Figure 3.2d compares observed and modelled catches in tonnes and Figure 3.2e shows the catchability by survey and age group.

The retrospective pattern is generally adequate (Figure 3.2b), with absolute values of Mohn’s rho < 16% for SSB, R and F.

4.3.3 Results of assessment (Tables 3.15-3.18, Figure 3.1)

Summaries of landings, fishing mortality, stock biomass, spawning stock biomass and recruitment since 1946

are given in Table 3.18 and Figure 3.1.

The fishing mortalities and population numbers are given in Tables 3.15 and 3.16.

The estimated F_{5-10} in 2025 is 0.548, which is above F_{pa} but within the F_{msy} range (Table 3.18). Fishing mortality increased steadily from 2012-2021 but has decreased since 2023. The spawning stock biomass in 2026 is estimated to be 338 kt (Table 3.20), which is the lowest since 2000, and much lower than the peak in 2013 (2,207 kt). When comparing it farther back in time, one should bear in mind that in the early part of the time-series (before the 1980s) the fraction of mature fish at age was considerably lower.

Total stock biomass in 2026 is estimated to 1,069 kt, which is below the long-term mean and well below the highest level observed after 1955 (3,678 kt in 2013).

It is noted that the exploitation pattern is still slightly dome-shaped with a decrease in selectivity above age 13, although the dome-shape is not as strong as it was before 2020 when there was a marked decrease above in selectivity above age 12.

M values (M = 0.2+cannibalism mortality) are given in Table 3.17. For ages 3—5 the M matrix in 1946—1983 also includes cannibalism mortality since the benchmark meeting in 2015 (ICES 2015a).

3.5 Reference points and harvest control rules

The current reference points for Northeast Arctic cod were estimated by SGBRP (ICES 2003a) and adopted by ACFM at the May 2003 meeting.

At the 46th session of JNRFC a new version of the management rule was adopted (see section 3.5.3) . The TAC advice for 2027 is based on the agreed harvest control rule.

3.5.1 Biomass reference points

The values adopted by ACFM in 2003 are B_{lim} = 220 000 t, B_{pa} = 460 000 t. (ICES 2003a).

3.5.2 Fishing mortality reference points

The values adopted by ACFM in 2003 are F_{lim} = 0.74 and F_{pa} = 0.40 (ICES 2003a). The F_{msy} for NEA cod was estimated by WKBarFar 2021 to be in the range 0.40 - 0.60.

3.5.3 Harvest control rule

The history of how the harvest control rule has developed is given in the 2017 AFWG report (ICES 2017). JNRFC in 2015 asked ICES to explore the consequences of 10 different harvest control rules. This was done by WKNEAMP (ICES 2015b, 2016). JNRFC in 2016 adopted one of the rules explored by WKNEAMP (Rule 6 in that report).

The current rule reads as follows:

The TAC is calculated as the average catch predicted for the coming 3 years using the target level of exploitation (F_{tr}).

The target level of exploitation is calculated according to the spawning stock biomass (SSB) in the first year of the forecast as follows:

- *if $SSB < B_{pa}$, then $F_{tr} = SSB / B_{pa} \times F_{msy}$;*

- *if $B_{pa} \leq SSB \leq 2 \times B_{pa}$, then $F_{tr} = F_{msy}$;*

- if $2\times B_{pa} < SSB < 3\times B_{pa}$, then $F_{tr} = F_{msy} \times (1 + 0.5 \times (SSB - 2\times B_{pa}) / B_{pa})$;

- if $SSB \geq 3\times B_{pa}$, then $F_{tr} = 1.5 \times F_{msy}$;

where F_{msy}=0.40 and B_{pa} =460 000 tonnes.

If the spawning stock biomass in the present year, the previous year and each of the three years of prediction is above B_{pa}, the TAC should not be changed by more than +/- 20% compared with the previous year's TAC. In this case, F_{tr} should however not be below 0.30.

3.6 Prediction

3.6.1 Prediction input (Tables 3.19a)

The input data to the short-term prediction with management option table (2026—2029) are given in Table 3.19a. For 2026 stock weights and maturity were calculated from surveys as described in Sections 3.3.2 and 3.3.4.

Catch weights in 2026 onwards and stock weights in 2027 and onwards for age 3–11 are predicted by the method described by Brander (2002), where the latest observation of weights by cohort are used together with average annual increments to predict the weight of the cohort the following year. The method is given by the equation

W(a+1,y+1)=W(a,y) + Incr(a), where Incr(a) is a “medium term” average of Incr(a,y)= W(a+1,y+1)-W(a,y)

This method was introduced in the cod prediction in the 2003 working group (ICES 2003b). Since the 2005 working group (ICES 2005) an average of the 3 most recent values of annual increments have been used for predicting stock weights. For catch weights the last 5-year period for averaging the increments is used (changed from 10-year period at the 2021 benchmark).

Weight in the stock at ages 3-5 has decreased from 2025 to 2026, this could be related to low capelin abundance, as those age groups have the highest proportion of capelin in their diet.

The maturity ogive for the years 2027—2029 was predicted by using the 2024-2026 average. The fishing pattern in 2026 and later years was set equal to the average of the previous 5 years as a default in the stock annex.

The stock number-at-age in 2026 was taken from the final SAM run (Table 3.16) for ages 4 and older. Recruitment at age 3 in the years 2026—2029 was estimated as described in section 3.6.2. Figure 3.3 shows the development in natural mortality due to cannibalism for cod (prey) age groups 1-3 together with the abundance of capelin in the period 1984—2025. Natural mortality at age 3 peaked in 2024 when the 2021 year class, which is stronger than the year classes before and after, was at age 3. For the weaker year classes from 2023 onwards, the 2025 value, which is similar to that in 2023 and preceding year, seems more appropriate as these year classes are less likely to be exposed to high cannibalism. Thus, the last year (2025) M values are used to predict natural mortality of age groups 3—6 for years 2026—2029.

The catch in 2026 is expected to be close to the TAC when taking into account transfers of quota between years and the expected level of the coastal cod catch. As last year, it was found to be more appropriate to use TAC constraint than F_{sq} (which is the usual choice) in the intermediate year, as F_{sq} would imply a catch in 2026 of 398 000 t, i. e. 113 000 t above the TAC.

3.6.2 Recruitment prediction (Table 3.19b-c)

At the 2008 AFWG meeting (ICES 2008) it was decided to use a hybrid model, which is a weighted arithmetic mean of different recruitment models. This model has not performed well in recent years (as shown e.g. in Fig. 3.2c for the prediction of age 3 abundance in the assessment (intermediate) year. A thorough analysis of existing recruitment models and five proposed new models, as well as using recent averages of recruitment values was carried out in 2024 (Kovalev and Chetyrkin, WD6, 2024) and has been updated in 2025 and 2026. Based on the model performance, the RCT3 model was, as in 2025, chosen for predicting 1-3 years ahead. This year the indices at age 1 and 2 from the ecosystem survey were included in the analysis.

This gave recruitment values of 243 million for 2026, 240 million for 2027 and 349 million for 2028. For the age 3 recruitment in 2026, the RCT3 estimate of 243 million is considerably higher than the SAM estimate of 132 million.

The new recruitment model (WD5) value of 334 million was used for year 2029 as this model the only one we have to predict with 4 years lag. An average of 5 recent years from the SAM assessment (2021-2025) was chosen to predict 5+ years ahead for using in medium term predictions (Fig. 3.8).

It is necessary to rerun an analysis of various recruitment models each year. The statistical approach described by Kovalev (WD5) based on environmental information (NAO and AO indexes, air temperature, frontal zone index, SST, Barents Sea ice cover) is promising but needs to be improved and to integrate for incorporating survey indices in the analysis.

3.6.3 Prediction results (Tables 3.20-3.21)

The resulting SSB in 2027 is 346 kt, which is 3 % higher than the SSB in 2026. Table 3.20 shows the short-term consequences over a range of F-values in 2027. The detailed outputs corresponding to a catch equal to the TAC in 2026 and the F corresponding to the agreed HCR in 2027 are given in Table 3.21. Summarized results are shown in the text table below (all biomasses in tonnes).

Basis	Catch (2027)	F (2027)	SSB (2028)	% SSB change *	% TAC change **	% Advice change ***	P(SSB2028 <B_{lim})
Advice basis							
Management plan^	312 667	0.35	420 936	22	10	16	<1%
Other options							
F = 0	0	0	603 750	75	-100	-100	<0.1%
F=0.30^^	272 528	0.30	443 194	28	-4	1	<1%
F = F_{2025}	448 559	0 . 548	348 514	1	57	66	5%
F=F_{pa} = F_{MSY}	347 793	0.40	401 774	16	22	29	<1%
F_{lim}	562 414	0.74	291 572	-16	97	109	22%

* SSB 2028 relative to SSB 2027.

** Advice for 2027 relative to TAC for 2026 (285 000 tonnes).

*** Advice for 2027 relative to advice for 2026 (269 440 tonnes).

^ Since SSB in 2027 is below B_{pa} = 460 000 t, F = 0.40*SSB_{2027} /B_{pa} = 0.30 is used in the 3-year prediction, giving catches of 272 528, 315 183 and 350 290 tonnes in 2027, 2028 and 2029, respectively. The average of this is 312 667 tonnes.

^^F=0.30 corresponds to applying the harvest control rule without a 3-year prediction.

The advice for 2027 is 16 % higher than the advice for 2026.

This catch forecast covers all catches. It is then implied that all types of catches are to be counted against this TAC. It also means that if any overfishing is expected to take place, the above calculated TAC should be reduced by the expected amount of overfishing.

The risk values were calculated using approximations to the weight, maturity etc. in the prediction years as the SAM prediction procedure was not flexible enough to accommodate the year-to-year variability in these parameters in the JRN-AFWG predictions. A mean of the values for three most recent years (2024-2026 or 2023-2025) was used for those parameters. It was verified that the median SSB was very close to the deterministic predictions.

In SAM predictions, the uncertainty in the predictions and thus the risk of SSB<B_{lim} is calculated taking uncertainty in the stock size at the start of the intermediate year and in recruitment into account. The recruitment uncertainty was calculated by drawing randomly from the last 10 years, however the approach taken for this matters very little as the contribution of the recruitment to the fishery in 2026-2027 and SSB in 2028 is very small. Uncertainty in weight, maturity etc. is not modelled.

Exploratory analysis of one possible formulation of an HCR which is S-shaped when SSB is below B_{pa} (see formula below) was presented at JRN-AFWG. Using that particular formulation with a three-year prediction as in the existing HCR would give an F_{target} of 0.41, giving catches of 329 735, 360 327 and 381 530 tonnes in 2027, 2028 and 2029, respectively. The average of this is 357 198 tonnes. Note that this is not the agreed HCR and is not being presented as the basis for current management but is presented here to facilitate further exploration of such a rule. In particular, the precise formulation of such a rule (especially the degree to which it deviates from the current straight line) would need to be explored by JRN-AFWG before it could be recommended for use in management.

Formula for S-shaped reduction of F_{target} below B_{pa} : (in the example described above the exponent p=3 was used, but other exponents could be explored)

$F_{target}=a*SSB^p$ for $SSB<=0.5*B_{pa}$

$F_{target}=F_{pa}-a*(B_{pa}-SSB)^p$ for $0.5*B_{pa} < SSB < B_{pa}$

where

$a=0.5*F_{pa}/((0.5*B_{pa})^p)$

3.6.4 Medium-term predictions (Figure 3.8)

The inputs for medium-term prediction are the same as for short-term ones. For years after terminal year in short-term prediction the same value as for this year are used for all parameters except target fishing mortality which is according to the HCR.

The stock size has been decreasing in recent years due to low incoming recruitment, downward adjustment of the stock size (due to model modifications at the benchmark in 2021) and high fishing mortality. The high fishing mortality in recent years was partly due to the 20% limit on annual reduction of TAC according HCR. Recruitment in coming years (2023-2026 year classes) is also estimated to be below average. Previous periods of low recruitment have mainly occurred when temperature is below average, which is not the case at present. Johannesen et al. (2026) reviewed the reasons for the low average recruitment after the 2005 year class and

the results from that paper could be useful for future predictions of cod recruitment.

The predictions for 2027 and following years indicate that catches, SSB and total stock biomass will increase after 2027, but SSB will remain below B_{pa} until 2029 (Figure 3.8).

3.6.5 Comparison to 2025 assessment

The text table below compares this year's estimates with the 2025 JRN-AFWG estimates for numbers at age (millions), total biomass, spawning biomass (thousand tonnes) in 2025, as well as reference F for the year 2024.

		N (2025) by age															
Assessment year	F (2024)	3	4	5	6	7	8	9	10	11	12	13	14	15+	TSB (2025)	SSB (2025)	F (2025)
2025	0,627	537*	425	132	65	52	38	19	10	2,9	0,7	0,2	0,1	0,1	1131	330	0,511**
2026	0,591	374	399	125	63	54	40	22	10	3,3	0,6	0,1	0,1	0,0	1102	352	0,548
Ratio 2026/2025	0,94	0 . 70	0 . 94	0 . 94	0 . 96	1 . 03	1 . 07	1 . 19	0 . 97	1 . 12	0 . 89	0 . 72	0 . 58	0 . 20	0 . 97	1 . 06	1 . 07

*estimated by recruitment models

**assuming TAC constraint

In the current assessment, the number of age 3-6, 10 and 12 and above in 2025 was adjusted downwards compared to the 2025 JRN-AFWG assessment, while age groups 7-9 and 11 were adjusted upwards.

3.6.6 Comparison to last year's prediction

The catch advice for 2027 is very close to the prediction from last year's working group, when taking into account that the 2026 TAC was set somewhat above the advice. The advice for 2027 is 312 667 t, while the advice for 2026 given by JRN-AFWG was 269 440 t. The 2026 assessment adjusted the stock size in 2026 slightly downwards compared to the prediction from the 2025 assessment. The outlook for stock size and catches after 2027 is less optimistic than in last year's assessment, mainly due to lower incoming recruitment.

3.7 Concerns with the assessment and management advice

The WG realizes that imprecise input data, in particular the catch-at-age matrix, and discontinuation of some surveys as well as incomplete spatial coverage and reduced synopticity in surveys, could be a main obstacle to producing precise stock assessments, regardless of which model is used.

Given the decline of the stock in recent years, the 20% limit on annual TAC change led to fishing pressure well above the target in the HCR for several years. The SSB is now below B_{pa}, and it is thus critical for future stock development to ensure that the TAC is set equal to the scientific advice. The allowed 10% quota transfer between years compounds the risk arising from the TAC being set above the advice in the current situation with the spawning stock being below B_{pa} .

Based on the predicted SSB in 2027, F= 0.30 is used for the advice. Applying F= 0.30 to the projected stock in 2027 would give a quota advice of 272 528 t. The three-year look ahead component in the HCR results in the actual advice being higher (at 312 667 t) because the HCR accounts for signs that the stock is expected to increase in 2027-2029, assuming the catch advice is followed.

Figure 3.9 compares the SSB, TSB, Recruitment and TAC hindcasts/forecasts made by ICES AFWG/JRN-AFWG in 2021-2026. Both the hindcasts and the forecasts were too optimistic, but the accuracy of the estimate of current stock size seems to have improved in recent years. When SSB is below B_{pa} , errors in the hindcasts/forecasts estimates of SSB also affect the target F used to calculate the HCR-based TAC recommendations, increasing the error in the TAC forecast.

It is also a concern whether the current harvest control rule is precautionary in view of the recent below average recruitment (no strong year classes after 2005). Preliminary results (Kovalev et al., WD10 2025) indicate that the current harvest control rule is precautionary also for a stock-recruitment relationship based on the year classes 2006-2019.

3.8 Additional assessment methods

All models use the same tuning data.

3.8.1 TISVPA (Tables 3.22-3.24, Figure 3.6a-c)

This year the TISVPA model was applied to NEA cod with the same settings as last year and using the same data as SAM except that natural mortality values from cannibalism were taken from the SAM runs. During WG the results of exploratory runs using the TISVPA model (Tables 3.22-3.24) were discussed. The residuals of the model approximation of catch-at-age and “fleets” data are presented in Figure 3.6a. Likelihood profiles for different data source are presented in Figure 3.6b. Retrospective run results are shown in Figure 3.6c.

3.8.2 Model comparisons (Figures 3.2a, 3.6c, 3.7)

Figure 3.7 compares the results of SAM and TISVPA, showing F, SSB, TSB and recruitment. Trends are similar in all models, but TISVPA gives a lower F in 2025 and higher spawning stock biomass in 2026 than SAM. The difference in total biomass in 2026 is very small, however. Also, TISVPA shows a different trend in F in recent years with a peak in 2022 followed by a strong decrease, while SAM gives an almost constant F in 2022-2023 and then a slow decrease. Recruitment in 2026 is lower in TISVPA than in SAM. Both models show a reasonable retrospective pattern (Figures 3.2a, 3.6c).

3.9 New and revised data sources

This section describes some data sources which could be revised or included in the assessment in the future.

3.9.1 Consistency between NEA cod and coastal cod catch data (Table 3.2)

Consistency between the catch data used for NEA cod and coastal cod should be ensured. The revised catch figures used in the coastal cod assessment do not correspond to the difference between the total cod catch and the catch used in the NEA cod assessment (Table 3.2). These discrepancies will be adjusted when the NEA cod catch series are revised (section 3.2.2).

3.9.2 Discard and bycatch data

Work on updating discard and bycatch data series is ongoing. Revised bycatch estimates in numbers for the period 2005-2025 are shown in Fig. 1.14. At WKARCT in 2015 it was, however, decided not to include those data in the catch-at-age matrix.

The bycatch mainly consists of age 1 and 2 fish, but the bycatch is generally small compared to other reported sources of mortality: catches, discards and the number of cod eaten by cod. From 1992 onwards, bycatches of age 3 and older fish are negligible, because use of sorting grids was made mandatory. However, in 1985, bycatches of age 5 and 6 cod were about one third of the reported catches for those age groups. The year class

for which the bycatches were highest, was the 1983 year class (total bycatch of age 2 and older fish of about 60 million, compared to a stock estimate of about 1500 million at age 3.

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Table 3.1. Northeast Arctic COD. Total catch (t) by fishing areas and unreported catch.

Year	Subarea 1	Division 2.a	Division 2.b	Unreported catches	Total catch
1961	409 694	153 019	220 508		783 221
1962	548 621	139 848	220 797		909 266
1963	547 469	117 100	111 768		776 337
1964	206 883	104 698	126 114		437 695
1965	241 489	100 011	103 430		444 983

Year	Subarea 1	Division 2.a	Division 2.b	Unreported catches	Total catch
1966	292 253	134 805	56 653		483 711
1967	322 798	128 747	121 060		572 605
1968	642 452	162 472	269 254		1 074 084
1969	679 373	255 599	262 254		1 197 226
1970	603 855	243 835	85 556		933 246
1971	312 505	319 623	56 920		689 048
1972	197 015	335 257	32 982		565 254
1973	492 716	211 762	88 207		792 685
1974	723 489	124 214	254 730		1 102 433
1975	561 701	120 276	147 400		829 377
1976	526 685	237 245	103 533		867 463
1977	538 231	257 073	109 997		905 301
1978	418 265	263 157	17 293		698 715
1979	195 166	235 449	9 923		440 538
1980	168 671	199 313	12 450		380 434
1981	137 033	245 167	16 837		399 037
1982	96 576	236 125	31 029		363 730
1983	64 803	200 279	24 910		289 992
1984	54 317	197 573	25 761		277 651
1985	112 605	173 559	21 756		307 920
1986	157 631	202 688	69 794		430 113
1987	146 106	245 387	131 578		523 071
1988	166 649	209 930	58 360		434 939
1989	164 512	149 360	18 609		332 481
1990	62 272	99 465	25 263	25 000	212 000
1991	70 970	156 966	41 222	50 000	319 158
1992	124 219	172 532	86 483	130 000	513 234
1993	195 771	269 383	66 457	50 000	581 611
1994	353 425	306 417	86 244	25 000	771 086
1995	251 448	317 585	170 966		739 999
1996	278 364	297 237	156 627		732 228
1997	273 376	326 689	162 338		762 403
1998	250 815	257 398	84 411		592 624
1999	159 021	216 898	108 991		484 910
2000	137 197	204 167	73 506		414 870
2001	142 628	185 890	97 953		426 471

Year	Subarea 1	Division 2.a	Division 2.b	Unreported catches	Total catch
2002	184 789	189 013	71 242	90 000	535 045
2003	163 109	222 052	51 829	115 000	551 990
2004	177 888	219 261	92 296	117 000	606 445
2005	159 573	194 644	121 059	166 000	641 276
2006	159 851	204 603	104 743	67 100	537 642
2007	152 522	195 383	97 891	41 087	486 883
2008	144 905	203 244	101 022	15 000	464 171
2009	161 602	207 205	154 623		523 431
2010	183 988	271 337	154 657		609 983
2011	198 333	328 598	192 898		719 829
2012	247 938	331087	148 638		727 663
2013	360 673	421678	183 858		966 209
2014	320 347	468 934	197 168		986 449
2015	272405	375328	216651		864384
2016	321347	351468	176607		849422
2017	309902	360477	197898		868276
2018	249397	321548	207681		778627
2019	234985	318539	139084		692609
2020	234029	298707	160166		692903
2021	281198	268942	217144		767284
2022	236173	256394	226644		719211
2023	260853	202358	119341		582552
2024	188045	183109	81886		453040
2025 [1]	124530	140946	63993		329468

Data provided by Working Group members

1 Provisional figure

Table 3.1a Advice, quota and official Norwegian catches (tonnes) in the fishery zone around Jan Mayen (part of ICES area 2a).

Year	Advice		TAC	CATCH
2018	-		-	441
2019	-		800	628
2020	-		800	522
2021	600		600	146
2022	347		347	276
2023	315		315	181
2024	0		0	6

2025	0		0	5
2026	181		181	

Table 3.2. Catches of Norwegian Coastal Cod in subareas 1 and 2, 1000 tonnes, which are removed from the NEA cod assessment.

Year	Norwegian catches of cod removed from the NEA cod -assessment
Av1960–70	38.6
1971–79	no data
1980	40
1981	49
1982	42
1983	38
1984	33
1985	28
1986	26
1987	31
1988	22
1989	17
1990	24
1991	25
1992	35
1993	44
1994	48
1995	39
1996	32
1997	36
1998	29
1999	23
2000	19
2001	14
2002	20
2003	19
2004	14
2005	13
2006	15
2007	13
2008	13
2009	15
2010	13.5

Year	Norwegian catches of cod removed from the NEA cod -assessment
2011	18.8
2012	35.5
2013	30.1
2014	33.6
2015	35.8
2016	54.9
2017	51.0
2018	36.3
2019	40.1
2020	45.3
2021	42.0
2022	40.3
2023	48.1
2024	30.8
2025	40.1

Table 3.3. Northeast Arctic COD. Total nominal catch ('000 t) by trawl and other gear for each

		Subarea 1		Division 2.a		Division 2.b	
Year		Trawl	Others	Trawl	Others	Trawl	Others
1967		238	84.8	38.7	90	121.1	-
1968		588.1	54.4	44.2	118.3	269.2	-
1969		633.5	45.9	119.7	135.9	262.3	-
1970		524.5	79.4	90.5	153.3	85.6	-
1971		253.1	59.4	74.5	245.1	56.9	-
1972		158.1	38.9	49.9	285.4	33	-
1973		459	33.7	39.4	172.4	88.2	-
1974		677	46.5	41	83.2	254.7	-
1975		526.3	35.4	33.7	86.6	147.4	-
1976		466.5	60.2	112.3	124.9	103.5	-
1977		471.5	66.7	100.9	156.2	110	-
1978		360.4	57.9	117	146.2	17.3	-
1979		161.5	33.7	114.9	120.5	8.1	-
1980		133.3	35.4	83.7	115.6	12.5	-
1981		91.5	45.1	77.2	167.9	17.2	-
1982		44.8	51.8	65.1	171	21	-
1983		36.6	28.2	56.6	143.7	24.9	-

1984		24.5	29.8	46.9	150.7	25.6	-
1985		72.4	40.2	60.7	112.8	21.5	-
1986		109.5	48.1	116.3	86.4	69.8	-
1987		126.3	19.8	167.9	77.5	129.9	1.7
1988		149.1	17.6	122	88	58.2	0.2
1989		144.4	19.5	68.9	81.2	19.1	0.1
1990		51.4	10.9	47.4	52.1	24.5	0.8
1991		58.9	12.1	73	84	40	1.2
1992		103.7	20.5	79.7	92.8	85.6	0.9
1993		165.1	30.7	155.5	113.9	66.3	0.2
1994		312.1	41.3	165.8	140.6	84.3	1.9
1995		218.1	33.3	174.3	143.3	160.3	10.7
1996		248.9	32.7	137.1	159	147.7	6.8
1997		235.6	37.7	150.5	176.2	154.7	7.6
1998		219.8	31	127	130.4	82.7	1.7
1999		133.3	25.7	101.9	115	107.2	1.8
2000		111.7	25.5	105.4	98.8	72.2	1.3
2001		119.1	23.5	83.1	102.8	95.4	2.5
2002		147.4	37.4	83.4	105.6	69.9	1.3
2003		146	17.1	107.8	114.2	50.1	1.8
2004		154.4	23.5	100.3	118.9	88.8	3.5
2005		132.4	27.2	87	107.7	115.4	5.6
2006		141.8	18.1	91.2	113.4	100.1	4.6
2007		129.6	22.9	84.8	110.6	91.6	6.3
2008		123.8	21.1	94.8	108.4	95.3	5.7
2009		130.1	31.5	102	105.2	142.1	11.4
2010		151.1	32.9	130	141.4	149.2	5.4
2011		158.1	38.4	163.5	167	181	11.9
2012		212.1	35.9	172.7	158.4	133.8	14.9
2013		308.5	52.2	216.9	204.7	159.7	24.1
2014		268.8	51.5	246.8	222.1	177.9	19.3
2015		224.3	48.1	192.2	183.2	197.7	19.0
2016		285.5	35.8	181.7	169.8	156.3	20.3
2017		265.4	44.5	189.5	171.0	180.0	17.9
2018		204.7	44.7	156.7	164.9	192.0	15.6
2019		199.4	35.6	177.8	140.7	128.9	10.1
2020		199.4	34.6	157.2	141.5	153.5	6.7

2021		220.8	60.4	120.2	148.7	202.1	15.1
2022		192.9	43.3	108.9	147.4	212.9	13.7
2023		218.5	42.4	90.9	111.5	112.6	6.8
2024		166.2	21.8	88.2	94.9	75.1	6.8
2025 [1]		110.9	15.9	77.2	68.3	56.2	7.8

Data provided by Working Group members

1 Provisional figures

Table 3.4. Northeast Arctic COD. Nominal catch(t) by countries. (Subarea 1 and divisions 2a and 2b combined, data provided by Working group members

Year	Faroe Islands	France	German Dem.Rep.	Fed.Rep.Germany	Greenland	Iceland	Norway	Poland	United Kingdom	Russia**	Spain	C
1961	3934	13755	3921	8129			268377	-	158113	325780		
1962	3109	20482	1532	6503			225615	-	175020	476760		
1963	-	18318	129	4223			205056	108	129779	417964		
1964	-	8634	297	3202			149878	-	94549	180550		
1965	-	526	91	3670			197085	-	89962	152780		
1966	-	2967	228	4284			203792	-	103012	169300		
1967	-	664	45	3632			218910	-	87008	262340		
1968	-	-	225	1073			255611	-	140387	676758		
1969	29374	-	5907	5543			305241	7856	231066	612215		
1970	26265	44245	12413	9451			377606	5153	181481	276632		
1971	5877	34772	4998	9726			407044	1512	80102	144802		
1972	1393	8915	1300	3405			394181	892	58382	96653		
1973	1916	17028	4684	16751			285184	843	78808	387196		
1974	5717	46028	4860	78507			287276	9898	90894	540801		
1975	11309	28734	9981	30037			277099	7435	101843	343580		
1976	11511	20941	8946	24369			344502	6986	89061	343057		
1977	9167	15414	3463	12763			388982	1084	86781	369876		
1978	9092	9394	3029	5434			363088	566	35449	267138		
1979	6320	3046	547	2513			294821	15	17991	105846		
1980	9981	1705	233	1921			232242	3	10366	115194		
1981	12825	3106	298	2228			277818		5262	83000	14500	
1982	11998	761	302	1717			287525		6601	40311	14515	
1983	11106	126	473	1243			234000		5840	22975	14229	
1984	10674	11	686	1010			230743		3663	22256	8608	
1985	13418	23	1019	4395			211065		3335	62489	7846	
1986	18667	591	1543	10092			232096		7581	150541	5497	

Year	Faroe Islands	France	German Dem.Rep.	Fed.Rep.Germany	Greenland	Iceland	Norway	Poland	United Kingdom	Russia**	Spain	
1987	15036	1	986	7035			268004		10957	202314	16223	
1988	15329	2551	605	2803			223412		8107	169365	10905	
1989	15625	3231	326	3291			158684		7056	134593	7802	
1990	9584	592	169	1437			88737		3412	74609	7950	
1991	8981	975		2613			126226		3981	119427***	3677	
1992	11663	2		3911	3337		168460		6120	182315	6217	
1993	17435	3572		5887	5389	9374	221051		11336	244860	8800	
1994	22826	1962		8283	6882	36737	318395		15579	291925	14929	
1995	22262	4912		7428	7462	34214	319987		16329	296158	15505	
1996	17758	5352		8326	6529	23005	319158		16061	305317	15871	
1997	20076	5353		6680	6426	4200	357825		18066	313344	17130	
1998	14290	1197		3841	6388	1423	284647		14294	244115	14212	
1999	13700	2137		3019	4093	1985	223390		11315	210379	8994	
2000	13350	2621		3513	5787	7562	192860		9165	166202	8695	
2001	12500	2681		4524	5727	5917	188431		8698	183572	9196	
2002	15693	2934		4517	6419	5975	202559		8977	184072	8414	
2003	19427	2921		4732	7026	5963	191977		8711	182160	7924	
2004	19226	3621		6187	8196	7201	212117		14004	201525	11285	
2005	16273	3491		5848	8135	5874	207825		10744	200077	9349	
2006	16327	4376		3837	8164	5972	201987		10594	203782	9219	
2007	14788	3190		4619	5951	7316	199809		9298	186229	9496	
2008	15812	3149		4955	5617	7535	196598		8287	190225	9658	
2009	16905	3908		8585	4977	7380	224298		8632	229291	12013	
2010	15977	4499		8442	6584	11299	264701		9091	267547	12657	
2011	13429	1173		4621	7155	12734	331535		8210	310326	13291	1
2012	17523	2841		8500	8520	9536	315739		11166	329943	12814	
2013	13833	7858		8010	7885	14734	438734		12536	432314	15042	
2014	33298	8149		6225	10864	18205	431846		14762	433479	16378	
2015	26568	7480		6427	7055	16120	377983		11778	381778	19905	
2016	24084	7946		6336	8607	16031	348949		13583	394107	14640	
2017	28637	9554		5977	13638	11925	357419		16731	396180	14414	
2018	26152	6605		9768	12743	10708	333539		11533	340364	13143	
2019	22270	6371		8470	7553	12294	282120		11214	316813	13939	
2020	21679	5796		9725	7391	9734	289472		12113	312683	11403	
2021	21767	4459		6190	8246	8933	337931		5426	352064	11080	

Year	Faroe Islands	France	German Dem.Rep.	Fed.Rep.Germany	Greenland	Iceland	Norway	Poland	United Kingdom	Russia**	Spain	
2022	21530	4988		7134	7688	6214	310145		7024	333697	12214	
2023	17556	4632		5630	3994	5157	242117		5972	276923	8030	
2024	15938	4677		5632	4000	3756	171480		4832	222661	6417	
2025*	14620	4588		5408	3702	0	129500		4658	148384	5770	

* Provisional figures

** USSR prior to 1991.

*** Includes Baltic countries.

^ Includes unspecified EU catches.

^^ In 2022-2026 assessment and advice was carried out by the Joint Russian-Norwegian working group on Arctic Fisheries (JRN-AFWG) which compiled catches for 2021-2025 and gave advice for 2023-2027.

Table 3.5. Barents Sea winter survey. Area covered ('000 square nautical miles) and areas implied in the method used to adjust for missing coverage in Russian Economic Zone (REZ). "Index ratio by age" means that the index by age (for the area outside REZ) was scaled by the observed ratio between total index and the index outside REZ observed in the years prior to the survey. Area N (covered from 2014 onwards) is included.

Year	Area covered	Additional area implied in adjustment	Adjustment method
1981-92	88.1		
1993	137.6		
1994	161.1		
1995	191.9		
1996	166.1		
1997	88.4	56.2	Index ratio by age
1998	100.4	51.1	Index ratio by age
1999	118.5		
2000	163.2		
2001	164.7		
2002	157.4		
2003	147.4		
2004	164.4		
2005	179.9		
2006	170.1	18.1	Partly covered strata raised to full strata area
2007	123.9	56.7	Index ratio by age
2008	165.2		
2009	171.8		
2010	160.5		
2011	174.3		

2012	151.3	16.7	Index ratio by age
2013	203.6		
2014	266.8		
2015	243.3		
2016	228.0		
2017	184.4	37.5	Index ratio by age
2018	236.3		
2019	241.2		
2020	203.2	25.1	Index ratio by age
2021	232.0	10.9	Index ratio by age
2022	232.7		
2023	253.3		
2024	263.1		
2025	232.1		
2026	252.4		

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Table 3.6. Northeast Arctic cod. Catch numbers-at-age (Thous)

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	
1946	4008	10387	18906	16596	13843	15370	59845	22618	10093	9573	5460	1927	750	
1947	710	13192	43890	52017	45501	13075	19718	47678	31392	9348	9330	4622	4103	
1948	140	3872	31054	55983	77375	21482	15237	9815	30041	7945	4491	3899	4205	
1949	991	6808	35214	100497	83283	29727	13207	5606	8617	13154	3657	1895	2167	
1950	1281	10954	29045	45233	62579	30037	19481	9172	6019	4133	6750	1662	1450	
1951	24687	77924	64013	46867	37535	33673	23510	10589	4221	1288	1002	3322	611	
1952	24099	120704	113203	73827	49389	20562	24367	15651	8327	3565	647	467	1044	
1953	47413	107659	112040	55500	22742	16863	10559	10553	5637	1752	468	173	156	
1954	11473	155171	146395	100751	40635	10713	11791	8557	6751	2370	896	268	123	
1955	3902	37652	201834	161336	84031	30451	13713	9481	4140	2406	867	355	128	
1956	10614	24172	129803	250472	86784	51091	14987	7465	3952	1655	1292	448	166	
1957	17321	33931	27182	70702	87033	39213	17747	6219	3232	1220	347	299	173	
1958	31219	133576	71051	40737	38380	35786	13338	10475	3289	1070	252	40	141	
1959	32308	77942	148285	53480	18498	17735	23118	9483	3748	997	254	161	98	
1960	37882	97865	64222	67425	23117	8429	7240	11675	4504	1843	354	102	226	
1961	45478	132655	123458	51167	38740	17376	5791	6778	5560	1682	910	280	108	
1962	42416	170566	167241	89460	28297	21996	7956	2728	2603	1647	392	280	103	
1963	13196	106984	205549	95498	35518	16221	11894	3884	1021	1025	498	129	157	

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1964	5298	45912	97950	58575	19642	9162	6196	3553	783	172	387	264	131
1965	15725	25999	78299	68511	25444	8438	3569	1467	1161	131	61	79	197
1966	55937	55644	34676	42539	37169	18500	5077	1495	380	403	77	9	70
1967	34467	160048	69235	22061	26295	25139	11323	2329	687	316	225	40	14
1968	3709	174585	267961	107051	26701	16399	11597	3657	657	122	124	70	46
1969	2307	24545	238511	181239	79363	26989	13463	5092	1913	414	121	23	46
1970	7164	10792	25813	137829	96420	31920	8933	3249	1232	260	106	39	35
1971	7754	13739	11831	9527	59290	52003	12093	2434	762	418	149	42	25
1972	35536	45431	26832	12089	7918	34885	22315	4572	1215	353	315	121	40
1973	294262	131493	61000	20569	7248	8328	19130	4499	677	195	81	59	55
1974	91855	437377	203772	47006	12630	4370	2523	5607	2127	322	151	83	62
1975	45282	59798	226646	118567	29522	9353	2617	1555	1928	575	231	15	37
1976	85337	114341	79993	118236	47872	13962	4051	936	558	442	139	26	53
1977	39594	168609	136335	52925	61821	23338	5659	1521	610	271	122	92	54
1978	78822	45400	88495	56823	25407	31821	9408	1227	913	446	748	48	51
1979	8600	77484	43677	31943	16815	8274	10974	1785	427	103	59	38	45
1980	3911	17086	81986	40061	17664	7442	3508	3196	678	79	24	26	8
1981	3407	9466	20803	63433	21788	9933	4267	1311	882	109	37	3	NA
1982	8948	20933	19345	28084	42496	8395	2878	708	271	260	27	5	5
1983	3108	19594	20473	17656	17004	18329	2545	646	229	74	58	20	5
1984	6942	14240	18807	20086	15145	8287	5988	783	232	153	49	12	8
1985	24634	45769	27806	19418	11369	3747	1557	768	137	36	31	32	8
1986	28968	70993	78672	25215	11711	4063	976	726	557	136	28	34	14
1987	13648	137106	98210	61407	13707	3866	910	455	187	227	21	59	20
1988	9828	22774	135347	54379	21015	3304	1236	519	106	69	43	14	5
1989	5085	17313	32165	81756	27854	5501	827	290	41	13	NA	11	16
1990	1911	7551	12999	17827	30007	6810	828	179	59	15	6	5	2
1991	4963	10933	16467	20342	19479	25193	3888	428	48	12	NA	NA	2
1992	21835	36015	27494	23392	18351	13541	18321	2529	264	82	3	9	NA
1993	10094	46182	63578	33623	14866	9449	6571	12593	1749	377	63	22	NA
1994	6531	59444	102548	59766	32504	10019	6163	3671	7528	995	121	19	4
1995	4879	42587	115329	98485	32036	7334	3014	1725	1174	1920	222	41	NA
1996	7655	28782	80711	100509	54590	10545	2023	930	462	230	809	84	NA
1997	12827	36491	69633	83017	65768	28392	4651	1151	373	213	144	238	NA
1998	31887	88874	48972	40493	34513	26354	6583	965	197	69	42	22	53
1999	7501	77714	92816	31139	15778	15851	8828	1837	195	40	34	8	30

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
2000	4701	33094	93044	47210	12671	6677	4787	1647	321	71	11	NA	14
2001	5044	35019	62139	62456	22794	5266	1773	1163	343	85	6	7	22
2002	2348	31033	76175	67656	42122	11527	1801	529	223	120	21	9	6
2003	7263	20885	64447	71109	36706	14002	2887	492	142	97	21	43	NA
2004	2090	38226	50826	68350	50838	18118	6239	1746	295	127	39	16	8
2005	5815	19768	113144	61665	44777	20553	6285	2348	562	100	21	24	7
2006	8548	47207	33625	78150	31770	15667	7245	1788	737	210	26	45	155
2007	25473	43817	62877	26303	34392	11240	4080	1381	505	285	44	13	35
2008	8459	51704	40656	35072	14037	20676	5503	1794	715	229	42	26	13
2009	4866	38711	83998	46639	20789	8417	8920	1957	872	987	76	21	20
2010	1778	16193	53855	75853	36797	17062	4784	4325	3034	913	189	49	35
2011	1418	8033	32472	70938	73875	21116	11708	5058	3237	600	434	12	0
2012	2695	10462	16646	40372	70014	48315	12326	5214	1926	1124	317	70	24
2013	2903	13659	22752	21020	54231	74451	47124	9143	2963	694	449	89	145
2014	5234	19226	38407	36633	29901	56109	47540	22738	3717	1169	313	210	157
2015	4315	31383	41181	51209	33745	22530	23609	24553	16071	2510	468	134	254
2016	2076	11291	50231	43609	35265	23417	14592	20105	15862	4781	871	249	308
2017	6535	13128	28365	66504	46136	28507	15307	10073	12169	6465	1927	399	285
2018	6120	28569	27128	33816	54328	28323	16208	9722	7132	3740	2295	840	271
2019	4389	21405	48422	29849	26548	39759	17395	8883	4606	2109	715	564	322
2020	3992	22446	37649	52454	31009	20904	23618	11768	6130	1572	591	310	278
2021	2983	17935	54005	59732	59136	22397	14744	13589	4919	1737	678	228	344
2022	5725	23486	53467	68112	47067	30569	11776	6046	3797	1489	575	164	107
2023	11046	15493	30653	37250	38616	28163	16233	5885	1995	984	195	56	94
2024	10389	21050	21148	26784	28564	23911	14331	5597	1133	263	105	33	12
2025	2131	16673	19634	14882	15130	13287	10667	5346	1564	353	77	34	11

Table 3.7. Northeast Arctic COD. Weights-at-age (kg) in landings from various countries

Norway														
Year			Age											
	2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1983	0.41	0.82	1.32	2.05	2.82	3.94	5.53	7.70	9.17	11.46	16.59	16.42	16.96	24.46
1984	1.16	1.47	1.97	2.53	3.13	3.82	4.81	5.95	7.19	7.86	8.46	7.99	9.78	10.64
1985	0.34	0.99	1.43	2.14	3.27	4.68	6.05	7.73	9.86	11.87	14.16	14.17	13.52	15.33
1986	0.30	0.67	1.34	2.04	3.14	4.60	5.78	6.70	7.52	9.74	10.68	12.86	9.59	16.31
1987	0.24	0.48	0.88	1.66	2.72	4.35	6.21	8.78	9.78	12.50	13.75	15.12	10.43	19.95

1988	0.36	0.56	0.83	1.31	2.34	3.84	6.50	8.76	9.97	11.06	14.43	19.02	12.89	10.16
1989	0.53	0.75	0.90	1.17	1.95	3.20	4.88	7.82	9.40	11.52	11.47		19.47	14.68
1990	0.40	0.81	1.22	1.59	2.14	3.29	4.99	7.83	10.54	14.21	17.63	7.97	14.64	
1991	0.63	1.37	1.77	2.31	3.01	3.68	4.63	6.06	8.98	12.89	17.00		14.17	16.63
1992	0.41	1.10	1.79	2.45	3.22	4.33	5.27	6.21	8.10	10.51	11.59		15.81	6.52
1993	0.30	0.83	1.70	2.41	3.35	4.27	5.45	6.28	7.10	7.82	10.10	16.03	19.51	17.68
1994	0.30	0.82	1.37	2.23	3.35	4.27	5.56	6.86	7.45	7.98	9.53	12.16	11.45	19.79
1995	0.44	0.78	1.26	1.87	2.80	4.12	5.15	5.96	7.90	8.67	9.20	11.53	17.77	21.11
1996	0.29	0.90	1.15	1.67	2.58	4.08	6.04	6.62	7.96	9.36	10.55	11.41	9.51	24.24
1997	0.35	0.78	1.14	1.56	2.25	3.48	5.35	7.38	7.55	8.30	11.15	8.64	12.80	
1998	0.38	0.68	1.03	1.64	2.23	3.24	4.85	6.88	9.18	9.84	15.78	14.37	13.77	15.58
1999	0.46	0.88	1.16	1.65	2.40	3.12	4.26	6.00	6.52	10.64	14.05	12.67	9.20	17.22
2000	0.31	0.65	1.23	1.80	2.54	3.58	4.49	5.71	7.54	7.86	12.71	14.71	15.40	20.26
2001	0.30	0.77	1.18	1.83	2.75	3.64	4.88	5.93	7.43	8.90	10.22	11.11	13.03	18.85
2002	0.31	0.90	1.40	1.90	2.60	3.55	4.60	5.80	7.40	9.56	8.71	12.92	8.42	17.61
2003	0.55	0.88	1.39	2.01	2.63	3.59	4.83	5.57	7.262	9.36	9.52	9.52	10.68	21.66
2004	0.54	1.08	1.41	1.95	2.69	3.46	4.77	6.72	7.90	8.66	12.21	14.02	16.50	11.37
2005	0.58	0.92	1.38	1.86	2.61	3.54	4.57	6.41	8.24	9.89	11.04	14.08	11.81	20.08
2006	0.51	0.97	1.45	2.06	2.71	3.56	4.57	5.53	6.61	7.53	8.55	8.44	9.82	12.31
2007	0.53	1.07	1.70	2.37	3.26	4.36	5.45	6.71	8.08	8.56	9.75	11.72	12.72	15.58
2008	0.65	1.12	1.70	2.44	3.32	4.41	5.61	6.84	8.25	9.31	10.54	12.45	13.59	21.15
2009	0.56	0.98	1.47	2.10	2.83	3.90	5.06	5.76	7.31	7.79	7.81	10.68	11.83	14.76
2010	0.55	0.95	1.46	2.06	2.93	4.02	5.40	6.44	7.19	8.43	9.11	10.46	11.39	15.55
2011	0.53	1.09	1.50	2.06	2.85	3.70	5.01	6.26	7.33	8.34	9.87	13.23		
2012		0.83	1.32	1.92	2.65	3.52	4.71	6.34	8.11	9.92	11.31	13.45	15.75	
2013	0.43	0.95	1.40	2.00	2.64	3.44	4.51	5.67	7.29	8.80	10.33	11.38	12.56	
2014	0.59	1.07	1.55	2.15	2.80	3.70	4.57	5.78	6.97	8.35	9.46	10.99	12.28	15.49
2015	0.64	0.96	1.42	1.96	2.57	3.30	4.13	5.49	6.46	7.18	8.63	10.37	12.24	14.60
2016	0.59	0.96	1.46	1.99	2.71	3.57	4.56	5.78	6.82	8.08	9.33	10.01	11.68	14.79
2017	0.55	0.99	1.53	2.06	2.69	3.64	4.72	5.91	6.91	7.88	9.41	10.93	11.78	15.07
2018	0.62	1.05	1.51	2.11	2.80	3.48	4.54	5.80	6.97	7.64	9.11	10.29	11.35	14.05
2019	0.51	0.96	1.43	2.02	2.72	3.60	4.51	5.80	6.91	7.94	8.89	10.94	11.55	14.49
2020	0.58	0.94	1.42	2.01	2.66	3.50	4.59	5.77	7.03	8.46	9.78	10.97	12.74	16.08
2021	0.39	0.75	1.27	1.86	2.55	3.42	4.52	5.86	7.13	8.55	10.09	11.79	12.98	15.75
2022	0.32	0.71	1.15	1.73	2.42	3.36	4.47	5.79	7.18	8.65	10.09	11.45	12.93	16.43
2023	0.38	0.80	1.23	1.79	2.51	3.39	4.47	5.80	7.23	8.74	9.86	11.79	13.66	15.78
2024	0.38	0.74	1.21	1.84	2.58	3.50	4.59	5.90	7.34	8.95	10.77	12.17	13.51	20.81

2025	0.29	0.83	1.31	1.89	2.68	3.56	4.64	6.03	7.52	9.09	10.85	12.26	14.34	16.13

Table 3.7. Northeast Arctic COD. Weights-at-age (kg) in landings from various countries (continued)

Russia (trawl only)														
Year				Age										
		2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1983		0.65	1.05	1.58	2.31	3.39	4.87	6.86	8.72	10.40	12.07	14.43			
1984		0.53	0.88	1.45	2.22	3.21	4.73	6.05	8.43	10.34	12.61	14.95			
1985		0.33	0.77	1.31	1.84	2.96	4.17	5.94	6.38	8.58	10.28				
1986		0.29	0.61	1.14	1.75	2.45	4.17	6.18	8.04	9.48	11.33	12.35	14.13		
1987		0.24	0.52	0.88	1.42	2.07	2.96	5.07	7.56	8.93	10.80	13.05	18.16		
1988		0.27	0.49	0.88	1.32	2.06	3.02	4.40	6.91	9.15	11.65	12.53	14.68		
1989		0.50	0.73	1.00	1.39	1.88	2.67	4.06	6.09	7.76	9.88				
1990		0.45	0.83	1.21	1.70	2.27	3.16	4.35	6.25	8.73	10.85	13.52			
1991		0.36	0.64	1.05	2.03	2.85	3.77	4.92	6.13	8.36	10.44	15.84	19.33		
1992		0.55	1.20	1.44	2.07	3.04	4.24	5.14	5.97	7.25	9.28	11.36			
1993		0.48	0.78	1.39	2.06	2.62	4.07	5.72	6.79	7.59	11.26	14.79	17.71		
1994		0.41	0.81	1.24	1.80	2.55	2.88	4.96	6.91	8.12	10.28	12.42	16.93		
1995		0.37	0.77	1.21	1.74	2.37	3.40	4.71	6.73	8.47	9.58	12.03	16.99		
1996		0.30	0.64	1.09	1.60	2.37	3.42	5.30	7.86	8.86	10.87	11.80			
1997		0.30	0.57	1.00	1.52	2.18	3.30	4.94	7.15	10.08	11.87	13.54			
1998		0.33	0.68	1.06	1.60	2.34	3.39	5.03	6.89	10.76	12.39	13.61	14.72		
1999		0.24	0.58	0.98	1.41	2.17	3.26	4.42	5.70	7.27	10.24	14.12			
2000		0.18	0.48	0.85	1.44	2.16	3.12	4.44	5.79	7.49	9.66	10.36			
2001		0.12	0.31	0.62	1.00	1.53	2.30	3.31	4.57	6.55	8.11	9.52	11.99		
2002		0.20	0.60	1.05	1.46	2.14	3.27	4.47	6.23	8.37	10.06	12.37			
2003		0.23	0.63	1.06	1.78	2.40	3.41	4.86	6.28	7.55	11.10	13.41	12.12	14.51	
2004		0.30	0.57	1.09	1.55	2.37	3.20	4.73	6.92	8.41	9.77	11.08			
2005		0.33	0.65	0.98	1.50	2.10	3.08	4.31	5.81	8.42	10.37	13.56	14.13		
2006		0.27	0.68	1.05	1.49	2.25	3.16	4.54	5.90	8.59	10.31	12.31			
2007		0.23	0.67	1.12	1.66	2.25	3.31	4.57	6.27	8.20	10.02	12.36	12.42		
2008		0.28	0.64	1.16	1.74	2.65	3.58	4.74	5.73	7.32	8.07	9.52	12.52		
2009		0.31	0.64	1.09	1.58	2.11	3.19	4.80	6.58	7.97	9.84	11.51			
2010		0.25	0.57	1.00	1.64	2.28	3.14	4.53	5.98	8.03	9.71	10.70	13.53		
2011		0.25	0.62	1.05	1.56	2.18	2.95	4.33	6.21	8.04	10.13	12.25	15.18		
2012		0.29	0.60	1.07	1.66	2.25	2.95	4.17	6.23	8.58	11.08	12.24	14.07	15.22	16.39
2013		0.33	0.63	1.05	1.54	2.26	3.09	4.08	5.47	7.37	9.59	12.57	15.54	17.05	
2014		0.32	0.61	1.05	1.61	2.26	3.15	4.00	5.24	7.13	9.46	11.18	14.47		

2015		0.30	0.60	0.97	1.49	2.11	3.13	4.64	5.78	7.13	9.53	12.12	16.71	17.37	
2016		0.26	0.55	0.97	1.53	2.20	3.19	4.50	6.12	7.97	9.55	10.95	14.35	14.74	17.25
2017		0.33	0.63	1.03	1.56	2.24	3.24	4.67	6.34	7.74	9.40	11.12	14.43	16.67	11.91
2018		0.33	0.68	1.06	1.62	2.40	3.22	4.66	6.23	7.79	8.91	10.26	11.26	13.41	10.14
2019		0.29	0.62	1.10	1.60	2.33	3.22	4.44	6.45	8.10	9.60	11.02	13.83	10.65	10.65
2020		0.27	0.47	0.93	1.44	2.05	2.95	4.28	5.73	7.59	8.45	10.66	12.26	12.18	12.23
2021		0.19	0.44	0.76	1.35	2.02	2.81	4.25	6.26	7.81	9.59	10.67	10.86	13.62	12.31
2022		0.39	0.62	0.91	1.42	2.21	3.22	4.45	6.15	8.16	9.91	10.83	11.96		10.33
2023		0.36	0.63	1.03	1.55	2.29	3.27	4.49	5.81	7.05	8.92	9.99	10.77		
2024		0.38	0.73	1.10	1.57	2.19	2.97	4.24	5.10	6.44	8.60	11.40	15.47		
2025		0.31	0.65	1.15	1.72	2.50	3.59	4.84	5.94	6.94	8.59	9.49	11.03	10.4	

Table 3.7. Northeast Arctic COD. Weights-at-age (kg) in landings from various countries (continued)

Germany (Division IIa and IIb)															
Year				Age											
		2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1994			0.68	1.04	2.24	3.49	4.51	5.79	6.93	8.16	8.46	8.74	9.48	15.25	
1995			0.44	0.84	1.5	2.72	3.81	4.46	4.81	7.37	7.69	8.25	9.47		
1996			0.84	1.15	1.64	2.53	3.58	4.13	3.9	4.68	6.98	6.43	11.32		
1997			0.43	0.92	1.42	2.01	3.15	4.04	5.16	4.82	3.96	7.04	8.8		
1998		0.23	0.73	1.17	1.89	2.72	3.25	4.13	5.63	6.5	8.57	8.42	11.45	8.79	
1999	[1]		0.853	1.448	1.998	2.65	3.473	4.156	5.447	6.82	5.902		8.01		
2000	[2]	0.26	0.73	1.36	2.04	2.87	3.67	4.88	5.78	7.05	8.45	8.67	9.33	6.88	
2001		0.38	0.80	1.21	1.90	2.74	3.90	4.99	5.69	7.15	7.32	11.72	9.11	6.60	
2002		0.35	1.00	1.31	1.80	2.53	3.64	4.38	5.07	6.82	9.21	7.59	13.18	19.17	19.20
2003		0.22	0.44	1.04	1.71	2.31	3.27	4.93	6.17	7.77	9.61	9.99	12.29	13.59	
2004	[2]	0.22	0.73	1.01	1.75	2.58	3.33	4.73	6.32	7.20	8.45	9.20	11.99	10.14	13.11
2005	[3]	0.57	0.77	1.13	1.66	2.33	3.36	4.38	5.92	6.65	7.26	10.01	11.14		
2006	[2]	0.71	0.91	1.39	1.88	2.56	3.77	5.33	6.68	9.14	10.89	11.51	16.83	18.77	
2007	[3]	0.59	1.35	1.79	2.51	3.53	4.00	4.95	6.55	7.54	9.71	11.40	11.57	23.34	15.61
2008	[3]	0.23	0.51	1.14	1.76	2.57	3.15	4.40	5.43	7.18	8.39	10.15	10.03	10.99	14.26
2009	[3]	0.35	0.60	1.19	1.83	2.96	4.08	5.61	6.97	8.55	9.13	10.54	13.34	10.30	17.06
2010	[3]	0.36	0.67	0.93	1.71	2.46	3.21	4.93	6.75	7.80	8.70	8.53	10.17	12.36	14.11
2011	[1]			1.75	3.09	3.30	3.28	4.13	4.99	6.61	7.91	9.38	10.79	14.67	14.91
2013	[3]			1.03	1.37	1.87	2.65	3.45	4.49	7.26	11.42	12.86	13.07		
2014	[4]		0.68	0.96	1.39	1.69	3.06	4.07	5.65	8.15	10.36	13.07	13.52		
2015	[4]	0.82	1.05	1.67	2.33	3.56	4.50	5.41	6.20	6.39					

2016	1		1.38	2.60	3.55	4.81	6.33	7.61	8.90	9.26	10.83	13.41	16.84	17.03	17.76
2017	1		1.58	2.79	3.93	3.93	4.77	6.35	8.16	9.09	10.39	11.24	12.48	14.39	13.04
2018	3	0.58	1.16	1.76	2.45	3.34	4.13	5.81	7.16	8.99	9.96	10.85	11.73	14.01	17.79
2019	1		0.82	1.37	1.80	2.26	3.49	4.45	5.44	7.08	9.25	9.39	13.30	12.24	15.25
2020	5			1.6	1.63	2.48	3.13	5.01	5.93	8.36	9.31	12.16	12.96	12.77	14.08
2021	2		0.68	1.3	1.52	2.25	3.22	4.58	6.49	7.43	10.37	11.73	14.64	14.34	15.74
2022	1		0.59	0.82	1.40	2.20	3.04	4.13	5.54	7.36	8.56	10.79	13.12	14.96	15.18
2023	2		0.74	0.94	1.25	1.89	2.97	4.36	5.7	5.55	8.4	10.06	9.86	22.68	
2024	1			2.05	2.43	2.46	2.66	3.24	3.89	3.87					
2025	4		0.6	0.9	1.34	2.06	2.44	3.13	4.13	5.78	7.47				
1	Division IIa only														
2	IIa and IIb combined														
3	I,IIa and IIb combined														
4	Division IIb only														
5	I and IIa combined														

Table 3.7. Northeast Arctic COD. Weights at age (kg) in landings from various countries (continued)

Spain (Division IIb)															
Year				Age											
		2	3	4	5	6	7	8	9	10	11	12	13	14	15+
1994		0.43	1.08	1.38	2.32	2.47	2.68	3.46	5.20	7.04	6.79	7.20	8.04	10.46	15.35
1995		0.42	0.51	0.98	1.99	3.41	4.95	5.52	8.62	9.21	11.42	9.78	8.08		
1996			0.66	1.12	1.57	2.43	3.17	3.59	4.44	5.48	6.79	8.10			
1997	1	0.51	0.65	1.22	1.68	2.60	3.39	4.27	6.67	7.88	11.34	13.33	10.03	8.69	
1998		0.47	0.74	1.15	1.82	2.44	3.32	3.71	5.00	7.26					
1999	1	0.21	0.69	1.06	1.69	2.50	3.32	4.72	5.76	6.77	7.24	7.63			
2000	1	0.23	0.61	1.24	1.75	2.47	3.12	4.65	6.06	7.66	10.94	11.40	7.20		
2001		0.23	0.64	1.25	1.95	2.86	3.55	4.95	6.46	8.50	11.07	13.09			
2002		0.16	0.55	1.00	1.48	2.17	3.29	4.47	5.35	8.29	12.23	9.01	12.16	15.2	
2003			0.58	1.05	1.70	2.33	3.33	4.92	6.24	9.98	13.07	14.74	14.17		
2004	1	0.31	0.56	0.80	1.28	1.96	2.59	3.72	5.36	5.28	7.41		11.43		
2005	1		0.63	1.14	1.85	2.48	3.43	4.25	5.38	8.41	11.19	15.04	16.93		
2006		0.30	0.61	0.99	1.46	2.04	2.55	3.39	3.50	4.70	6.36				
2007		0.42	0.60	1.20	1.76	2.40	3.18	3.96	5.19	6.61	9.48	7.65	12.65	15.74	19.66
2009	1	0.12	0.45	0.95	1.60	2.18	3.36	4.52	6.04	7.30	9.42	10.35	11.47	12.54	

2010	[2]	0.18	0.56	1.11	1.73	2.36	3.36	5.14	6.88	8.64	9.65	6.83			
2011	[1]		0.45	0.90	1.26	1.84	2.55	4.08	5.61	8.17	8.14	7.31	8.91		
2012	[2]		0.40	0.84	1.29	1.96	2.78	3.71	4.99	7.42		7.19	9.32		
2013		0.17	0.72	1.06	1.63	2.36	3.14	3.90	4.36	6.55					
2014		0.24	0.43	0.74	1.27	1.85	2.60	3.56	4.51	5.52	7.18	9.42	9.26	13.16	15.05
2015	[2]		0.40	0.80	1.19	1.79	2.45	3.38	4.41	5.85	6.64	7.48	6.77		
2016	[3]	0.11	0.38	0.76	1.20	1.72	2.50	3.39	4.96	7.11	8.56				
2017	[2]	0.12	0.42	0.75	1.17	1.69	2.50	3.39	4.47	5.69	5.93	6.00	10.91	13.57	10.52
2018	[2]	0.19	0.45	0.83	1.30	1.86	2.57	3.55	4.92	5.51	7.84	7.08	7.28		
2019	[2]	0.19	0.39	0.90	1.30	1.85	2.65	3.48	4.83	5.96	5.67	7.04	8.36		
2021	[2]		0.36	0.60	1.20	1.83	2.49	3.11	4.55	6.10	6.50	7.03		9.013	17.13
2022	[2]		0.49	0.80	1.25	1.83	2.77	4.06	5.52	7.71	8.87	12.18			
2023	[2]		0.54	1.15	1.56	2.28	3.27	4.24	5.56	6.62	8.62	7.00	12.98	16.92	
2024	[2]	0.15	0.44	0.71	1.41	1.98	2.69	3.74	5.24	5.93	8.41	10.28	9.99	12.26	20.16
2025	[2]		0.37	0.91	1.57	2.28	3.12	4.19	5.42	7.09	7.52	12.83	9.11		
[1] IIa and IIb combined															
[2] I,IIa and IIb combined															
[3] I and IIb combined															
Iceland (Sub-area I)															
1994		0.42	0.85	1.44	2.77	3.54	4.08	5.84	6.37	7.02	7.48	7.37			
1995			1.17	0.91	1.60	2.28	3.61	4.73	6.27			6.26			
1996			0.36	0.99	1.55	2.83	3.79	4.81	5.34	7.25	7.68	9.08	8.98	10.52	
1997		0.42	0.43	0.76	1.60	2.40	3.45	4.40	5.74	6.15		8.28	10.52	9.89	
UK (England & Wales)															
1995	[1]			1.47	2.11	3.47	5.57	6.43	7.17	8.12	8.05	10.2	10.1		
1996	[2]			1.55	1.81	2.42	3.61	6.3	6.47	7.83	7.91	8.93	9.38	10.9	
1997	[2]			1.93	2.17	3.07	4.17	4.89	6.46		12.3	8.44			
[1] Division IIa and IIb															
[2] Division IIa															
Poland (Division IIb)															
2006		0.18	0.51	0.89	1.55	2.23	3.6	5.28	6.95	8.478	11	10.8	15.6	18.9	
2008			0.49	0.90	1.45	2.24	2.79	3.82	4.68	5.015	6.45	7.02	7.22	5.99	6.91
2009				1.02	1.72	2.65	3.81	5.23	6.91	8.862	11.1	13.6	16.5		
2010				1.39	1.66	2.29	2.98	3.92	5.18	6.313	6.66	8.72	9.05		
2011				0.99	1.50	2.17	3.15	4.43	7.45	7.28					
2016	[1]		0.84	1.59	2.29	2.81	3.91	4.78	5.61	6.709	7.89	8.54	11.6	13.7	16.09
2017	[2]		0.71	1.23	1.52	2.47	3.52	4.78	6.97	9.193	9.95	10.9	14.1		

2018	3		0.74	1.15	1.66	2.45	3.55	4.48	6.06	6.31	7.59	7.91	8.28	8.52	9.40
2019	1				1.57	2.00	2.69	4.04	5.61	7.23	9.13	11.62	12.41	13.46	11.47
	1	Division IIa													
	2	Division IIa and IIb													
	3	I and IIb combined													

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Table 3.8. Northeast Arctic COD. Catch weights at age (kg)

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1946	0.350	0.590	1.110	1.690	2.370	3.170	3.980	5.050	5.920	7.200	8.150	8.130	9.250
1947	0.320	0.560	0.950	1.500	2.140	2.920	3.650	4.560	5.840	7.420	8.850	8.790	10.000
1948	0.340	0.530	1.260	1.930	2.460	3.360	4.220	5.310	5.920	7.090	8.430	8.180	9.430
1949	0.370	0.670	1.110	1.660	2.500	3.230	4.070	5.270	5.990	7.080	8.220	8.260	8.700
1950	0.390	0.640	1.290	1.700	2.360	3.480	4.520	5.620	6.400	7.960	8.890	9.070	10.270
1951	0.400	0.830	1.390	1.880	2.540	3.460	4.880	5.200	7.140	8.220	9.390	9.500	9.520
1952	0.440	0.800	1.330	1.920	2.640	3.710	5.060	6.050	7.420	8.430	10.190	10.130	10.560
1953	0.400	0.760	1.280	1.930	2.810	3.720	5.060	6.340	7.400	8.670	10.240	11.410	11.930
1954	0.440	0.770	1.260	1.970	3.030	4.330	5.400	6.750	7.790	10.670	9.680	9.560	11.110
1955	0.320	0.570	1.130	1.730	2.750	3.940	4.900	7.040	7.200	8.780	10.080	11.020	12.110
1956	0.330	0.580	1.070	1.830	2.890	4.250	5.550	7.280	8.000	8.350	9.940	10.250	11.560
1957	0.330	0.590	1.020	1.820	2.890	4.280	5.490	7.510	8.240	9.250	10.610	10.820	12.070
1958	0.340	0.520	0.950	1.920	2.940	4.210	5.610	7.350	8.670	9.580	11.630	11.000	13.830
1959	0.350	0.720	1.470	2.680	3.590	4.320	5.450	6.440	7.170	8.630	11.620	11.950	13.000
1960	0.340	0.510	1.090	2.130	3.380	4.870	6.120	8.490	7.790	8.300	11.420	11.720	13.420
1961	0.310	0.550	1.050	2.200	3.230	5.110	6.150	8.150	8.680	9.600	11.950	13.180	13.420
1962	0.320	0.550	0.930	1.700	3.030	5.030	6.550	7.700	9.270	10.560	12.720	13.480	14.440
1963	0.320	0.610	0.960	1.730	3.040	4.960	6.440	7.910	9.620	11.310	12.740	13.190	14.290
1964	0.330	0.550	0.950	1.860	3.250	4.970	6.410	8.070	9.340	10.160	12.890	13.250	14.000
1965	0.380	0.680	1.030	1.490	2.410	3.520	5.730	7.540	8.470	11.170	13.720	13.460	14.120
1966	0.440	0.740	1.180	1.780	2.460	3.820	5.360	7.270	8.630	10.660	14.150	14.000	15.000
1967	0.290	0.810	1.350	2.040	2.810	3.480	4.890	7.110	9.030	10.590	13.830	14.150	16.760
1968	0.330	0.700	1.480	2.120	3.140	4.210	5.270	6.650	9.010	9.660	14.850	16.300	17.000
1969	0.440	0.790	1.230	2.030	2.900	3.810	5.020	6.430	8.330	10.710	14.210	15.000	17.000
1970	0.370	0.910	1.340	2.000	3.000	4.150	5.590	7.600	8.970	10.990	14.070	14.610	16.000
1971	0.450	0.880	1.380	2.160	3.070	4.220	5.810	7.130	8.620	10.830	12.950	14.250	15.970
1972	0.380	0.770	1.430	2.120	3.230	4.380	5.830	7.620	9.520	12.090	13.670	13.850	16.000
1973	0.380	0.910	1.540	2.260	3.290	4.610	6.570	8.370	10.540	11.620	13.900	14.000	15.840

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1974	0.320	0.660	1.170	2.220	3.210	4.390	5.520	7.860	9.820	11.410	13.240	13.700	14.290
1975	0.410	0.640	1.110	1.900	2.950	4.370	5.740	8.770	9.920	11.810	13.110	14.000	14.290
1976	0.350	0.730	1.190	2.010	2.760	4.220	5.880	9.300	10.280	11.860	13.540	14.310	14.280
1977	0.490	0.900	1.430	2.050	3.300	4.560	6.460	8.630	9.930	10.900	13.670	14.260	14.910
1978	0.490	0.810	1.450	2.150	3.040	4.460	6.540	7.980	10.150	10.850	13.180	14.000	15.000
1979	0.350	0.700	1.240	2.140	3.150	4.290	6.580	8.610	9.220	10.890	14.340	14.500	15.310
1980	0.270	0.560	1.020	1.720	3.020	4.200	5.840	7.260	8.840	9.280	14.450	15.000	15.500
1981	0.490	0.980	1.440	2.090	2.980	4.850	6.570	9.160	10.820	10.770	13.930	15.000	16.000
1982	0.370	0.660	1.350	1.990	2.930	4.240	6.460	8.510	12.240	10.780	14.040	15.000	16.000
1983	0.840	1.370	2.090	2.860	3.990	5.580	7.770	9.290	11.550	11.420	12.800	14.180	15.550
1984	1.420	1.930	2.490	3.140	3.910	4.910	6.020	7.400	8.130	11.420	12.800	14.180	15.550
1985	0.940	1.370	2.020	3.220	4.630	6.040	7.660	9.810	11.800	11.420	12.800	14.180	15.550
1986	0.640	1.270	1.880	2.790	4.490	5.840	6.830	7.690	9.810	11.420	12.800	14.180	15.550
1987	0.490	0.880	1.550	2.330	3.440	5.920	8.600	9.600	12.170	11.420	12.800	14.180	15.550
1988	0.540	0.850	1.320	2.240	3.520	5.350	8.060	9.510	11.360	11.420	12.800	14.180	15.550
1989	0.740	0.960	1.310	1.920	2.930	4.640	7.520	9.120	11.080	11.420	12.800	14.180	15.550
1990	0.810	1.220	1.640	2.220	3.240	4.680	7.300	9.840	13.250	11.420	12.800	14.180	15.550
1991	1.050	1.450	2.150	2.890	3.750	4.710	6.080	8.820	11.800	11.420	12.800	14.180	15.550
1992	1.160	1.570	2.210	3.100	4.270	5.190	6.140	7.770	10.120	11.420	12.800	14.180	15.550
1993	0.810	1.520	2.160	2.790	4.070	5.530	6.470	7.190	7.980	11.457	12.800	14.180	15.550
1994	0.820	1.300	2.060	2.890	3.210	5.200	6.800	7.570	8.010	9.955	13.012	14.180	15.550
1995	0.770	1.200	1.780	2.590	3.810	4.990	6.230	8.050	8.740	9.774	11.388	14.546	15.550
1996	0.790	1.110	1.610	2.460	3.820	5.720	6.740	8.040	9.280	10.451	11.190	12.819	16.045
1997	0.670	1.040	1.530	2.220	3.420	5.200	7.190	7.730	8.610	11.145	11.926	12.608	14.234
1998	0.680	1.050	1.620	2.300	3.300	4.860	6.870	9.300	10.300	10.754	12.676	13.394	14.011
1999	0.630	1.010	1.540	2.340	3.210	4.290	6.000	6.730	10.080	11.151	12.255	14.191	14.839
2000	0.570	1.040	1.610	2.340	3.340	4.480	5.720	7.520	8.020	11.930	12.682	13.743	15.675
2001	0.660	1.050	1.620	2.510	3.510	4.780	6.040	7.540	9.000	10.230	13.519	14.197	15.206
2002	0.720	1.130	1.560	2.310	3.520	4.780	6.200	7.660	9.140	10.379	11.687	15.081	15.681
2003	0.670	1.120	1.830	2.500	3.580	5.040	6.360	8.200	10.710	10.167	11.848	13.138	16.602
2004	0.720	1.130	1.610	2.430	3.270	4.720	6.710	7.980	9.190	10.840	11.619	13.310	14.571
2005	0.690	1.080	1.570	2.210	3.260	4.440	6.230	8.190	9.720	10.626	12.347	13.066	14.752
2006	0.720	1.160	1.600	2.390	3.320	4.540	5.470	6.780	7.700	10.800	12.116	13.842	14.494
2007	0.740	1.210	1.830	2.510	3.820	5.040	6.580	8.080	8.940	10.349	12.304	13.596	15.309
2008	0.770	1.270	1.870	2.820	3.790	5.120	6.220	7.750	8.400	10.139	11.816	13.795	15.052
2009	0.750	1.170	1.740	2.420	3.860	5.350	6.430	8.010	8.670	10.055	11.588	13.276	15.261

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
2010	0.780	1.200	1.740	2.440	3.400	5.040	6.250	7.320	8.530	10.378	11.496	13.033	14.715
2011	0.780	1.310	1.720	2.370	3.200	4.620	6.180	7.470	8.570	10.387	11.847	12.935	14.459
2012	0.670	1.140	1.730	2.340	3.120	4.400	6.280	8.240	10.350	10.367	11.857	13.309	14.356
2013	0.710	1.170	1.670	2.360	3.190	4.220	5.580	7.310	9.080	11.029	11.835	13.320	14.750
2014	0.790	1.200	1.730	2.340	3.280	4.210	5.490	6.980	8.670	10.823	12.551	13.297	14.761
2015	0.780	1.090	1.550	2.180	3.140	4.460	5.610	6.620	7.340	10.215	12.328	14.058	14.737
2016	0.780	1.140	1.660	2.260	3.250	4.500	5.980	7.310	8.540	9.372	11.670	13.822	15.536
2017	0.710	1.150	1.660	2.320	3.320	4.670	6.130	7.150	8.140	9.597	10.752	13.121	15.288
2018	0.860	1.170	1.710	2.500	3.310	4.610	6.030	7.320	8.060	9.707	10.998	12.137	14.552
2019	0.680	1.150	1.660	2.390	3.330	4.450	6.110	7.290	8.410	9.806	11.117	12.401	13.513
2020	0.709	1.084	1.604	2.195	3.092	4.390	5.731	7.218	8.406	9.989	11.226	12.529	13.793
2021	0.527	0.896	1.487	2.159	2.982	4.364	6.048	7.348	8.796	9.991	11.424	12.645	13.928
2022	0.623	0.956	1.478	2.245	3.247	4.441	5.877	7.328	8.738	10.122	11.427	12.858	14.051
2023	0.638	1.056	1.617	2.346	3.310	4.470	5.794	7.141	8.777	9.988	11.519	12.792	14.184
2024	0.727	1.109	1.612	2.279	3.135	4.387	5.469	7.019	8.828	10.093	11.408	12.942	14.187
2025	0.675	1.168	1.749	2.520	3.525	4.674	5.951	7.241	8.860	9.814	11.523	12.824	14.345

* values on 1993-2025, ages 12-15, have been updated by the VB model using the most recent actual data for ages 3-11

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Table 3.9. Northeast Arctic COD. Stock weights at age (kg)

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1946	0.35	0.59	1.11	1.69	2.37	3.17	3.98	5.05	5.92	7.2	8.146	8.133	9.253
1947	0.32	0.56	0.95	1.5	2.14	2.92	3.65	4.56	5.84	7.42	8.848	8.789	9.998
1948	0.34	0.53	1.26	1.93	2.46	3.36	4.22	5.31	5.92	7.09	8.43	8.181	9.433
1949	0.37	0.67	1.11	1.66	2.5	3.23	4.07	5.27	5.99	7.08	8.218	8.259	8.701
1950	0.39	0.64	1.29	1.7	2.36	3.48	4.52	5.62	6.4	7.96	8.891	9.07	10.271
1951	0.4	0.83	1.39	1.88	2.54	3.46	4.88	5.2	7.14	8.22	9.389	9.502	9.517
1952	0.44	0.8	1.33	1.92	2.64	3.71	5.06	6.05	7.42	8.43	10.185	10.134	10.563
1953	0.4	0.76	1.28	1.93	2.81	3.72	5.06	6.34	7.4	8.67	10.238	11.409	11.926
1954	0.44	0.77	1.26	1.97	3.03	4.33	5.4	6.75	7.79	10.67	9.68	9.557	11.106
1955	0.32	0.57	1.13	1.73	2.75	3.94	4.9	7.04	7.2	8.78	10.077	11.023	12.105
1956	0.33	0.58	1.07	1.83	2.89	4.25	5.55	7.28	8	8.35	9.944	10.248	11.564
1957	0.33	0.59	1.02	1.82	2.89	4.28	5.49	7.51	8.24	9.25	10.605	10.825	12.075
1958	0.34	0.52	0.95	1.92	2.94	4.21	5.61	7.35	8.67	9.58	11.631	11	13.832
1959	0.35	0.72	1.47	2.68	3.59	4.32	5.45	6.44	7.17	8.63	11.621	11.95	13

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1960	0.34	0.51	1.09	2.13	3.38	4.87	6.12	8.49	7.79	8.3	11.422	11.719	13.424
1961	0.31	0.55	1.05	2.2	3.23	5.11	6.15	8.15	8.68	9.6	11.952	13.181	13.422
1962	0.32	0.55	0.93	1.7	3.03	5.03	6.55	7.7	9.27	10.56	12.717	13.482	14.44
1963	0.32	0.61	0.96	1.73	3.04	4.96	6.44	7.91	9.62	11.31	12.737	13.193	14.287
1964	0.33	0.55	0.95	1.86	3.25	4.97	6.41	8.07	9.34	10.16	12.886	13.251	14
1965	0.38	0.68	1.03	1.49	2.41	3.52	5.73	7.54	8.47	11.17	13.722	13.465	14.118
1966	0.44	0.74	1.18	1.78	2.46	3.82	5.36	7.27	8.63	10.66	14.148	14	15
1967	0.29	0.81	1.35	2.04	2.81	3.48	4.89	7.11	9.03	10.59	13.829	14.146	16.756
1968	0.33	0.7	1.48	2.12	3.14	4.21	5.27	6.65	9.01	9.66	14.848	16.3	17
1969	0.44	0.79	1.23	2.03	2.9	3.81	5.02	6.43	8.33	10.71	14.211	15	17
1970	0.37	0.91	1.34	2	3	4.15	5.59	7.6	8.97	10.99	14.074	14.611	16
1971	0.45	0.88	1.38	2.16	3.07	4.22	5.81	7.13	8.62	10.83	12.945	14.25	15.973
1972	0.38	0.77	1.43	2.12	3.23	4.38	5.83	7.62	9.52	12.09	13.673	13.852	16
1973	0.38	0.91	1.54	2.26	3.29	4.61	6.57	8.37	10.54	11.62	13.904	14	15.841
1974	0.32	0.66	1.17	2.22	3.21	4.39	5.52	7.86	9.82	11.41	13.242	13.704	14.291
1975	0.41	0.64	1.11	1.9	2.95	4.37	5.74	8.77	9.92	11.81	13.107	14	14.293
1976	0.35	0.73	1.19	2.01	2.76	4.22	5.88	9.3	10.28	11.86	13.544	14.311	14.284
1977	0.49	0.9	1.43	2.05	3.3	4.56	6.46	8.63	9.93	10.9	13.668	14.255	14.906
1978	0.49	0.81	1.45	2.15	3.04	4.46	6.54	7.98	10.15	10.85	13.177	14	15
1979	0.35	0.7	1.24	2.14	3.15	4.29	6.58	8.61	9.22	10.89	14.344	14.5	15.315
1980	0.27	0.56	1.02	1.72	3.02	4.2	5.84	7.26	8.84	9.28	14.448	15	15.5
1981	0.49	0.98	1.44	2.09	2.98	4.85	6.57	9.16	10.82	10.77	13.932	15	16
1982	0.37	0.66	1.35	1.99	2.93	4.24	6.46	8.51	12.24	10.78	14.041	15	16
1983	0.37	0.92	1.6	2.44	3.82	4.76	6.17	7.7	9.25	12.621	14.544	16.466	18.388
1984	0.42	1.16	1.81	2.79	3.78	4.57	6.17	7.7	9.25	12.621	14.544	16.466	18.388
1985	0.413	0.875	1.603	2.81	4.059	5.833	7.685	10.117	14.29	12.621	14.544	16.466	18.388
1986	0.311	0.88	1.47	2.467	3.915	5.81	6.58	6.833	11.004	12.621	14.544	16.466	18.388
1987	0.211	0.498	1.254	2.047	3.431	5.137	6.523	9.3	13.15	12.621	14.544	16.466	18.388
1988	0.212	0.404	0.79	1.903	2.977	4.392	7.812	12.112	13.107	12.621	14.544	16.466	18.388
1989	0.299	0.52	0.868	1.477	2.686	4.628	7.048	9.98	9.25	12.621	14.544	16.466	18.388
1990	0.398	0.705	1.182	1.719	2.458	3.565	4.71	7.801	8.956	12.621	14.544	16.466	18.388
1991	0.518	1.136	1.743	2.428	3.214	4.538	6.88	10.719	9.445	12.621	14.544	16.466	18.388
1992	0.44	0.931	1.812	2.716	3.895	5.176	6.774	9.598	12.427	12.621	14.544	16.466	18.388
1993	0.344	1.172	1.82	2.823	4.031	5.497	6.765	8.571	10.847	12.621	14.544	16.466	18.388
1994	0.237	0.757	1.419	2.458	3.845	5.374	6.648	7.653	8.136	12.916	16.114	16.466	18.388
1995	0.197	0.487	1.141	2.118	3.504	4.915	6.949	9.051	9.775	11.409	15.248	18.62	18.388

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1996	0.206	0.482	0.98	2.041	3.52	5.507	7.74	9.922	10.63	12.093	13.533	17.659	21.171
1997	0.211	0.537	1.11	1.876	3.381	5.258	8.546	10.653	10.776	13.232	14.313	15.745	20.122
1998	0.242	0.561	1.179	1.936	2.944	4.583	7.092	10.7	12.042	13.771	15.607	16.617	18.021
1999	0.209	0.514	1.183	2.007	3.037	4.479	6.512	10.028	11.117	14.698	16.215	18.057	18.981
2000	0.194	0.465	1.218	1.963	3.064	4.12	5.746	7.157	9.961	14.589	17.26	18.733	20.557
2001	0.284	0.513	1.21	2.25	3.299	5.066	6.373	9.29	11.456	13.317	17.138	19.887	21.294
2002	0.23	0.603	1.184	2.138	3.336	4.81	6.912	8.809	10.475	12.534	15.703	19.752	22.549
2003	0.233	0.551	1.317	2.022	3.239	4.984	6.727	8.422	14.226	12.524	14.815	18.164	22.403
2004	0.24	0.55	1.074	2.038	2.911	4.402	6.263	8.535	10.197	12.371	14.803	17.176	20.674
2005	0.225	0.61	1.083	1.87	3.002	3.971	5.789	8.127	12.759	12.611	14.63	17.163	19.594
2006	0.252	0.591	1.219	2.014	3.028	4.434	5.999	7.774	9.954	13.679	14.902	16.971	19.58
2007	0.249	0.663	1.329	2.127	3.183	4.59	6.477	8.88	12.124	12.261	16.111	17.274	19.368
2008	0.286	0.726	1.418	2.41	3.331	4.914	6.747	8.851	10.393	12.776	14.504	18.617	19.701
2009	0.274	0.652	1.353	2.312	3.803	5.103	6.75	9.252	10.119	12.323	15.09	16.83	21.168
2010	0.258	0.608	1.208	2.01	3.088	4.903	6.498	7.992	9.689	12.467	14.574	17.483	19.214
2011	0.225	0.6	1.097	1.926	2.861	4.403	6.531	8.648	9.885	12.508	14.738	16.909	19.929
2012	0.227	0.555	1.182	1.834	2.831	4.124	6.056	8.584	11.498	12.249	14.785	17.092	19.3
2013	0.247	0.577	1.134	1.998	2.841	4.015	5.523	8.077	10.304	13.207	14.491	17.144	19.501
2014	0.216	0.577	1.137	1.791	2.781	3.85	5.245	6.992	9.378	12.746	15.578	16.816	19.558
2015	0.229	0.54	1.134	1.934	2.753	4.081	5.315	7.135	8.947	11.778	15.056	18.025	19.198
2016	0.21	0.536	1.001	1.812	2.72	3.958	5.64	7.064	8.569	10.885	13.954	17.445	20.522
2017	0.255	0.675	1.107	1.896	2.826	4.158	5.7	7.628	9.071	10.634	12.934	16.216	19.888
2018	0.286	0.62	1.188	1.949	2.768	4.059	5.749	7.38	9.097	10.8	12.646	15.073	18.54
2019	0.24	0.603	1.085	1.82	3.025	4.296	5.891	7.293	9.667	11.186	12.837	14.749	17.28
2020	0.148	0.503	1.055	1.692	2.59	4.064	5.617	7.673	9.313	11.306	13.278	14.964	16.922
2021	0.17	0.437	0.954	1.718	2.669	3.804	5.822	7.396	9.334	11.187	13.415	15.459	17.159
2022	0.293	0.48	0.929	1.616	2.741	3.933	5.744	8.012	9.648	11.361	13.279	15.613	17.706
2023	0.272	0.645	1.022	1.71	2.876	4.352	5.925	7.879	9.79	11.36	13.478	15.46	17.876
2024	0.246	0.706	1.075	1.803	2.667	3.995	5.95	7.011	9.436	11.714	13.477	15.683	17.707
2025	0.196	0.586	1.154	1.895	2.794	3.842	5.418	7.034	8.231	11.349	13.881	15.683	17.953
2026	0.18	0.475	0.996	1.817	2.675	3.763	5.781	7.493	8.44	10.558	13.465	16.135	17.952

values on 1993-2026, ages 12-15, have been updated by the VB model using the most recent actual data for ages 3-11

Table 3.10. Northeast Arctic COD. Basis for maturity ogives (percent) used in the assessment. Norwegian and Russian data.

Norway							

	Percentage mature							
	Age							
Year	3	4	5	6	7	8	9	10
1982	0	5	10	34	65	82	92	100
1983	5	8	10	30	73	88	97	100
Russia								
	Percentage mature							
	Age							
Year	3	4	5	6	7	8	9	10
1984	0	5	18	31	56	90	99	100
1985	0	1	10	33	59	85	92	100
1986	0	2	9	19	56	76	89	100
1987	0	1	9	23	27	61	81	80
1988	0	1	3	25	53	79	100	100
1989	0	0	2	15	39	59	83	100
1990	0	2	6	20	47	62	81	95
1991	0	3	1	23	66	82	96	100
1992	0	1	8	31	73	92	95	100
1993	0	3	7	21	56	89	95	99
1994	0	1	8	30	55	84	95	98
1995	0	0	4	23	61	75	94	97
1996	0	0	1	22	56	82	95	100
1997	0	0	1	10	48	73	90	100
1998	0	0	2	15	47	87	97	96
1999	0	0.2	1.3	9.9	38.4	74.9	94	100
2000	0	0	6	19.2	51.4	84	95.5	100
2001	0.1	0.1	3.9	27.9	62.3	89.4	96.3	100
2002	0.1	1.9	10.9	34.4	68.1	82.8	97.6	100
2003	0.2	0	11	29.2	65.9	89.6	95.1	100
2004	0	0.7	8	33.8	63.3	83.4	96.4	96.4
2005	0	0.6	4.6	24.2	61.5	84.9	95.3	98.1
2006	0	0	6.1	29.6	59.6	89.5	96.4	100
2007	0	0.4	5.7	20.8	60.4	83.5	96	100

2008	0	0.5	4	24.6	48.3	84.4	94.7	98.7
2009	0	0	6	28	66	85	97	100
2010	0	0.2	1.5	22.8	47	77.4	90.2	95.5
2011	0	0	2.2	20.7	50.4	73.7	90.6	95.6
2012	0.2	0	1.5	10.8	43.9	76.1	90.8	96.4
2013	0	0	0.6	10.6	41.8	70.6	89.8	96.9
2014	0	0	1.9	14.1	45.9	76	92	97.5
2015	0	0.2	0.2	7.9	27	60.8	83.4	93.7
2016	0	0	0.2	5.2	22.4	44.1	74.8	92.5
2017*	0	0	0.8	6.3	20.8	51.6	80.4	98.6
2018	0	0.5	2.5	23.6	53.9	79.4	92.5	96.0
2019**	0	0	4.5	11.9	56.4	91.8	95.1	100
2020**	0	0.4	1.7	15.8	43.8	71.2	74.9	84.9
2021**	0	0	2.7	16.1	44.1	72.2	87.1	88.1
2022**	0	0	0.8	11.6	59.7	72.6	80.4	96.2
2023**	0	0	0.3	12.3	50.9	84.3	92.6	97.5
2024**	0	0	1.4	10.2	32.5	74.8	97.4	100
2025**	0	0	1.6	8.7	26.6	57.6	80.3	91.2
2026**	0	0	9.5	34.7	65.5	69.4	91.1	93.9

***Not used in inputs (instead ratios presented in WD 10, 2017 used for further calculations) **Not used in inputs (instead ratios presented in WD 15, 2019 used for further calculations)**

Norway								
	Percentage mature							
	Age							
Year	3	4	5	6	7	8	9	10
1985	0.31	1.36	8.94	38.33	51.27	85.13	100	79.2
1986	2.92	7	7.85	18.85	49.72	66.52	35.59	80.09
1987	0	0.07	4.49	12.42	16.28	31.23	19.32	
1988	0	2.35	6.16	40.54	53.63	45.36	100	100
1989	1.52	0.67	3.88	30.65	70.36	82.02	100	100
1990	1.52	0.67	4.18	22	57.45	80.95	100	100
1991	0.1	3.4	13.93	38.03	75.52	90.12	95.39	100
1992	0.22	1.85	21.04	52.83	86.95	96.52	99.83	100
1993	0	2.6	10.37	52.6	84.8	97.25	99.3	99.73
1994	0.51	0.33	15.78	36.92	62.84	88.44	97.56	100
1995	0	0.62	8.19	51.48	63.75	81.11	98.01	99.34
1996	0.03	0	2.82	29.56	70.22	82.06	100	100

1997	0	0	1.48	17.91	73.31	93.01	99.12	100
1998	0.12	0.68	3.17	15.42	47.31	75.73	94.3	100
1999	0.42	0.16	1.6	27.46	70.48	94.57	98.99	100
2000	0	0.11	8.15	30.23	77.3	81.95	100	100
2001	0.49	0.51	9.03	43.81	62.52	74.36	94.13	100
2002	0.27	0.73	5.94	43.22	68.4	85.31	92.52	100
2003	0.02	0.18	6.5	35.97	68.56	87.97	96.3	100
2004	0.24	1.36	10.23	54.56	81.84	90.94	98.76	98.91
2005	0	0.27	9	55.16	81.77	93.51	98.03	100
2006	0	0.22	5.92	44.25	69.85	89.89	96.65	100
2007	0.12	0.33	8.7	47.88	84.29	91.68	99.11	100
2008	0	0.27	9.27	34.13	61.39	88.04	91.17	100
2009	0	0	9	46	85	86	98	99
2010	0	0.36	7.5	41.75	67.7	90.1	95.29	98.55
2011	0	0.2	5.2	48	77.7	89.7	97.3	97.2
2012	0	0	7.7	32.2	67.5	81	90.9	96.3
2013	0	0.3	1	20.2	55.3	80	91.8	99.3
2014	0	0.4	2	13.3	56.7	85	93.8	98.7
2015	0	0	1.9	10.9	29.2	79.1	93.1	99.6
2016	0.07	0.2	1.0	6.4	28.5	71.3	86.1	98.6
2017	0	0.2	0.5	18	54.8	81.4	95.9	100
2018	0	0.1	3.0	16.2	38.3	61.0	93.7	98.9
2019	0	0.4	4.0	24.0	68.6	93.2	96.7	99.8
2020	0	0.44	3.18	13.68	42.51	80.06	91.18	94.03
2021	0.28	0.25	0.79	17.11	43.21	68.80	90.75	98.63
2022	1.55	0	1.19	9.54	44.22	70.17	77.19	98.50
2023	0.80	2.10	2.29	8.89	49.84	80.60	94.93	94.05
2024	0.00	0.30	1.08	10.98	37.92	73.88	96.51	99.23
2025	0	0.55	2.10	8.73	34.70	60.27	84.23	95.63
2026	0	0.60	2.06	12.94	39.27	66.03	95.50	98.01

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Table 3.11. Northeast Arctic cod. Proportion mature-at-age

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1946	0	0	0.01	0.03	0.06	0.11	0.18	0.44	0.65	0.86	0.96	0.96	1
1947	0	0	0.01	0.03	0.06	0.13	0.16	0.42	0.75	0.91	0.95	1	1

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1948	0	0	0.01	0.03	0.07	0.13	0.25	0.47	0.73	0.91	0.97	1	1
1949	0	0	0.01	0.03	0.09	0.17	0.29	0.54	0.79	0.88	0.97	1	1
1950	0	0	0.01	0.03	0.09	0.23	0.35	0.52	0.79	0.95	0.97	1	1
1951	0	0	0.01	0.03	0.1	0.24	0.4	0.58	0.72	0.85	0.96	1	1
1952	0	0	0.01	0.03	0.08	0.22	0.41	0.63	0.82	0.92	0.97	1	1
1953	0	0	0.01	0.03	0.07	0.19	0.4	0.64	0.84	0.94	0.97	1	1
1954	0	0	0.01	0.03	0.08	0.16	0.37	0.68	0.87	0.93	0.96	1	1
1955	0	0	0.01	0.03	0.07	0.13	0.26	0.53	0.83	0.92	0.97	1	1
1956	0	0	0.01	0.03	0.06	0.12	0.14	0.41	0.67	0.91	0.96	1	1
1957	0	0	0.01	0.03	0.06	0.09	0.12	0.22	0.6	0.82	0.97	1	1
1958	0	0	0.01	0.03	0.06	0.1	0.1	0.3	0.5	0.82	0.97	1	1
1959	0	0	0.01	0.04	0.12	0.34	0.49	0.67	0.84	0.87	1	1	1
1960	0	0.01	0.03	0.06	0.1	0.19	0.45	0.69	0.77	0.85	0.99	1	1
1961	0	0	0.01	0.06	0.12	0.31	0.65	0.91	0.98	0.98	1	0.96	1
1962	0	0	0.01	0.05	0.15	0.34	0.61	0.81	0.92	0.97	1	0.932	1
1963	0	0.01	0.01	0.03	0.07	0.28	0.42	0.81	0.98	0.98	1	0.966	1
1964	0	0	0	0.03	0.13	0.37	0.66	0.89	0.95	0.99	1	1	1
1965	0	0	0	0.01	0.06	0.2	0.55	0.73	0.99	0.98	1	1	1
1966	0	0	0.01	0.02	0.06	0.22	0.35	0.74	0.94	0.94	1	1	1
1967	0	0	0	0.03	0.07	0.14	0.38	0.64	0.89	0.9	1	1	1
1968	0	0	0.03	0.05	0.09	0.19	0.39	0.58	0.82	1	1	1	1
1969	0	0	0	0.02	0.04	0.12	0.34	0.55	0.74	0.95	1	1	1
1970	0	0.01	0	0.01	0.07	0.23	0.58	0.81	0.89	0.91	1	1	1
1971	0	0	0.01	0.05	0.11	0.3	0.59	0.79	0.86	0.88	1	1	1
1972	0.01	0.02	0.02	0.01	0.1	0.34	0.64	0.81	0.94	1	1	1	1
1973	0	0	0	0.02	0.16	0.53	0.81	0.92	0.95	0.98	1	1	1
1974	0	0	0	0.01	0.03	0.21	0.5	0.96	1	0.96	1	1	1
1975	0	0	0.01	0.02	0.09	0.21	0.56	0.78	0.79	0.95	1	1	1
1976	0	0	0	0.05	0.12	0.29	0.45	0.84	0.83	1	0.9	1	1
1977	0	0	0.02	0.08	0.26	0.54	0.76	0.87	0.93	0.94	0.9	1	1
1978	0	0	0	0.02	0.13	0.44	0.71	0.77	0.81	0.89	0.8	1	1
1979	0	0	0	0.03	0.13	0.39	0.77	0.89	0.83	0.78	0.9	1	1
1980	0	0	0	0.02	0.13	0.35	0.65	0.82	1	0.9	0.9	1	1
1981	0	0	0.02	0.07	0.2	0.54	0.8	0.97	1	1	1	1	1
1982	0	0.05	0.1	0.34	0.65	0.82	0.92	1	1	1	1	1	1
1983	0.01	0.08	0.1	0.3	0.73	0.88	0.97	1	1	1	1	1	1

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1984	0	0.05	0.18	0.31	0.56	0.9	0.99	1	1	1	1	1	1
1985	0	0.01	0.09	0.36	0.55	0.85	0.96	0.9	1	1	1	1	1
1986	0	0.05	0.08	0.19	0.53	0.71	0.62	0.9	1	1	1	1	1
1987	0	0.01	0.07	0.18	0.22	0.46	0.5	0.75	1	1	1	1	1
1988	0	0.02	0.05	0.33	0.53	0.62	1	1	1	1	1	1	1
1989	0.008	0.003	0.029	0.228	0.547	0.705	0.915	1	1	1	1	1	1
1990	0.008	0.013	0.051	0.21	0.522	0.715	0.905	0.975	1	1	1	1	1
1991	0.001	0.032	0.075	0.305	0.708	0.861	0.957	1	1	1	1	1	1
1992	0.001	0.014	0.145	0.419	0.8	0.943	0.974	1	1	1	1	1	1
1993	0	0.028	0.087	0.368	0.704	0.931	0.972	0.994	1	1	1	1	1
1994	0	0.005	0.119	0.336	0.583	0.876	0.965	0.99	1	1	1	1	1
1995	0	0.005	0.06	0.373	0.614	0.748	0.955	0.98	1	1	1	1	1
1996	0	0	0.016	0.252	0.619	0.817	0.975	1	1	1	1	1	1
1997	0	0	0.014	0.14	0.597	0.842	0.95	0.967	1	1	1	1	1
1998	0	0.005	0.031	0.168	0.468	0.828	0.956	0.98	1	1	1	1	1
1999	0	0.001	0.014	0.17	0.506	0.841	0.961	1	1	1	1	1	1
2000	0	0	0.066	0.261	0.699	0.872	0.978	1	1	1	1	1	1
2001	0.001	0.006	0.069	0.378	0.646	0.851	0.955	1	1	1	1	1	1
2002	0.001	0.015	0.085	0.412	0.695	0.846	0.97	1	1	1	1	1	1
2003	0.001	0	0.089	0.331	0.662	0.882	0.96	1	1	1	1	1	1
2004	0	0.009	0.092	0.438	0.728	0.883	0.973	0.974	1	1	1	1	1
2005	0	0.003	0.066	0.366	0.72	0.897	0.971	0.991	1	1	1	1	1
2006	0	0.015	0.061	0.367	0.633	0.907	0.961	1	1	1	1	1	1
2007	0	0.007	0.076	0.37	0.719	0.884	0.977	1	1	1	1	1	1
2008	0.005	0.008	0.082	0.309	0.539	0.869	0.928	0.994	1	1	1	1	1
2009	0	0	0.081	0.362	0.745	0.859	0.978	0.997	0.994	1	1	1	1
2010	0.005	0.006	0.06	0.335	0.552	0.838	0.931	0.971	0.983	1	1	1	1
2011	0	0	0.04	0.339	0.644	0.798	0.932	0.963	0.991	1	1	1	1
2012	0.001	0	0.058	0.209	0.544	0.799	0.93	0.967	0.99	1	1	1	1
2013	0	0	0.01	0.156	0.482	0.763	0.913	0.982	0.985	1	1	1	1
2014	0	0	0.025	0.137	0.516	0.806	0.935	0.984	0.996	1	1	1	1
2015	0	0.001	0.004	0.074	0.282	0.681	0.891	0.963	0.984	1	1	1	1
2016	0	0	0.002	0.057	0.256	0.569	0.832	0.955	0.984	1	1	1	1
2017	0	0.018	0.003	0.148	0.463	0.749	0.931	0.99	1	1	1	1	1
2018	0	0.003	0.028	0.207	0.478	0.731	0.916	0.971	1	1	1	1	1
2019	0	0	0.01	0.126	0.466	0.842	0.942	0.968	0.996	1	1	1	1

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
2020	0	0	0.014	0.112	0.356	0.775	0.904	0.955	1	1	1	1	1
2021	0.002	0.002	0.006	0.14	0.386	0.657	0.893	0.974	0.959	1	1	1	1
2022	0.014	0	0.01	0.079	0.402	0.674	0.756	0.975	1	1	1	1	1
2023	0.007	0.02	0.019	0.074	0.454	0.774	0.93	0.931	1	1	1	1	1
2024	0	0.003	0.009	0.091	0.345	0.709	0.946	0.982	1	1	1	1	1
2025	0	0.005	0.017	0.072	0.316	0.579	0.825	0.947	1	1	1	1	1
2026	0	0.006	0.017	0.107	0.357	0.634	0.936	0.970	0.977	1	1	1	1

Table 3.12. The Northeast Arctic cod stock's consumption of cod in million individuals

Year/age	0	1	2	3	4	5	6
1984	0.000	445.517	22.050	0.210	0.000	0.000	0.000
1985	1666.586	364.480	71.015	0.195	0.000	0.000	0.000
1986	75.977	1176.758	356.833	91.073	0.000	0.000	0.000
1987	656.681	201.269	341.617	14.878	0.000	0.000	0.000
1988	32.022	477.665	25.936	1.766	0.000	0.000	0.000
1989	952.903	142.366	0.000	0.000	0.000	0.000	0.000
1990	0.000	109.519	23.394	0.000	0.000	0.000	0.000
1991	119.415	139.980	185.324	1.642	0.000	0.000	0.000
1992	3169.151	908.793	146.337	4.264	0.000	0.000	0.000
1993	4102.284	18808.372	488.612	47.671	1.337	0.429	0.000
1994	8431.643	7441.695	684.343	132.702	50.647	8.099	0.421
1995	8418.130	15428.601	784.351	216.107	68.583	3.719	0.225
1996	10519.853	22321.565	1505.455	137.712	52.854	18.369	1.064
1997	3126.829	18455.430	1937.256	167.155	15.846	1.195	0.212
1998	92.085	5958.935	594.415	206.893	23.500	1.439	0.455
1999	641.949	2153.277	308.935	51.333	4.319	0.005	0.000
2000	1985.822	2637.396	190.697	38.837	14.169	3.900	0.043
2001	96.489	2450.080	114.763	23.839	11.687	1.802	0.924
2002	7748.150	461.223	408.079	41.491	5.289	0.797	0.017
2003	5501.502	4142.630	107.905	24.009	0.000	0.000	0.000
2004	6509.070	2403.771	572.026	20.370	10.429	1.312	0.224
2005	2385.302	2959.102	132.889	80.477	4.568	5.527	0.513
2006	3059.691	2079.927	148.016	6.303	2.044	0.076	0.000
2007	2169.491	1115.686	183.196	73.029	3.369	0.125	0.000
2008	13666.275	665.739	82.010	92.678	30.590	4.056	0.000
2009	9199.560	7033.736	135.161	63.870	19.727	4.896	0.209

2010	4002.285	6849.978	291.566	52.189	26.550	15.472	2.049
2011	12188.009	4281.832	439.384	167.385	38.370	9.921	4.782
2012	20522.152	11552.782	992.813	98.256	29.175	4.112	0.000
2013	26014.012	4719.550	1529.658	169.811	16.209	7.120	1.073
2014	35620.557	6031.347	717.016	188.974	51.365	4.977	0.061
2015	1526.064	10493.065	301.631	65.936	37.436	15.784	1.555
2016	11818.869	2505.932	497.292	11.305	17.276	25.234	5.956
2017	20973.763	1547.446	378.187	113.586	7.735	3.992	2.731
2018	7305.954	13558.925	273.481	34.646	2.152	0.255	0.000
2019	818.241	8488.729	840.337	52.688	5.525	0.017	0.000
2020	3132.038	2476.266	334.678	145.464	41.842	10.266	0.532
2021	23133.275	1538.922	230.303	70.070	21.472	11.393	1.343
2022	9410.470	4375.246	277.617	12.053	1.214	0.056	0.000
2023	2956.285	1804.072	197.847	45.056	0.691	0.014	0.000
2024	2995.720	2588.269	281.263	123.264	19.185	0.190	0.000
2025	4102.000	1098.010	262.295	25.738	3.623	0.054	0.000

Table 3.13. Northeast Arctic COD. Tuning data

North-East Arctic cod (Sub-areas I and II) (run name: XSAASA01)										
104										
FLT15_I: NorBarTrSur_I										
1981	2026									
1	1	0.085	0.189							
3	12									
1	1640	2330	4000	3840	480	100	30	NA	NA	NA
1	2830	2770	2360	1550	1600	140	20	NA	NA	NA
1	2495	5234	4333	1696	582	321	97	NA	NA	NA
1	9749	2828	2144	1174	407	40	8	NA	NA	NA
1	16679	12598	1992	767	334	21	7	NA	NA	NA
1	80500	14393	6414	830	191	34	4	NA	NA	NA
1	24038	39115	5435	1570	200	45	3	NA	NA	NA
1	14803	8049	17331	2048	358	53	3	NA	NA	NA
1	4636	7586	3779	9019	982	94	10	NA	NA	NA
1	2835	3487	3459	2056	2723	161	38	NA	NA	NA
1	4585	3367	2565	2149	1215	1267	61	NA	NA	NA
1	15826	5771	1782	1283	767	429	272	NA	NA	NA
1	27389	14013	7248	1583	624	389	223	NA	NA	NA
1	29392	30704	15333	4572	795	261	148	55	55	13

1	28284	24236	25101	7642	1798	242	107	50	61	19
1	16308	11743	13859	10888	2443	264	37	17	12	16
1	31799	6844	7426	5999	2667	485	64	91	8	NA
1	35510	16694	3167	2615	1752	816	79	52	4	4
1	18848	18075	6139	1271	681	514	101	26	2	6
1	24581	13003	11173	2675	456	184	121	33	10	5
1	18279	19511	8290	3796	945	117	44	19	4	1
1	11836	13756	10895	4579	1440	220	32	18	5	2
1	37670	12631	9393	6688	1750	467	102	17	4	4
1	6388	18462	5346	4324	3059	685	165	28	7	2
1	24888	5506	10297	2238	1636	381	92	30	4	10
1	11649	11538	2832	4342	1372	524	136	24	18	18
1	36113	12773	6851	1365	2360	682	230	41	11	10
1	19437	30059	11190	4024	1734	811	179	36	3	3
1	12628	19670	22023	6069	1790	902	524	51	17	7
1	3681	11425	15480	14450	3956	1124	367	160	58	12
1	8540	5037	12970	13866	10351	1637	436	120	82	39
1	7572	6459	3371	9069	13258	4861	902	226	88	111
1	6884	11409	6318	4043	6454	7638	3352	222	287	84
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLT15_II: NorBarTrSur_II										
2014	2026									
1	1	0.085	0.189							
3	12									
1	22685	9379	8859	5639	3274	5305	3619	981	101	120

1	14407	22825	14729	11353	7443	2922	5351	1808	338	98
1	9937	13548	18831	11347	7233	2856	1317	1606	677	180
1	17925	6215	8454	9016	3782	2633	818	326	261	451
1	13941	18478	6181	6417	7388	2588	928	587	129	419
1	28157	17915	22190	7965	3296	3831	815	262	54	70
1	23773	16024	13156	11488	4983	2426	2044	453	166	243
1	11150	11935	11231	5428	3798	1357	727	353	125	103
1	5198	8868	8660	6651	4460	3042	570	229	208	255
1	4121	3982	4652	4317	3224	1426	749	158	34	35
1	19871	6331	3621	2996	2822	1615	890	268	37	20
1	15443	16818	5763	2976	2350	1897	953	355	85	49
1	4306	10507	13355	4226	2100	1520	789	351	122	42
FLT16: NorBarLofAcSur										
1985		2026								
1	1	0.085	0.26							
3	12									
1	1530	1416	204	151	157	33	13	10	5	NA
1	4996	1343	684	116	77	31	3	NA	4	NA
1	628	2049	502	174	14	30	7	NA	NA	NA
1	504	355	578	109	40	3	0	1	NA	NA
1	170	344	214	670	166	32	5	2	NA	NA
1	148	206	262	269	668	73	6	3	NA	NA
1	502	346	293	339	367	500	37	2	2	NA
1	1765	658	215	184	284	254	824	43	17	NA
1	3572	1911	1131	354	255	252	277	442	49	NA
1	3239	3745	2293	961	234	118	103	42	187	29
1	1377	1395	2036	1016	281	47	45	29	26	81
1	994	896	1128	974	462	59	11	4	9	15
1	1586	442	503	459	510	215	23	7	1	8
1	3912	1898	449	415	349	271	51	10	2	1
1	1476	1303	523	139	118	187	99	10	2	1
1	2948	1673	1492	546	146	69	50	13	6	2
1	1774	1606	851	621	191	27	8	6	3	1
1	614	1062	1011	713	366	94	12	8	6	0
1	3067	1168	1271	1461	677	235	38	4	1	2
1	334	852	349	456	480	217	88	24	2	7
1	1250	333	693	341	438	180	75	18	1	3

1	648	538	186	420	176	159	87	23	3	10
1	585	304	308	129	466	151	80	33	9	4
1	1999	2887	1166	789	248	352	55	28	17	7
1	1078	1825	1415	560	415	128	266	36	17	4
1	228	880	1614	1750	618	314	108	125	40	29
1	404	283	674	1595	2727	645	233	68	75	9
1	828	494	344	895	2266	1335	257	104	38	28
1	606	845	724	541	1336	2338	1617	215	111	88
1	2869	1242	1115	777	553	1490	1739	980	146	105
1	1387	2356	1300	1442	964	498	969	686	325	127
1	563	769	1199	664	594	409	356	565	344	286
1	1115	424	444	742	486	484	268	167	146	230
1	1090	1499	540	584	775	456	193	141	61	137
1	2036	1254	1446	639	493	739	273	218	65	111
1	1173	1173	819	943	506	509	495	195	84	80
1	649	591	558	402	369	163	114	143	82	34
1	294	530	570	504	476	345	116	68	53	39
1	287	265	336	346	278	183	135	32	17	15
1	1507	510	299	286	304	265	185	59	11	2
1	1304	1533	549	275	241	213	109	39	15	6
1	253	691	941	408	223	177	156	64	21	6
FLT18: RusSweptArea										
1982	2025									
1	1	0.9	1							
3	12									
1	1413	1525	721	198	551	174	37	19	15.1	1.5
1	520	642	506	358	179	252	94	NA	NA	NA
1	1189	700	489	357	154	69	61	17	14.6	7.4
1	1188	1592	1068	365	165	37	8	16	1.5	20.9
1	1622	1532	1493	481	189	42	2	6	NA	NA
1	557	3076	900	701	184	60	25	4	0.7	3.3
1	993	938	2879	583	260	47	24	NA	NA	NA
1	490	978	1062	1454	1167	299	112	47	18.5	11.7
1	167	487	627	972	1538	673	153	49	9.1	1.7
1	1077	484	532	583	685	747	98	14	2.6	NA
1	675	308	239	273	218	175	25	25	4	0.1
1	1604	1135	681	416	354	87	3	7	0.6	0.7

1	1363	1309	1019	354	128	49	21	11	5.7	2.2
1	589	1065	1395	849	251	83	19	18	9.5	5.8
1	733	784	1035	773	348	132	19	5	12	1.6
1	1342	835	613	602	348	116	32	30	NA	NA
1	2028	1363	788	470	259	130	48	5	NA	0.9
1	1587	2072	980	301	123	94	42	4	NA	NA
1	1839	1286	1786	773	114	52	23	9	3.9	0.4
1	1224	1557	1290	1061	304	50	14	5	25.4	13.1
1	980	1473	1473	896	600	182	29	8	0.8	0.5
1	1246	1057	1166	1203	535	241	40	9	3.1	1.1
1	329	1576	880	1111	776	279	93	23	3.6	2.5
1	1408	631	1832	744	605	244	88	28	6.4	1.1
1	927	1613	777	1801	662	342	161	43	17.5	7.4
1	2579	1617	1903	846	1525	553	226	86	49	18.5
1	2203	3088	1635	1472	830	863	291	115	33	19
1	974	2317	3687	2016	1175	620	413	205	65	41
1	334	1070	2505	3715	1817	789	395	299	155.9	75.2
1	882	508	1432	3065	3300	917	439	176	175.5	105.4
1	815	1114	839	2122	3358	1878	432	195	45.7	76.3
1	747	1174	1177	884	2349	3132	1367	306	92.4	98.5
1	1399	1368	1725	1483	1111	1929	1297	383	93.4	55.1
1	657	1583	1742	1932	1610	925	1158	761	241.6	113.6
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	1456	884	1063	1952	1231	567	266	120	119.8	103.8
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
FLT007: Ecosystem										
2004	2025									
1	1	0.65	0.75							
3	12									
1	1477	4215	1502	798	402	101	22	5	1.3	2

1	2166	558	1009	280	156	57	12	5	1.2	0.5
1	1861	2056	599	698	176	81	26	6	2.5	0.4
1	5862	1592	791	246	269	60	22	9	1.5	2.4
1	6526	4834	1323	511	128	175	33	9	2.3	3.9
1	2023	2806	2896	1017	319	127	73	26	8.1	5.1
1	568	1770	3972	4249	1427	385	105	68	15.9	6.2
1	1236	1015	2402	3004	1784	323	77	18	13.4	8.7
1	2291	1464	700	1508	1652	845	127	44	15.5	20.8
1	2491	1836	1257	632	1182	1302	538	91	33.2	24.6
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	1744	2252	1413	726	486	262	353	266	78.7	27
1	772	937	1216	701	444	272	138	132	54.2	30.2
1	3750	1415	1049	1209	626	280	112	64	44.5	71.7
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	4166	2323	2151	766	422	444	161	49	21.9	29.5
1	1395	1356	934	829	308	142	107	31	10.3	14.8
1	847	998	811	457	336	124	47	50	23.8	16.8
1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1	699	401	571	527	450	233	93	21.6	8	8.9
1	2344	682	468	410	290	145	77	25	6.3	3.5
1	1692	1810	453	223	210	152	64	22	12.4	0.9

Table 3.14. Parameters settings used in SAM run

Configuration saved: Wed Jun 3 11:23:55 2026

#

Where a matrix is specified rows corresponds to fleets and columns to ages.

Same number indicates same parameter used

Numbers (integers) starts from zero and must be consecutive

Negative numbers indicate that the parameter is not included in the model

#

$minAge

The minimium age class in the assessment

3

$maxAge

The maximum age class in the assessment

15

$maxAgePlusGroup

Is last age group considered a plus group for each fleet (1 yes, or 0 no).

1 1 1 1 1 1

$keyLogFsta

Coupling of the fishing mortality states processes for each age (normally only

the first row (= fleet) is used).

Sequential numbers indicate that the fishing mortality is estimated individually

for those ages; if the same number is used for two or more ages, F is bound for

those ages (assumed to be the same). Binding fully selected ages will result in a

flat selection pattern for those ages.

0 1 2 3 4 5 6 7 8 9 10 11 11

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

$corFlag

Correlation of fishing mortality across ages (0 independent, 1 compound symmetry,

2 AR(1), 3 separable AR(1).

0: independent means there is no correlation between F across age

1: compound symmetry means that all ages are equally correlated;

2: AR(1) first order autoregressive - similar ages are more highly correlated than

ages that are further apart, so similar ages have similar F patterns over time.

if the estimated correlation is high, then the F pattern over time for each age

varies in a similar way. E.g if almost one, then they are parallel (like a

separable model) and if almost zero then they are independent.

3: Separable AR - Included for historic reasons . . . more later

0

$keyLogFpar

Coupling of the survey catchability parameters (nomally first row is

not used, as that is covered by fishing mortality).

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

0 1 2 3 4 5 6 7 8 8 -1 -1 -1

9 10 11 12 13 14 15 16 17 17 -1 -1 -1

18 19 20 21 22 23 24 25 26 26 -1 -1 -1

27 28 29 30 31 32 33 34 35 35 -1 -1 -1

36 37 38 39 40 41 42 43 44 44 -1 -1 -1

$keyQpow

Density dependent catchability power parameters (if any).

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

$keyVarF

Coupling of process variance parameters for log(F)-process (Fishing mortality

normally applies to the first (fishing) fleet; therefore only first row is used)

0 1 1 1 1 1 1 1 1 1 1 1 1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1

$keyVarLogN

Coupling of the recruitment and survival process variance parameters for the

log(N)-process at the different ages. It is advisable to have at least the first age

class (recruitment) separate, because recruitment is a different process than

survival.

0 1 1 1 1 1 1 1 1 1 1 1

$keyVarLogP

#

$keyVarObs

Coupling of the variance parameters for the observations.

First row refers to the coupling of the variance parameters for the catch data

observations by age

Second and further rows refers to coupling of the variance parameters for the

index data observations by age

0 0 1 1 1 1 1 1 1 1 1 1

2 3 3 3 3 3 3 3 3 -1 -1 -1

2 3 3 3 3 3 3 3 3 -1 -1 -1

4 4 4 4 4 4 4 4 4 -1 -1 -1

5 5 5 5 5 5 6 6 6 6 -1 -1 -1

7 7 7 7 7 7 7 7 7 -1 -1 -1

$obsCorStruct

Covariance structure for each fleet ("ID" independent, "AR" AR(1), or "US" for unstructured). | Possible values are: "ID" "AR" "US"

"ID" "AR" "AR" "AR" "AR" "AR"

$keyCorObs

Coupling of correlation parameters can only be specified if the AR(1) structure is chosen above.

NA's indicate where correlation parameters can be specified (-1 where they cannot).

#3-4 4-5 5-6 6-7 7-8 8-9 9-10 10-11 11-12 12-13 13-14 14-15

NA NA NA NA NA NA NA NA NA NA NA

0 0 0 0 1 1 2 2 3 -1 -1 -1

0 0 0 0 1 1 2 2 3 -1 -1 -1

4 4 4 5 6 6 6 7 8 -1 -1 -1

9 9 9 9 9 10 10 10 11 -1 -1 -1

12 12 12 13 13 13 14 14 15 -1 -1 -1

$stockRecruitmentModelCode

Stock recruitment code (0 for plain random walk, 1 for Ricker, 2 for Beverton-Holt, 3 piece-wise constant, 61 for segmented regression/hockey stick, 62 for AR(1), 63 for bent hyperbola / smooth hockey stick, 64 for power function with degree < 1, 65 for power function with degree > 1, 66 for Shepher, 67 for Deriso, 68 for Saila-Lorda, 69 for sigmoidal Beverton-Holt, 90 for CMP spline, 91 for more flexible spline, and 92 for most flexible spline).

0

$noScaledYears

Number of years where catch scaling is applied.

0

$keyScaledYears

A vector of the years where catch scaling is applied.

$keyParScaledYA

A matrix specifying the couplings of scale parameters (nrow = no scaled years, ncols = no ages).

$fbarRange

lowest and higest age included in Fbar

5 10

$keyBiomassTreat

To be defined only if a biomass survey is used (0 SSB index, 1 catch index, 2 FSB index, 3 total catch, 4 total landings, 5 TSB index, 6 TSN index, and 10 Fbar idx).

-1 -1 -1 -1 -1 -1

$obsLikelihoodFlag

Option for observational likelihood | Possible values are: "LN" "ALN"

"LN" "LN" "LN" "LN" "LN" "LN"

$fixVarToWeight

If weight attribute is supplied for observations this option sets the treatment (0 relative weight, 1 fix variance to weight). Can be specified fleetwise.

0 0 0 0 0 0

$fracMixF

The fraction of t(3) distribution used in logF increment distribution

0

$fracMixN

The fraction of t(3) distribution used in logN increment distribution (for each age group)

0 0 0 0 0 0 0 0 0 0 0 0 0

$fracMixObs

A vector with same length as number of fleets, where each element is the fraction of t(3) distribution used in the distribution of that fleet

0 0 0 0 0 0

$constRecBreaks

For stock-recruitment code 3: Vector of break years between which recruitment is at constant level. The break year is included in the left interval. For spline stock-recruitment: Vector of log-ssb knots. (This option is only used in combination with stock-recruitment code 3, 90-92, and 290)

$predVarObsLink

Coupling of parameters used in a prediction-variance link for observations.

-1 -1 0 0 0 0 0 0 0 0 0 0 0

1 1 1 1 1 1 1 1 1 NA NA NA

1 1 1 1 1 1 1 1 1 NA NA NA

2 2 2 2 2 2 2 2 2 NA NA NA

-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 NA NA NA

3 3 3 3 3 3 3 3 3 NA NA NA

$stockWeightModel

Integer code describing the treatment of stock weights in the model (0 use as known, 1 use as observations to inform stock weight process (GMRF with cohort and within year correlations)), 2 to add extra correlation to plusgroup

0

$keyStockWeightMean

Coupling of stock-weight process mean parameters (not used if stockWeightModel==0)

NA NA NA NA NA NA NA NA NA NA NA NA NA

$keyStockWeightObsVar

Coupling of stock-weight observation variance parameters (not used if stockWeightModel==0)

NA NA NA NA NA NA NA NA NA NA NA NA

$catchWeightModel

Integer code describing the treatment of catch weights in the model (0 use as known, 1 use as observations to inform catch weight process (GMRF with cohort and within year correlations)), 2 to add extra correlation to plusgroup

0

$keyCatchWeightMean

Coupling of catch-weight process mean parameters (not used if catchWeightModel==0)

NA NA NA NA NA NA NA NA NA NA NA NA

$keyCatchWeightObsVar

Coupling of catch-weight observation variance parameters (not used if catchWeightModel==0)

NA NA NA NA NA NA NA NA NA NA NA NA

$matureModel

Integer code describing the treatment of proportion mature in the model (0 use as known, 1 use as observations to inform proportion mature process (GMRF with cohort and within year correlations on logit(proportion mature))), 2 to add extra correlation to plusgroup

0

$keyMatureMean

Coupling of mature process mean parameters (not used if matureModel==0)

NA NA NA NA NA NA NA NA NA NA NA NA

$mortalityModel

Integer code describing the treatment of natural mortality in the model (0 use as known, 1 use as observations to inform natural mortality process (GMRF with cohort and within year correlations)), 2 to add extra correlation to plusgroup

0

$keyMortalityMean

#

NA NA NA NA NA NA NA NA NA NA NA NA

$keyMortalityObsVar

Coupling of natural mortality observation variance parameters (not used if mortalityModel==0)

NA NA NA NA NA NA NA NA NA NA NA NA NA

$keyXtraSd

An integer matrix with 4 columns (fleet year age coupling), which allows additional uncertainty to be estimated for the specified observations

$logNMeanAssumption

#

0 0

$initState

#

0

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Table 3.15. Northeast Arctic cod. Fishing mortality

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	FBAR5-10
1946	0.004	0.020	0.068	0.136	0.273	0.245	0.366	0.364	0.506	0.478	0.542	0.474	0.474	0.242
1947	0.002	0.022	0.091	0.188	0.398	0.292	0.438	0.439	0.740	0.601	0.699	0.730	0.730	0.308
1948	0.001	0.022	0.093	0.217	0.474	0.347	0.496	0.439	0.699	0.665	0.770	0.954	0.954	0.344
1949	0.002	0.030	0.138	0.314	0.481	0.365	0.459	0.466	0.777	0.710	0.809	1.052	1.052	0.371
1950	0.002	0.043	0.162	0.315	0.430	0.362	0.477	0.538	0.867	0.868	0.822	1.223	1.223	0.381
1951	0.010	0.074	0.233	0.343	0.444	0.391	0.501	0.564	0.761	0.865	0.845	1.266	1.266	0.413
1952	0.015	0.099	0.288	0.439	0.484	0.407	0.522	0.650	0.860	0.954	0.846	1.295	1.295	0.465
1953	0.021	0.108	0.246	0.346	0.395	0.374	0.474	0.608	0.784	0.794	0.772	1.037	1.037	0.407
1954	0.017	0.113	0.261	0.370	0.418	0.361	0.491	0.692	0.811	0.789	0.777	0.944	0.944	0.432
1955	0.014	0.109	0.288	0.496	0.499	0.514	0.562	0.739	0.899	0.828	0.784	0.879	0.879	0.516
1956	0.018	0.123	0.365	0.604	0.560	0.608	0.584	0.731	0.907	0.993	0.853	0.822	0.822	0.575
1957	0.020	0.137	0.290	0.520	0.542	0.586	0.536	0.683	0.886	0.927	0.838	0.721	0.721	0.526
1958	0.038	0.176	0.364	0.549	0.537	0.502	0.507	0.703	0.817	0.885	0.701	0.617	0.617	0.527
1959	0.035	0.199	0.441	0.525	0.527	0.524	0.553	0.718	0.746	0.788	0.687	0.637	0.637	0.548
1960	0.036	0.206	0.397	0.496	0.494	0.552	0.528	0.746	0.846	0.783	0.678	0.713	0.713	0.536
1961	0.039	0.216	0.482	0.570	0.545	0.648	0.685	0.822	0.896	0.871	0.739	0.757	0.757	0.625
1962	0.039	0.216	0.586	0.748	0.630	0.680	0.795	0.969	0.921	0.844	0.759	0.739	0.739	0.735
1963	0.023	0.192	0.612	0.809	0.746	0.759	0.877	1.047	1.051	0.841	0.775	0.733	0.733	0.808
1964	0.018	0.160	0.406	0.539	0.573	0.683	0.909	0.890	0.950	0.795	0.871	0.763	0.763	0.667
1965	0.023	0.147	0.368	0.460	0.466	0.591	0.789	0.831	0.790	0.677	0.872	0.775	0.775	0.584
1966	0.031	0.143	0.283	0.389	0.470	0.601	0.765	0.800	0.708	0.647	0.795	0.697	0.697	0.551

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	FBAR5-10
1967	0.029	0.153	0.251	0.328	0.467	0.643	0.822	0.813	0.762	0.645	0.791	0.627	0.627	0.554
1968	0.024	0.171	0.361	0.447	0.502	0.639	0.851	0.825	0.755	0.594	0.794	0.639	0.639	0.604
1969	0.025	0.178	0.416	0.492	0.652	0.812	1.002	0.911	0.848	0.620	0.751	0.628	0.628	0.714
1970	0.034	0.165	0.382	0.483	0.588	0.821	0.984	0.940	0.789	0.577	0.702	0.635	0.635	0.700
1971	0.027	0.160	0.309	0.363	0.501	0.795	0.993	0.915	0.800	0.604	0.677	0.624	0.624	0.646
1972	0.047	0.185	0.335	0.405	0.433	0.703	1.049	1.002	0.882	0.660	0.738	0.642	0.642	0.655
1973	0.153	0.222	0.386	0.442	0.461	0.684	0.932	0.870	0.826	0.679	0.736	0.625	0.625	0.629
1974	0.172	0.287	0.491	0.522	0.513	0.631	0.704	0.868	0.928	0.722	0.858	0.634	0.634	0.622
1975	0.107	0.274	0.505	0.627	0.641	0.730	0.733	0.732	0.963	0.802	0.903	0.607	0.607	0.661
1976	0.151	0.295	0.522	0.603	0.678	0.845	0.877	0.698	0.823	0.844	0.863	0.673	0.673	0.704
1977	0.132	0.318	0.649	0.674	0.700	0.893	1.101	0.831	0.927	0.817	0.946	0.789	0.789	0.808
1978	0.121	0.251	0.580	0.732	0.760	0.895	1.190	0.933	1.254	0.964	1.081	0.876	0.876	0.848
1979	0.055	0.204	0.404	0.607	0.704	0.807	1.094	0.984	1.249	1.041	1.034	0.946	0.946	0.767
1980	0.037	0.165	0.352	0.614	0.730	0.810	1.011	1.018	1.202	0.983	1.043	0.876	0.876	0.756
1981	0.031	0.147	0.286	0.573	0.796	0.951	1.112	0.933	1.051	0.946	0.968	0.838	0.838	0.775
1982	0.043	0.159	0.292	0.645	0.859	0.925	1.104	0.843	0.817	0.921	0.843	0.831	0.831	0.778
1983	0.026	0.163	0.303	0.553	0.941	1.095	1.094	0.836	0.728	0.751	0.789	0.858	0.858	0.804
1984	0.022	0.155	0.326	0.578	1.088	1.169	1.124	0.881	0.746	0.714	0.685	0.876	0.876	0.861
1985	0.039	0.160	0.385	0.646	0.960	1.184	1.000	0.784	0.780	0.678	0.621	0.933	0.933	0.827
1986	0.028	0.166	0.450	0.746	0.926	1.159	0.997	0.900	0.872	0.802	0.619	1.031	1.031	0.863
1987	0.039	0.153	0.477	0.808	1.000	1.138	0.940	0.981	0.915	0.891	0.659	1.150	1.150	0.891
1988	0.034	0.129	0.328	0.626	0.922	0.984	0.940	1.033	0.854	0.838	0.726	1.138	1.138	0.806
1989	0.031	0.110	0.251	0.427	0.639	0.794	0.753	0.878	0.724	0.737	0.709	1.218	1.218	0.624
1990	0.019	0.096	0.175	0.296	0.386	0.504	0.588	0.628	0.656	0.688	0.668	1.157	1.157	0.430
1991	0.020	0.101	0.211	0.335	0.423	0.462	0.529	0.523	0.543	0.698	0.646	1.139	1.139	0.414
1992	0.026	0.111	0.281	0.426	0.522	0.551	0.564	0.560	0.557	0.750	0.634	1.152	1.152	0.484
1993	0.013	0.108	0.318	0.527	0.617	0.659	0.700	0.686	0.728	0.823	0.736	1.156	1.156	0.585
1994	0.011	0.107	0.315	0.601	0.929	0.912	0.852	0.846	0.959	0.914	0.822	1.148	1.148	0.743
1995	0.013	0.114	0.296	0.602	0.922	0.905	0.942	0.952	1.006	0.927	0.897	1.107	1.107	0.770
1996	0.021	0.130	0.331	0.580	0.880	0.966	0.881	1.135	0.942	0.936	0.975	1.053	1.053	0.796
1997	0.021	0.159	0.442	0.674	0.891	1.242	1.079	1.235	1.002	1.003	0.960	0.988	0.988	0.927
1998	0.028	0.171	0.474	0.697	0.841	1.185	1.105	1.308	1.010	0.923	0.859	0.854	0.854	0.935
1999	0.014	0.145	0.463	0.678	0.860	1.112	1.169	1.260	0.937	0.906	0.726	0.766	0.766	0.924
2000	0.008	0.115	0.349	0.578	0.833	1.022	1.074	1.179	0.823	0.900	0.599	0.736	0.736	0.839
2001	0.009	0.098	0.283	0.515	0.753	0.938	0.869	1.096	0.733	0.799	0.498	0.739	0.739	0.742
2002	0.008	0.092	0.269	0.513	0.775	0.887	0.817	0.867	0.659	0.770	0.445	0.708	0.708	0.688

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	FBAR5-10
2003	0.010	0.089	0.282	0.462	0.716	0.812	0.796	0.812	0.609	0.689	0.417	0.673	0.673	0.647
2004	0.010	0.091	0.296	0.504	0.746	0.851	0.884	0.918	0.658	0.703	0.400	0.595	0.595	0.700
2005	0.011	0.100	0.337	0.541	0.736	0.846	0.923	0.873	0.689	0.748	0.397	0.546	0.546	0.709
2006	0.017	0.101	0.293	0.459	0.621	0.726	0.787	0.785	0.695	0.769	0.417	0.576	0.576	0.612
2007	0.020	0.091	0.253	0.363	0.450	0.544	0.581	0.583	0.653	0.766	0.428	0.524	0.524	0.462
2008	0.012	0.072	0.164	0.284	0.372	0.455	0.504	0.480	0.604	0.724	0.447	0.457	0.457	0.377
2009	0.010	0.061	0.135	0.227	0.322	0.368	0.483	0.410	0.561	0.763	0.497	0.403	0.403	0.324
2010	0.009	0.052	0.108	0.177	0.286	0.388	0.430	0.456	0.678	0.638	0.574	0.374	0.374	0.308
2011	0.006	0.050	0.106	0.162	0.254	0.356	0.472	0.551	0.639	0.556	0.559	0.318	0.318	0.317
2012	0.007	0.048	0.120	0.162	0.236	0.319	0.445	0.525	0.611	0.530	0.518	0.314	0.314	0.301
2013	0.008	0.049	0.124	0.193	0.274	0.362	0.468	0.552	0.610	0.544	0.487	0.354	0.354	0.329
2014	0.008	0.054	0.146	0.235	0.323	0.402	0.435	0.544	0.621	0.595	0.510	0.398	0.398	0.348
2015	0.010	0.056	0.153	0.278	0.332	0.401	0.371	0.525	0.805	0.675	0.554	0.461	0.461	0.343
2016	0.009	0.053	0.149	0.261	0.346	0.424	0.417	0.582	0.850	0.734	0.638	0.564	0.564	0.363
2017	0.010	0.058	0.152	0.278	0.372	0.492	0.480	0.615	0.960	0.840	0.731	0.670	0.670	0.398
2018	0.012	0.061	0.160	0.270	0.375	0.481	0.531	0.678	0.945	0.966	0.846	0.758	0.758	0.416
2019	0.009	0.065	0.157	0.260	0.387	0.517	0.548	0.731	0.908	0.960	0.855	0.785	0.785	0.433
2020	0.010	0.068	0.172	0.289	0.428	0.547	0.657	0.838	1.021	0.984	0.989	0.853	0.853	0.489
2021	0.012	0.075	0.214	0.374	0.517	0.600	0.803	1.007	1.063	1.196	1.197	1.077	1.077	0.586
2022	0.030	0.092	0.255	0.418	0.520	0.613	0.818	1.087	1.191	1.495	1.475	1.213	1.213	0.619
2023	0.040	0.100	0.242	0.373	0.495	0.631	0.837	1.139	1.225	1.525	1.446	1.372	1.372	0.620
2024	0.020	0.096	0.236	0.354	0.470	0.660	0.782	1.041	1.007	1.394	1.341	1.283	1.283	0.591
2025	0.008	0.076	0.206	0.329	0.406	0.536	0.728	1.083	0.846	1.424	1.349	1.257	1.257	0.548

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Table 3.16. Northeast Arctic COD Stock number-at-age (Thous)

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	TOTAL
1946	1118705	684402	376095	171743	77615	85717	226590	88702	34146	31617	17102	7731	2616	292278
1947	606990	668821	505847	307474	135698	53834	57766	135147	53157	18573	17037	8690	5900	257493
1948	450421	348506	458049	344226	213473	75630	35680	31099	70040	19242	8520	6879	6043	206780
1949	665916	291722	271715	362570	230137	105827	42733	17720	16872	29371	7719	3227	3993	204952
1950	1015895	419236	230474	189702	208176	113650	58068	22453	9281	6435	12383	2733	2071	229055
1951	2347123	773957	327375	179788	115908	112274	65150	28940	10566	3057	2126	4563	1124	397195
1952	2318293	1091750	465902	198834	119413	62588	62093	32384	13644	4253	1058	732	1308	437225
1953	2408053	1117333	612840	238703	91104	60739	33593	29089	13183	4534	1290	365	434	461125

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	TOTAL
1954	868392	1381741	715893	377979	137045	48952	34854	17559	13326	4955	1714	490	232	360313
1955	378782	578985	923654	444218	226021	75895	30555	18144	7183	4984	1870	651	232	269117
1956	765497	242064	417332	568498	216225	114428	35974	14658	7098	2345	1860	716	303	238699
1957	1433137	415409	147417	208817	236229	96143	49044	15634	5774	2331	670	646	367	261161
1958	910099	719851	253752	96039	101262	108441	41366	23116	6457	1926	757	223	400	226368
1959	1336878	472404	437061	142131	47194	48242	55263	20432	9286	2330	638	319	277	257245
1960	1515374	640020	243988	204660	69364	23064	23397	25576	8190	3771	888	261	270	275882
1961	1564632	727119	358989	132355	102588	36296	11236	12221	9991	2842	1479	383	214	296034
1962	1222542	822500	408254	176747	64547	49487	15497	4593	4620	3323	940	583	229	277386
1963	922958	682673	469449	173078	65781	29096	21006	5654	1396	1571	1175	354	320	237451
1964	469715	420570	356685	174040	55485	22690	10784	7129	1542	378	558	454	267	152029
1965	878943	248688	265454	199067	82138	24163	8750	3377	2441	470	133	187	277	171408
1966	1910570	566000	164102	145910	106595	44253	11041	3232	1186	931	197	44	169	295422
1967	1348408	1320171	392988	104331	80330	55600	20659	4319	1200	496	408	75	84	332906
1968	182521	1045705	931628	292887	72582	41863	23727	7501	1587	452	213	153	71	260089
1969	111134	137364	735685	507180	161053	41793	19352	8499	2755	632	209	78	98	172583
1970	211139	86334	88120	378331	239870	64560	15444	5748	2785	936	276	81	77	109370
1971	408239	148525	57913	45170	172881	104136	22417	4786	1807	1054	435	112	69	967545
1972	1087470	315498	105889	37376	27173	80943	36926	6763	1616	672	481	188	80	170107
1973	1669448	785796	213413	64033	21366	15807	32580	10078	1934	536	282	186	117	281557
1974	572374	1145450	546032	124551	35371	11486	6761	10119	3490	706	222	114	134	245681
1975	622104	367536	642979	267976	62589	18377	5403	3000	3300	1115	286	75	109	199484
1976	591809	461308	226360	300525	109866	26383	7456	2279	1270	971	402	94	84	172880
1977	372322	403024	289361	114427	135637	43943	9002	2596	1013	501	327	142	76	137237
1978	621631	248304	216160	115602	48491	56039	14325	2356	922	353	198	103	82	132456
1979	197868	442249	156176	87997	41436	18020	18456	3432	737	203	111	55	63	96680
1980	128605	151486	297470	90142	38674	16442	6656	5036	1031	171	56	33	36	73583
1981	142060	101015	108273	168936	40377	15324	6144	2064	1450	248	52	16	23	58598
1982	183384	122943	81847	62102	80689	15544	4735	1634	673	401	78	16	14	55406
1983	145096	137068	89903	50235	28340	27354	4956	1307	592	244	126	28	11	48525
1984	447181	118456	83918	53132	24022	9937	7350	1316	473	245	98	45	13	74618
1985	541580	394664	85489	46267	24150	6035	2617	1985	431	182	100	41	20	110356
1986	1506227	408457	244899	48185	20553	7304	1452	851	773	167	77	45	20	223901
1987	368179	1056819	259109	112832	17486	6916	1767	472	280	265	61	35	19	182424
1988	335344	243527	575027	120511	35403	5272	1701	572	145	93	85	26	14	131772
1989	160217	229032	149016	295238	56208	10495	1611	519	159	50	33	32	11	90262

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	TOTAL
1990	132907	129937	128232	95416	138724	22527	3248	636	165	62	19	13	10	65189
1991	293372	127592	99060	86183	62677	83920	11125	1474	279	66	26	8	6	76578
1992	724353	267016	103566	70588	49697	34629	48143	5765	814	138	26	11	4	130474
1993	1053301	507628	244785	75077	37770	23917	15773	25252	2955	420	56	12	4	198695
1994	794345	788893	413826	146799	40165	16101	10841	6307	10814	1261	157	22	4	222953
1995	556253	516715	550058	236627	61080	12642	5356	3588	2169	3408	414	57	7	194837
1996	412512	311397	344544	284487	103822	19578	4281	1613	1129	614	1125	139	17	148526
1997	807781	212764	210161	186299	121723	37662	5989	1581	425	348	198	350	45	158532
1998	1106974	492906	130946	98127	70022	42610	9059	1652	360	130	100	61	118	195306
1999	646859	611610	268390	65003	32698	26410	11529	2468	355	104	43	34	63	166556
2000	784603	415771	378196	122810	24829	11326	7394	2774	594	112	34	17	37	174849
2001	607336	555621	292246	184149	51769	9045	3434	1980	705	212	36	15	22	170657
2002	379231	436195	370832	187454	83206	20253	3030	1234	546	266	79	18	14	148235
2003	794178	294291	289256	233239	83777	30396	6727	1138	430	243	98	43	13	173382
2004	247242	588932	218426	185233	113188	34184	10979	2539	435	205	106	53	23	140154
2005	671151	187220	406762	139817	94551	38964	11463	3939	816	187	86	61	34	155505
2006	507467	444771	141890	228714	68776	34593	13786	3507	1310	349	73	49	48	144533
2007	1131299	418598	293699	88799	114604	30813	12929	4740	1237	535	136	39	46	209747
2008	943286	936159	326160	163314	51095	60770	15374	5756	1956	547	199	73	42	250473
2009	552235	740257	722863	243660	87068	33065	28791	7773	2969	914	221	104	61	241997
2010	197303	435425	620172	545325	162715	53612	18233	14354	4465	1557	337	113	91	205370
2011	346208	177687	373011	523256	380098	83798	30544	9874	7589	1821	720	146	115	193486
2012	489966	270296	146053	311504	397675	215945	43221	15313	4788	3319	866	346	154	189944
2013	447737	368451	224990	128237	237569	271816	137437	21586	7633	2127	1610	425	316	184993
2014	865508	346985	295435	182820	102707	171467	147616	63656	10203	3336	1002	820	438	219199
2015	448837	575481	302788	216062	131380	67232	99344	72997	28710	4814	1474	491	711	195032
2016	278194	316673	417988	217206	136338	75890	43075	53767	32778	10529	2016	690	636	158578
2017	755007	234739	232091	288800	145866	81016	40775	23925	21948	12241	4191	874	619	184209
2018	497403	538868	187346	163125	189072	83815	39484	22091	10716	6708	4256	1639	616	174513
2019	640744	370812	396526	149987	92269	110424	43825	19716	8860	3557	1971	1424	832	184094
2020	526991	420355	278984	249470	99944	54491	54949	21351	8352	3076	1124	683	808	172057
2021	364959	338361	311909	193590	146495	52538	26662	22714	8138	2566	971	343	521	146976
2022	189589	246697	243557	197529	120236	74760	22547	9878	6476	2235	634	241	234	111461
2023	235706	143940	163860	140154	108489	60243	32257	8316	2696	1552	388	114	115	89783
2024	618991	179433	106144	97660	80169	49657	28577	10914	2151	607	263	73	45	117468
2025	374318	399291	125006	62534	53605	40474	22316	9809	3275	628	123	56	26	109146

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp	TOTAL
2026		274944	303636	89257	38289	29157	19601	8969	2772	1143	124	26	19	90022

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Table 3.17. Northeast Arctic COD. Natural mortality used in final run

Year_age	3	4	5	6	7	8	9	10	11	12	13	14	+gp
1946	0.4901	0.3038	0.226	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1947	0.5438	0.3246	0.2309	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1948	0.4928	0.3048	0.2263	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1949	0.4338	0.2819	0.2209	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1950	0.3164	0.2364	0.2103	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1951	0.7235	0.3943	0.2471	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1952	0.7148	0.3909	0.2463	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1953	0.5367	0.3219	0.2302	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1954	0.3878	0.264	0.2168	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1955	0.4056	0.271	0.2184	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1956	0.5899	0.3425	0.235	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1957	0.7252	0.395	0.2473	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1958	0.5616	0.3315	0.2325	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1959	0.7131	0.3903	0.2462	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1960	0.7036	0.3866	0.2453	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1961	0.6094	0.35	0.2368	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1962	0.5201	0.3154	0.2287	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1963	0.7882	0.4194	0.253	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1964	0.6027	0.3475	0.2362	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1965	0.4164	0.2752	0.2194	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1966	0.3529	0.2505	0.2136	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1967	0.2707	0.2186	0.2062	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1968	0.2242	0.2006	0.202	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1969	0.206	0.2	0.2003	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1970	0.2927	0.2272	0.2082	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1971	0.2562	0.213	0.2049	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1972	0.3234	0.2391	0.211	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1973	0.2172	0.2	0.2014	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1974	0.2168	0.2	0.2013	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1975	0.2317	0.2035	0.2027	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1976	0.2238	0.2004	0.202	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

1977	0.2487	0.2101	0.2042	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1978	0.2342	0.2045	0.2029	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1979	0.2081	0.2	0.2005	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1980	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1981	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1982	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1983	0.2031	0.2	0.2001	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1984	0.201	0.2	0.2117	0.2066	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1985	0.2049	0.2251	0.2014	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1986	0.2763	0.2152	0.2445	0.2293	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1987	0.2578	0.2503	0.2165	0.2618	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1988	0.2224	0.2129	0.2459	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1989	0.2	0.2308	0.2	0.2366	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1990	0.2	0.2	0.2046	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1991	0.2	0.2	0.2	0.2051	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1992	0.2073	0.2	0.2	0.2022	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1993	0.2418	0.2	0.2046	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1994	0.3484	0.2679	0.2218	0.2291	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1995	0.5348	0.3213	0.2437	0.2111	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1996	0.5226	0.3287	0.2516	0.2262	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1997	0.422	0.2671	0.2506	0.2401	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1998	0.4328	0.2776	0.2181	0.2759	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1999	0.2652	0.237	0.243	0.2333	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2000	0.2493	0.2139	0.2481	0.2307	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2001	0.236	0.2249	0.2034	0.2308	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2002	0.2765	0.212	0.205	0.2304	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2003	0.2386	0.2	0.2	0.2196	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2004	0.2501	0.2171	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2005	0.3	0.2133	0.2161	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2006	0.2026	0.2246	0.2	0.2112	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2007	0.2453	0.2	0.2436	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2008	0.2569	0.2115	0.2	0.2313	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2009	0.2728	0.2062	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2010	0.2953	0.2311	0.2035	0.2021	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2011	0.4204	0.3033	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2012	0.3727	0.2934	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2013	0.391	0.2324	0.2027	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

2014	0.3674	0.2908	0.2093	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2015	0.3525	0.2586	0.2332	0.2044	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2016	0.2159	0.2511	0.2569	0.2152	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2017	0.3865	0.2169	0.2147	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2018	0.2667	0.2127	0.2	0.221	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2019	0.2898	0.2115	0.2177	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2020	0.4407	0.2294	0.2	0.2104	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2021	0.4227	0.2638	0.2301	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2022	0.2653	0.2214	0.2174	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2023	0.3022	0.2054	0.2187	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2024	0.4017	0.2882	0.2138	0.2124	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2025	0.276	0.2081	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

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Table 3.18. Northeast Arctic COD. Summary table

Year	RECRUITS	TOTALBIO	TOTSPBIO	LANDINGS	YIELD/SSB	FBAR 5-10
1946	1118705	3964681	958708	706000	0.7364	0.2419
1947	606990	3519602	985876	882017	0.8947	0.3075
1948	450421	3410480	820536	774295	0.9436	0.3445
1949	665916	2963622	617585	800122	1.2956	0.3706
1950	1015895	2826541	553748	731982	1.3219	0.3809
1951	2347123	3700177	500725	827180	1.652	0.4129
1952	2318293	4121521	493884	876795	1.7753	0.4653
1953	2408053	4053288	409585	695546	1.6982	0.4073
1954	868392	4207159	411405	826021	2.0078	0.432
1955	378782	3585798	333945	1147841	3.4372	0.5163
1956	765497	3403184	287691	1343068	4.6684	0.5754
1957	1433137	2816959	213583	792557	3.7108	0.526
1958	910099	2356640	205277	769313	3.7477	0.5269
1959	1336878	2743552	436850	744607	1.7045	0.5479
1960	1515374	2362539	388901	622042	1.5995	0.5356
1961	1564632	2378197	391163	783221	2.0023	0.6252
1962	1222542	2206140	319379	909266	2.847	0.7347
1963	922958	2041580	219734	776337	3.5331	0.8083
1964	469715	1503825	206135	437695	2.1233	0.6667
1965	878943	1465933	111898	444930	3.9762	0.584
1966	1910570	2252893	123041	483711	3.9313	0.5513

Year	RECRUITS	TOTALBIO	TOTSPBIO	LANDINGS	YIELD/SSB	FBAR 5-10
1967	1348408	2778879	129787	572605	4.4119	0.554
1968	182521	3396564	227063	1074084	4.7303	0.6041
1969	111134	2905485	150684	1197226	7.9453	0.7141
1970	211139	2190565	243714	933246	3.8293	0.6996
1971	408239	1661794	331478	689048	2.0787	0.6463
1972	1087470	1629924	354709	565254	1.5936	0.6545
1973	1669448	2299390	337591	792685	2.3481	0.629
1974	572374	2184091	160204	1102433	6.8814	0.6215
1975	622104	2087677	133423	829377	6.2161	0.6614
1976	591809	1929480	166210	867463	5.2191	0.704
1977	372322	1945199	336974	905301	2.6866	0.8081
1978	621631	1596001	230843	698715	3.0268	0.8484
1979	197868	1131975	183127	440538	2.4056	0.7666
1980	128605	851865	110022	380434	3.4578	0.7558
1981	142060	951197	162351	399038	2.4579	0.7749
1982	183384	744006	321003	363730	1.1331	0.7782
1983	145096	736363	306167	289992	0.9472	0.8036
1984	447181	826942	236803	277651	1.1725	0.8609
1985	541580	1020434	194767	307920	1.581	0.8264
1986	1506227	1457876	166145	430113	2.5888	0.863
1987	368179	1280157	117029	523071	4.4696	0.8908
1988	335344	1006851	195795	434939	2.2214	0.8055
1989	160217	951791	239606	332481	1.3876	0.6237
1990	132907	904588	300828	212000	0.7047	0.4295
1991	293372	1357531	645219	319158	0.4947	0.414
1992	724353	1713437	820682	513234	0.6254	0.4839
1993	1053301	2260042	720302	581611	0.8075	0.5843
1994	794345	2202057	584525	771086	1.3192	0.7425
1995	556253	1903453	538696	739999	1.3737	0.7698
1996	412512	1713252	551815	732228	1.3269	0.7958
1997	807781	1563497	547964	762403	1.3913	0.9271
1998	1106974	1382929	385808	592624	1.5361	0.9347
1999	646859	1222929	281546	484910	1.7223	0.9235
2000	784603	1241575	257827	414868	1.6091	0.8391
2001	607336	1494637	383797	426471	1.1112	0.7424
2002	379231	1607876	523968	535045	1.0211	0.6878

Year	RECRUITS	TOTALBIO	TOTSPBIO	LANDINGS	YIELD/SSB	FBAR 5-10
2003	794178	1689122	568153	551990	0.9716	0.6467
2004	247242	1575679	660531	606445	0.9181	0.6998
2005	671151	1519888	580180	641276	1.1053	0.7094
2006	507467	1516627	581918	537642	0.9239	0.6119
2007	1131299	1795801	638030	486883	0.7631	0.4624
2008	943286	2461402	696863	464171	0.6661	0.3767
2009	552235	2989109	984028	523430	0.5319	0.3243
2010	197303	3230737	1203887	609983	0.5067	0.3076
2011	346208	3455941	1733390	719830	0.4153	0.3171
2012	489966	3532166	1940936	727663	0.3749	0.3015
2013	447737	3677745	2207102	966209	0.4378	0.3289
2014	865508	3391787	2070400	986449	0.4765	0.3474
2015	448837	3217938	1647624	864384	0.5246	0.3435
2016	278194	2782812	1298178	849422	0.6543	0.3636
2017	755007	2729426	1334847	868276	0.6505	0.3982
2018	497403	2530298	1197991	778627	0.6499	0.4159
2019	640744	2422158	1136354	692609	0.6095	0.4332
2020	526991	2110034	902033	692903	0.7682	0.4885
2021	364959	1886062	762061	767284	1.0069	0.5858
2022	189589	1655893	638202	719211	1.1269	0.6186
2023	235706	1447998	659627	582552	0.8832	0.6195
2024	618991	1260764	500725	453040	0.9048	0.5908
2025	374318	1102429	351746	329468	0.9367	0.548
Arith. Mean	718593	2174980	560787	666091	1.9531	0.5946

Table 3.19a. Northeast Arctic COD. Input for the short term prediction

2026								
Age	N	M	Mat	PF	PM	SWT	Sel	CWT
3	243000	0.276	0	0	0	0.18	0.036	0.558
4	274944	0.208	0.006	0	0	0.475	0.148	1.067
5	303636	0.2	0.017	0	0	0.996	0.389	1.736
6	89257	0.200	0.107	0	0	1.817	0.623	2.499
7	38289	0.2	0.357	0	0	2.675	0.812	3.515
8	29157	0.2	0.634	0	0	3.763	1.026	4.839
9	19601	0.2	0.936	0	0	5.781	1.339	6.091

10	8969	0.2	0.97	0	0	7.493	1.811	7.383
11	2772	0.2	0.977	0	0	8.44	1.793	8.830
12	1143	0.2	1	0	0	10.558	2.376	10.153
13	124	0.2	1	0	0	13.465	2.299	11.238
14	26	0.2	1	0	0	16.135	2.096	12.934
15	19	0.2	1	0	0	17.952	2.096	14.210
2027								
Age	N	M	Mat	PF	PM	SWT	Sel	CWT
3	240000	0.276	0	0	0	0.204	0.036	0.564
4		0.208	0.005	0	0	0.531	0.148	0.950
5		0.2	0.014	0	0	0.904	0.389	1.635
6		0.200	0.09	0	0	1.751	0.623	2.486
7		0.2	0.339	0	0	2.726	0.812	3.494
8		0.2	0.641	0	0	3.763	1.026	4.829
9		0.2	0.902	0	0	5.416	1.339	6.256
10		0.2	0.966	0	0	7.196	1.811	7.523
11		0.2	0.992	0	0	8.887	1.793	8.972
12		0.2	1	0	0	10.495	2.376	10.123
13		0.2	1	0	0	12.691	2.299	11.577
14		0.2	1	0	0	15.687	2.096	12.649
15		0.2	1	0	0	18.397	2.096	14.320
2028								
Age	N	M	Mat	PF	PM	SWT	Sel	CWT
3	349000	0.276	0.000	0	0	0.203	0.036	0.564
4		0.208	0.005	0	0	0.555	0.148	0.950
5		0.200	0.014	0	0	0.96	0.389	1.635
6		0.200	0.090	0	0	1.659	0.623	2.486
7		0.2	0.339	0	0	2.66	0.812	3.494
8		0.2	0.641	0	0	3.814	1.026	4.829
9		0.2	0.902	0	0	5.416	1.339	6.256
10		0.2	0.966	0	0	6.831	1.811	7.523
11		0.2	0.992	0	0	8.59	1.793	8.972
12		0.2	1	0	0	10.942	2.376	10.123
13		0.2	1	0	0	12.628	2.299	11.577
14		0.2	1	0	0	14.913	2.096	12.649

15		0.2	1	0	0	17.949	2.096	14.320

Table 3.19b. Northeast Arctic COD. Input for the short term prediction using RCT3

Yearclass	recruitment	BST1	BST2	BST3	BSA1	BSA2	BSA3	ECO0 (shifted)	ECO1 (shifted)	ECO2 (shifted)
1982	528	NA	NA	NA	NA	NA	NA	NA	NA	NA
1983	1369	NA	NA	NA	NA	NA	NA	NA	NA	NA
1984	356	NA	NA	NA	NA	NA	NA	NA	NA	NA
1985	333	NA	NA	NA	NA	NA	NA	NA	NA	NA
1986	158	NA	NA	NA	NA	NA	NA	NA	NA	NA
1987	133	NA	NA	NA	NA	NA	NA	NA	NA	NA
1988	300	NA	NA	NA	NA	NA	NA	NA	NA	NA
1989	714	NA	NA	NA	NA	NA	NA	NA	NA	NA
1990	989	NA	NA	NA	NA	NA	NA	NA	NA	NA
1991	749	NA	NA	294	NA	NA	324	NA	NA	NA
1992	537	NA	557	283	NA	624	138	NA	NA	NA
1993	400	1044	541	163	903	212	99	NA	NA	NA
1994	774	5356	792	318	2175	272	159	NA	NA	NA
1995	1042	5899	1423	355	1826	565	391	NA	NA	NA
1996	623	5044	496	188	1698	475	148	NA	NA	NA
1997	746	2491	350	246	2524	232	295	NA	NA	NA
1998	589	473	242	183	365	263	177	NA	NA	NA
1999	374	129	78	118	153	51	61	NA	NA	NA
2000	758	713	419	377	364	209	307	NA	NA	NA
2001	243	34	66	64	19	53	33	NA	NA	330
2002	694	3022	243	249	1505	117	125	NA	331	147
2003	539	323	217	116	161	139	65	543	441	510
2004	1254	853	289	361	500	158	58	180	479	505
2005	1016	674	370	194	411	47	200	276	333	373
2006	591	595	102	126	85	94	108	101	131	94
2007	206	69	36	37	51	25	23	483	570	84
2008	364	389	95	85	205	44	40	903	310	160
2009	509	1028	226	76	620	91	83	653	510	256
2010	468	617	100	69	266	40	61	2083	1454	659
2011	850	703	143	227	496	89	287	1413	914	NA
2012	448	436	191	144	313	211	139	2282	NA	184
2013	283	1246	343	99	1759	211	56	NA	339	154
2014	757	1642	306	179	1904	202	112	2445	725	341

2015	483	312	129	139	241	73	109	351	351	NA
2016	617	645	501	282	439	280	204	1165	NA	414
2017	526	2714	559	238	2058	362	117	NA	2100	475
2018	367	1791	274	112	1437	158	65	1841	560	106
2019	186	165	35	52	93	29	29	313	63	NA
2020	241	81	66	41	46	43	29	116	NA	40
2021	632	668	163	199	525	103	151	NA	218	275
2022	NA	305	307	154	244	201	130	399	322	237
2023	NA	378	119	43	328	106	25	360	226	109
2024	NA	165	45	NA	199	32	NA	301	155	NA
2025	NA	225	NA	NA	293	NA	NA	601	NA	NA

Table 3.19c. Results of RCT3 prediction of NEA cod recruitment (in million individuals of age 3).

prediction	**RCT3 SPALY ***			**RCT3 8****			**RCT3_short*****		
	WAP	**log WAP**	**int.se**	**WAP**	**log WAP**	**int.se**	**WAP**	**log WAP**	**int.se**
yearclass:2018	456	6 . 122	0 . 21	489	6 . 193	0 . 22	398	5 . 988	0 . 23
yearclass:2019	229	5 . 436	0 . 24	234	5 . 457	0 . 24	270	5 . 600	0 . 25
yearclass:2020	186	5 . 224	0 . 22	197	5 . 281	0 . 22	205	5 . 323	0 . 23
yearclass:2021	561	6 . 330	0 . 17	589	6 . 378	0 . 19	614	6 . 419	0 . 19
yearclass:2022	524	6 . 262	0 . 16	538	6 . 287	0.17	539	6 . 290	0 . 17
yearclass:2023	243	5 . 492	0 . 17	232	5 . 448	0 . 19	225	5 . 414	0 . 19
yearclass:2024	240	5 . 480	0 . 29	246	5 . 504	0.31			
yearclass:2025	349	5.855	0.37	349	5.855	0.37			

*same survey indices as in the last year (BST1 + BST2 + BST3 + BSA1 + BSA2 + BSA3)

**recruitment ~ BST1 + BST2 + BST3 + BSA1 + BSA2 + BSA3+ ECO1 + ECO2

*** recruitment ~ BST3 + BSA3

Table 3.19 d. Results of various recruitment models (million individuals age 3). Values used in the predictions are shown in bold (RCT3 notations are shown in T able 3.19 c)

NEA cod recruitment at age 3				
Year	2026	202 7	202 8	202 9
Yearclass	202 3	202 4	2025	
Cod in Forest*	471	403	522	**334**
SAM	132			
RCT3 SPALY	232	246	3 49	
RCT3 8	**243**	**240**	**349**	
RCT3 _short	225			

*** -WD 5**

Table 3.20. Northeast Arctic COD. Management option table.

2026					
Biomass (t)	SSB (t)	FMult	FBar	Landings (t)	
1069493	338010	1	0.371	285000	
2027				2028	
Biomass	SSB	FBar	Landings	Biomass	SSB
1169133	345518	0.00	0	1564900	603750
		0.05	50786	1514721	572658
		0.10	99223	1467002	543483
		0.15	145453	1421588	516091
		0.20	189608	1378338	490354
		0.25	231810	1337119	466157
		0.30	272172	1297807	443393
		0.35	310800	1260290	421962
		0.40	347793	1224461	401774
		0.45	383241	1190223	382744
		0.50	417229	1157484	364795
		0.55	449838	1126158	347855
		0.60	481141	1096168	331858
		0.65	511207	1067440	316741
		0.70	540101	1039904	302449
		0.75	567884	1013496	288927
		0.80	594612	988157	276128
		0.85	620338	963830	264005
		0.90	645112	940464	252518
		0.95	668981	918008	241626
		1.00	691988	896418	231293
Tonnes	Tonnes		Tonnes	Tonnes	Tonnes

Table 3.21. Northeast Arctic COD. Detailed prediction output assuming TAC constrained catch in 2026 and HCR in 2027

Fbar	age						
range:	5-10						
Year:	202 6						

F	multiplier:	1					
Fbar:	0.3707						
Age	F	CatchNos	Yield	StockNos	Biomass	SSNos	SSB
3	0.013	2816	1571	243000	43740	0	0
4	0.055	13265	14154	274944	130598	1650	784
5	0.144	37045	64310	303636	302421	5162	5141
6	0.231	16747	41851	89257	162180	9550	17353
7	0.301	9066	31866	38289	102423	13669	36565
8	0.380	8414	40713	29157	109718	18486	69561
9	0.496	7008	42688	19601	113313	18347	106061
10	0.671	4019	29673	8969	67205	8700	65189
11	0.665	1233	10891	2772	23396	2708	22858
12	0.881	615	6248	1143	12068	1143	12068
13	0.852	65	735	124	1670	124	1670
14	0.777	13	167	26	420	26	420
15+	0.777	9	134	19	341	19	341
Total	NA	100316	285000	1010937	1069493	79583	338010
		Thous	Tonnes	Thous	Tonnes	Thous	Tonnes
Fbar	age						
range:	5-10						
Year:	202 7						
F	multiplier:	0.95					
Fbar:	0.3525						

Age	F	CatchNos	Yield	StockNos	Biomass	SSNos	SSB	
3	0.013	2645	1492	240000	48960	0	0	
4	0.052	8357	7939	181947	96614	910	483	
5	0.137	24604	40228	211390	191096	2959	2675	
6	0.220	38597	95951	215212	376837	19369	33915	
7	0.286	13148	45939	58007	158128	19664	53605	
8	0.362	6419	30999	23200	87301	14871	55960	
9	0.472	5608	35086	16319	88385	14720	79724	
10	0.638	4222	31760	9769	70297	9437	67907	
11	0.632	1610	14445	3753	33349	3722	33082	
12	0.837	609	6160	1168	12253	1168	12253	
13	0.810	198	2290	388	4922	388	4922	

14	0.739	21	262	43	679	43	679	
15+	0.739	8	116	17	312	17	312	
Total	NA	106046	312667	961213	1169133	87269	345518	
		Thous	Tonnes	Thous	Tonnes	Thous	Tonnes	

Table 3.22. Northeast Arctic COD. Assessments results by means of TISVPA

Year	B(3+)	SSB	R(3)	F(5-10)
1984	825823.6	254757.2	418024.6	0.775768
1985	987268.2	200507.9	554474.7	0.636755
1986	1357022	180445.6	1081923	0.787412
1987	1205235	131241.7	287456.1	1.031337
1988	982216.8	216756	215188.8	0.981547
1989	917986.4	241735.2	172453.2	0.469323
1990	986280	331603.4	226554.5	0.312283
1991	1571481	727445.9	403198.3	0.226568
1992	1945374	943122.9	699606	0.404027
1993	2397449	832558.2	901165.8	0.605103
1994	2177955	645654.2	700922	0.803527
1995	1837904	557218.3	477530.7	0.747565
1996	1742526	604535	382152.7	0.717818
1997	1626071	650490.5	637688.9	1.042215
1998	1292535	425845.4	785891	1.065035
1999	1102105	288388.1	480117	0.916143
2000	1083621	247310.6	560999	0.643958
2001	1331597	372693	479060.9	0.51656
2002	1467950	504133.2	417799.8	0.506833
2003	1567616	542436.1	664604.4	0.505588
2004	1510728	636614.5	271775.8	0.597617
2005	1474783	575082.9	525208	0.602082
2006	1497056	592639	524961.9	0.626207
2007	1788392	630775.8	1247344	0.49029
2008	2506980	683427.7	1219446	0.349802
2009	3141497	972746.8	819976	0.334
2010	3402331	1158629	468386.1	0.36612
2011	3577832	1634651	580466.7	0.318827

2012	3681970	1871738	655782.2	0.287215
2013	3795761	2077920	775012.5	0.294628
2014	3514723	1975821	970965.6	0.324807
2015	3317549	1569107	480036.6	0.357403
2016	2939773	1269297	380298.8	0.339452
2017	2956634	1399110	770931.8	0.42729
2018	2716742	1271197	618500.5	0.497187
2019	2546291	1166653	643780.4	0.451052
2020	2277399	920495.1	524680.1	0.488317
2021	2101609	814447.4	338717.7	0.5922
2022	1818732	698795.3	201690.3	0.731155
2023	1591100	741093.6	296598.7	0.619385
2024	1342211	586567	443314.4	0.477888
2025	1134345	451837.9	224248.9	0.372207
2026		469622.2		

Table 3.23. NEA cod TISVPA estimates of abundance at age (thousands)

	3	4	5	6	7	8	9	10	11	12	13	14	15
1984	418025	134272	77030	45218	23962	12562	9005	1429	625	402	180	31	21
1985	554475	335291	96865	45028	19562	6730	3335	2365	457	323	153	96	24
1986	1081923	433179	230004	55500	20719	6833	2190	1297	1088	223	224	91	38
1987	287456	802716	289982	113953	22414	7052	2099	746	402	374	69	140	47
1988	215189	212363	521775	144568	35607	6006	2089	725	157	130	104	34	12
1989	172453	164730	150280	285217	60582	9623	1617	590	160	33	42	47	68
1990	226554	137270	116663	94980	154918	25770	3444	642	246	90	16	31	12
1991	403198	183802	105711	82620	61241	97682	14621	2023	364	148	58	8	16
1992	699606	326194	141706	73279	50823	34556	58691	8592	1264	247	107	45	5
1993	901166	552651	238517	93259	40342	25718	16426	31063	4466	738	129	80	4
1994	700922	699582	412064	142004	47805	18827	11279	6829	13164	1825	275	57	12
1995	477531	489199	486179	244062	62568	13637	6020	3353	1968	4003	538	125	3
1996	382153	276870	321322	286212	115503	23013	4708	2006	1025	540	1454	254	3
1997	637689	220512	176689	183665	139361	46641	8497	1859	678	348	196	561	2
1998	785891	407651	138487	83747	73224	46909	12042	1990	415	137	65	52	125
1999	480117	489303	241173	68157	30698	25533	11947	3338	467	120	33	20	76
2000	560999	361678	320636	113143	25789	10920	6831	2387	968	147	48	3	46
2001	479061	432659	262738	171514	49682	9679	3577	1855	639	457	56	28	89
2002	417800	373683	316329	162164	81606	20994	3481	1474	611	242	271	38	26

2003	664604	313881	275889	194511	75747	31325	7646	1321	728	298	100	191	4
2004	271776	516744	238311	172447	98270	32141	12861	3538	608	436	155	62	31
2005	525208	209520	381616	151220	84521	37961	11298	4637	1314	232	231	92	27
2006	524962	384973	152592	215771	73473	32701	13446	3959	1566	536	96	159	548
2007	1247344	420967	267521	95037	106144	32278	12699	4544	1524	532	224	55	147
2008	1219446	955177	308096	157046	54140	54069	15971	6353	2225	743	190	141	71
2009	819976	934405	724433	214692	93212	31440	26514	8326	3498	1160	400	119	113
2010	468386	619603	722180	514113	133915	55991	17903	13792	4901	2020	247	260	186
2011	580467	346195	473021	529700	341548	75729	29885	10053	7216	1733	916	69	0
2012	655782	378664	246264	353346	363384	208515	42430	14596	4267	3277	915	430	148
2013	775012	447273	271593	185197	248755	231954	124345	23622	7464	1969	1724	507	825
2014	970966	521344	340807	199666	130758	154525	126572	62019	11548	3606	1023	1044	781
2015	480037	667161	371456	240100	130316	80182	79449	63338	30361	5955	1863	584	1107
2016	380299	333382	485964	254999	148703	75769	45120	42923	30221	11652	2665	1113	1377
2017	770932	304341	247913	326705	163425	87944	41165	24248	18794	12140	5360	1470	1050
2018	618500	517520	232192	172136	201537	89411	44508	19944	11188	5989	4648	2783	898
2019	643780	467787	391679	163006	104605	108646	44451	20678	8000	3637	1950	1998	1140
2020	524680	477178	358947	270128	104216	59373	51819	20547	8963	2893	1338	998	895
2021	338718	334156	357873	255690	166501	56288	28736	21241	7065	2548	1085	614	927
2022	201690	219379	239037	233664	151910	80074	24965	10467	5880	1811	683	365	238
2023	296599	150642	154930	144066	126745	75126	32293	9033	2939	1363	310	135	227
2024	443314	209236	107517	94870	80817	65126	34029	11583	2549	761	313	101	37
2025	224249	286933	135576	65863	52122	40708	32048	15533	4661	1100	367	162	52
2026	0	168019	217865	93235	40458	28984	21307	16587	7880	2401	581	230	102

Table 3.24. NEA cod TISVPA estimates of fishing mortality coefficients

Year	3	4	5	6	7	8	9	10	11	12	13	14	15
1984	0.0225	0.13152	0.31767	0.54319	0.93673	0.95184	0.95416	0.95102	0.3238	1.05789	0.5572	0.5572	0.5572
1985	0.02093	0.11968	0.30438	0.45317	0.61995	0.88367	0.7706	0.78876	0.72037	0.25751	0.45662	0.45662	0.45662
1986	0.02081	0.14815	0.37839	0.61778	0.74848	0.87896	1.11922	0.98171	0.91322	0.80461	0.53207	0.53207	0.53207
1987	0.02567	0.14802	0.48848	0.81171	1.1614	1.12231	1.54934	1.16977	1.04326	0.62839	0.62859	0.62859	0.62859
1988	0.02449	0.13978	0.39774	0.86644	1.15985	1.28624	1.0694	1.10961	1.3399	1.00404	0.5952	0.5952	0.5952
1989	0.01367	0.08686	0.23303	0.35387	0.56807	0.59655	0.56136	0.50306	0.47872	0.52922	0.30258	0.30258	0.30258
1990	0.00841	0.05703	0.15398	0.25386	0.30744	0.41077	0.38084	0.36681	0.30985	0.28971	0.19904	0.19904	0.19904
1991	0.0067	0.03763	0.1083	0.1817	0.24196	0.25111	0.29614	0.2802	0.25282	0.21091	0.14464	0.14464	0.14464
1992	0.00991	0.06662	0.16209	0.30314	0.4285	0.50182	0.46163	0.56698	0.49272	0.42904	0.24832	0.24832	0.24832
1993	0.01467	0.08436	0.25105	0.39173	0.62807	0.78531	0.81777	0.75669	0.88135	0.72683	0.36423	0.36423	0.36423
1994	0.01701	0.10966	0.27746	0.54142	0.69826	1.00219	1.10736	1.09447	0.9798	1.12764	0.45956	0.45956	0.45956
1995	0.01635	0.10337	0.29307	0.46621	0.75376	0.83414	1.1013	1.14712	1.10859	0.88879	0.45124	0.45124	0.45124
1996	0.0204	0.09962	0.28197	0.51024	0.69698	0.61631	0.85025	1.08884	1.11445	1.03877	0.45598	0.45598	0.45598
1997	0.02627	0.16592	0.35886	0.67586	1.07279	1.1891	1.3414	1.42254	1.7649	1.72784	0.63347	0.63347	0.63347
1998	0.02933	0.1667	0.47857	0.63798	1.00164	1.35346	1.24138	1.67718	1.35397	1.5831	0.63568	0.63568	0.63568
1999	0.02036	0.1725	0.4362	0.79979	0.82593	1.07907	1.20968	1.14619	1.3013	1.07372	0.57353	0.57353	0.57353
2000	0.01839	0.11339	0.35661	0.5461	0.77571	0.65826	0.72059	0.80648	0.7081	0.76943	0.40495	0.40495	0.40495
2001	0.0139	0.09286	0.23575	0.48696	0.58933	0.69276	0.61934	0.57522	0.58807	0.51045	0.32061	0.32061	0.32061

2002	0.01247	0.08029	0.23339	0.37103	0.62307	0.64131	0.65807	0.50461	0.51168	0.51441	0.3004	0.3004	0.3004
2003	0.01339	0.07282	0.20288	0.37721	0.48117	0.70188	0.62221	0.6504	0.64629	0.46217	0.28616	0.28616	0.28616
2004	0.01433	0.06408	0.22206	0.39653	0.61112	0.67479	0.88851	0.79269	0.76087	0.51915	0.33459	0.33459	0.33459
2005	0.01567	0.08939	0.25703	0.37988	0.55824	0.74025	0.71142	0.96567	0.78284	0.73047	0.34146	0.34146	0.34146
2006	0.01655	0.1046	0.26069	0.48197	0.5782	0.74333	0.85982	0.84223	1.05832	0.82446	0.37516	0.37516	0.37516
2007	0.01368	0.08492	0.2319	0.35767	0.53207	0.53554	0.58966	0.6949	0.6276	0.74338	0.30479	0.30479	0.30479
2008	0.00919	0.06536	0.17031	0.2881	0.35586	0.44569	0.39713	0.44172	0.47569	0.42399	0.2277	0.2277	0.2277
2009	0.0083	0.05307	0.158	0.26616	0.36753	0.38842	0.43192	0.39177	0.40492	0.42507	0.21662	0.21662	0.21662
2010	0.00791	0.05355	0.14737	0.27911	0.38674	0.46119	0.43204	0.49017	0.41194	0.41588	0.23329	0.23329	0.23329
2011	0.00766	0.04316	0.12632	0.21825	0.33833	0.4016	0.42955	0.40452	0.4254	0.35123	0.21176	0.21176	0.21176
2012	0.0077	0.04333	0.10508	0.19173	0.27096	0.36257	0.38245	0.4105	0.3648	0.37435	0.19823	0.19823	0.19823
2013	0.00817	0.05018	0.12062	0.184	0.27711	0.33904	0.40779	0.43831	0.43769	0.37934	0.21589	0.21589	0.21589
2014	0.00952	0.05658	0.14969	0.22687	0.28392	0.37332	0.41014	0.5049	0.50438	0.49125	0.25141	0.25141	0.25141
2015	0.00994	0.06599	0.16932	0.28438	0.35318	0.38147	0.45026	0.50581	0.58173	0.5662	0.29258	0.29258	0.29258
2016	0.01055	0.05861	0.16775	0.27028	0.37089	0.39458	0.37857	0.45464	0.47352	0.5295	0.28395	0.28395	0.28395
2017	0.01116	0.06578	0.18799	0.34581	0.46071	0.5495	0.51631	0.50322	0.56959	0.57577	0.35658	0.35658	0.35658
2018	0.01101	0.07543	0.19325	0.35301	0.54088	0.61936	0.65302	0.6236	0.56608	0.61578	0.40589	0.40589	0.40589
2019	0.01011	0.06242	0.18548	0.2963	0.4422	0.57846	0.58047	0.6232	0.55013	0.48389	0.37401	0.37401	0.37401
2020	0.0121	0.06758	0.18046	0.34315	0.44984	0.5832	0.67861	0.69464	0.68767	0.58884	0.42027	0.42027	0.42027
2021	0.0166	0.08877	0.21542	0.36801	0.59055	0.66713	0.77338	0.93871	0.87588	0.84026	0.52778	0.52778	0.52778
2022	0.02881	0.12548	0.29514	0.45667	0.65309	0.93647	0.92104	1.12452	1.27213	1.129	0.68757	0.68757	0.68757
2023	0.03953	0.16758	0.31346	0.45677	0.56755	0.69489	0.84425	0.84939	0.92978	1.00249	0.61102	0.61102	0.61102

2024	0.01721	0.20051	0.36211	0.40518	0.46805	0.48842	0.51286	0.63071	0.5848	0.61511	0.60565	0.60565	0.60565
2025	0.01098	0.06667	0.17441	0.28731	0.38685	0.44741	0.45862	0.47864	0.46341	0.43806	0.26412	0.26412	0.26412

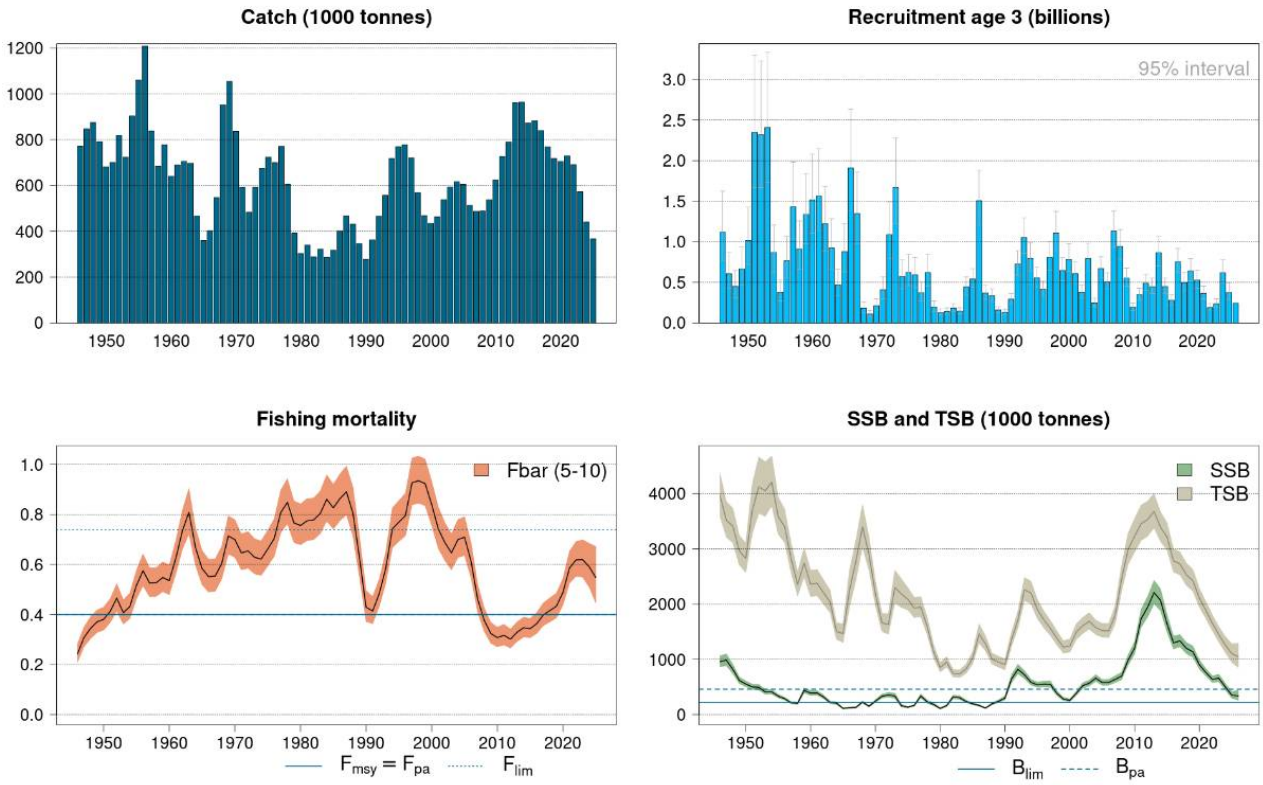


Figure 3.1. Cod in ICES subareas 1 and 2 (Northeast Arctic). Catch, recruitment, F, SSB and TSB (total stock biomass, age 3+) with 95 % confidence levels. The biomass reference points relate to SSB. For this stock, Fmgt ranges from 0.40 to 0.60, and there are three SSBmgt values (460 000, 920 000 and 1 380 000 tonnes).

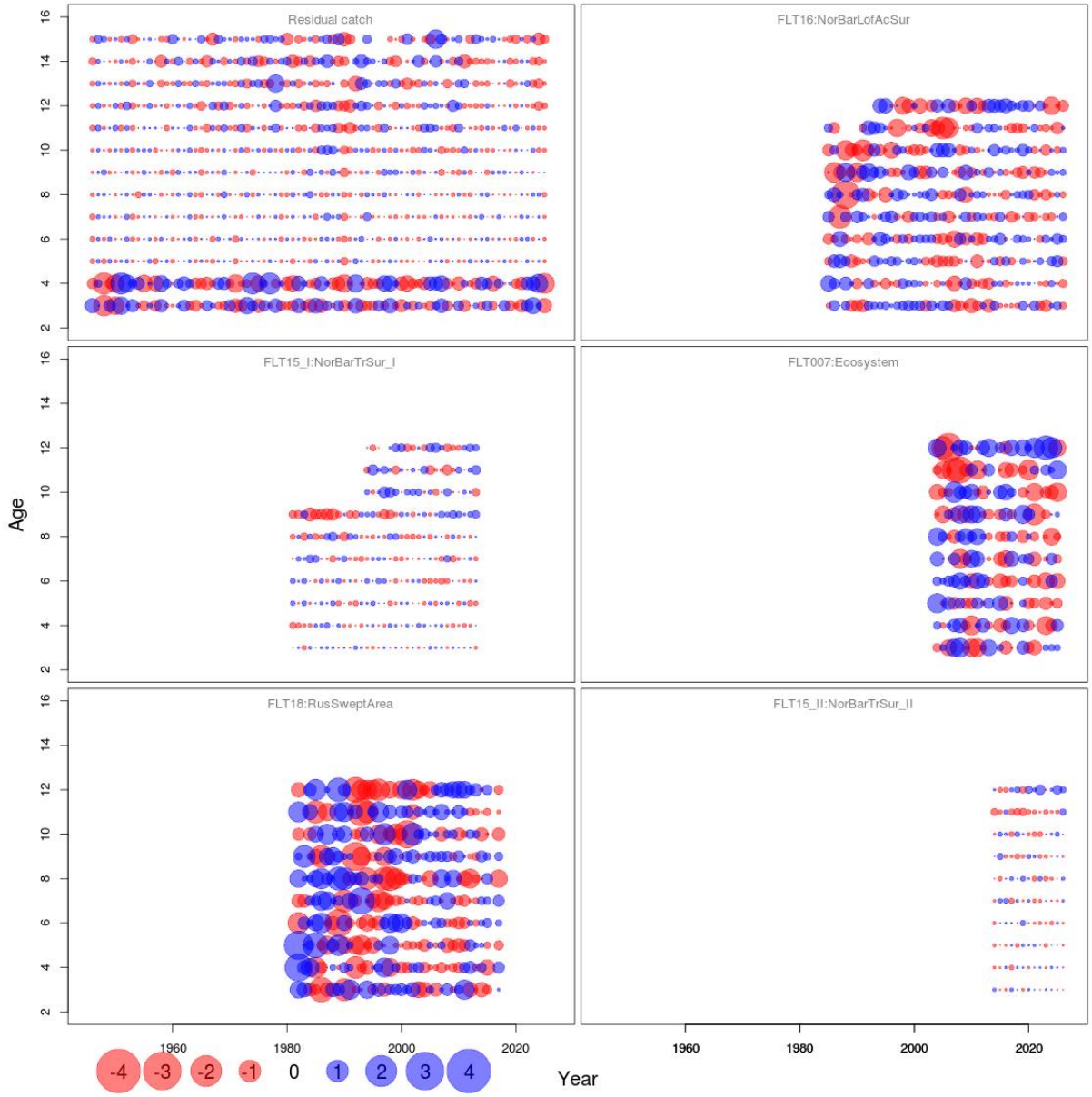
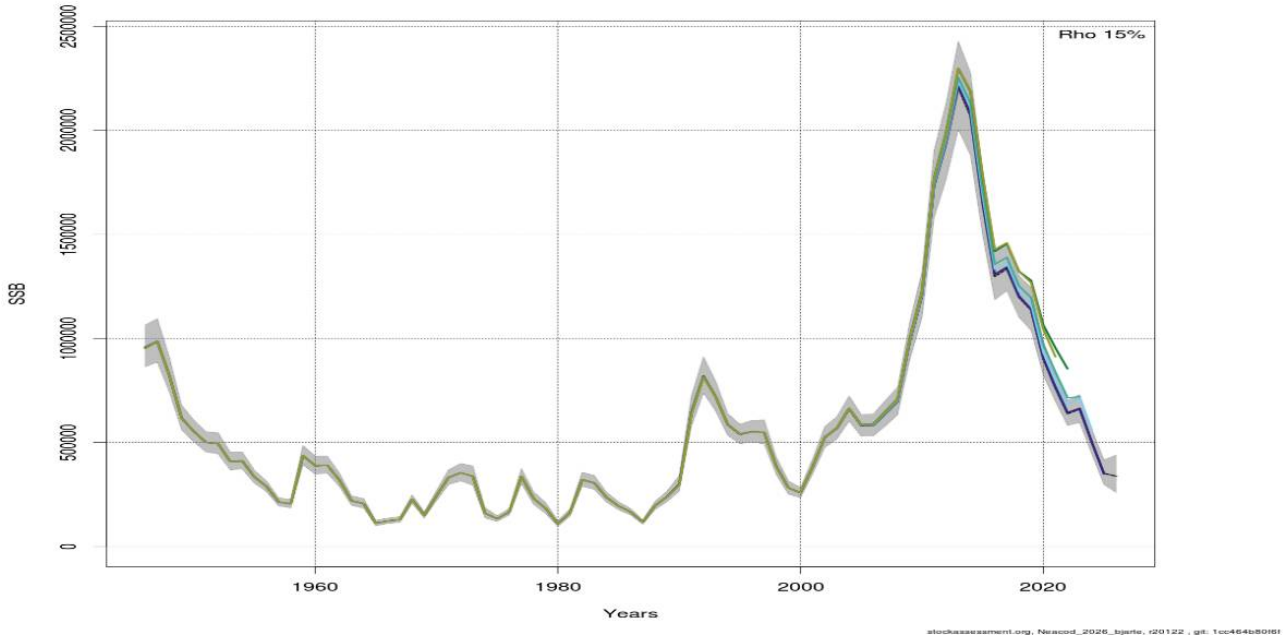
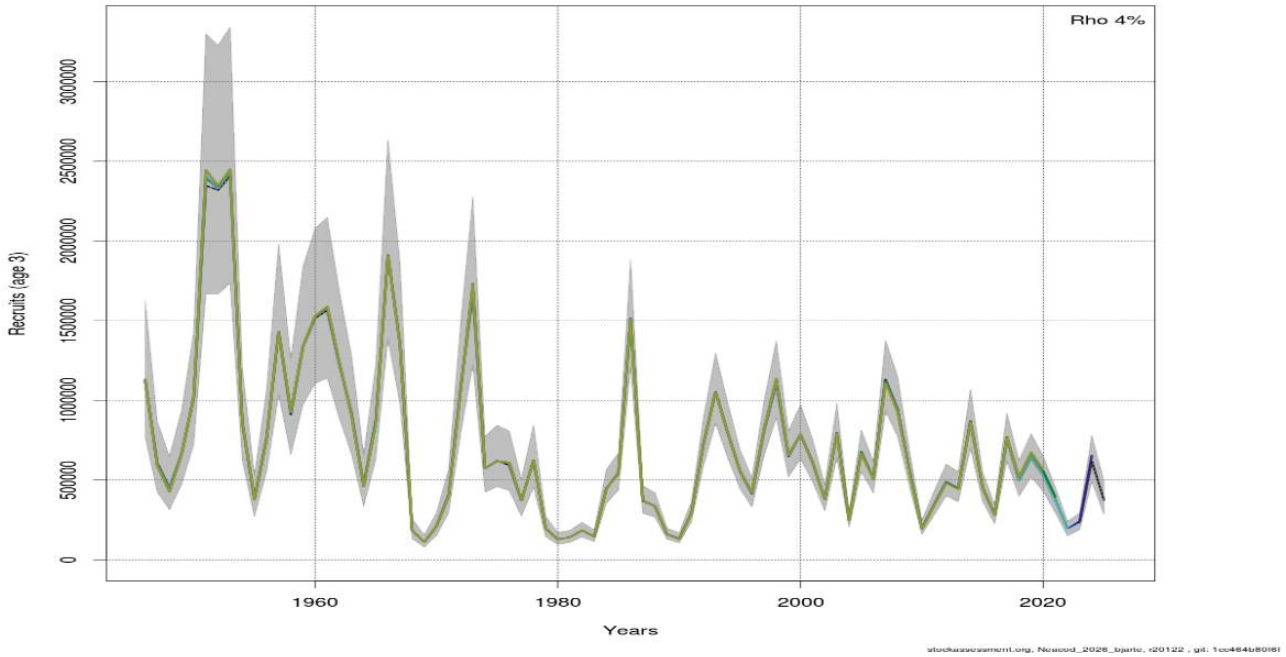


Figure 3.2a. Standardized one-observation-ahead residuals for log-catches and log-indices (Thygesen et al . 2017) in the final SAM run


Rho 15%
SSB
0
500000
1000000
1500000
2000000
2500000
1960
1980
2000
2020
Years
stockassessment.org, Neacod_2026_bjarte, r20122 , git: 1cc464b80f6f


Rho 4%
Recruits (age 3)
0
500000
1000000
1500000
2000000
2500000
3000000
1960
1980
2000
2020
Years
stockassessment.org, Neacod_2026_bjarte, r20122 , git: 1cc464b80f6f

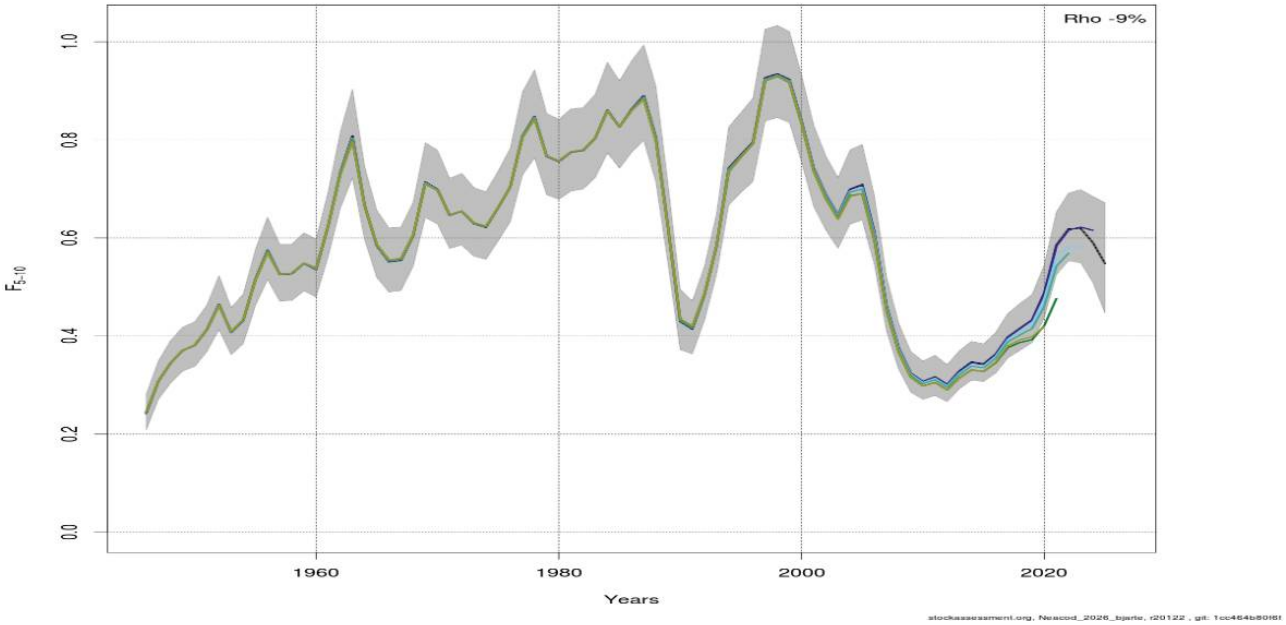


Figure 3.2b. NEA cod SSB, R and F bar model retrospective pattern for final SAM run.

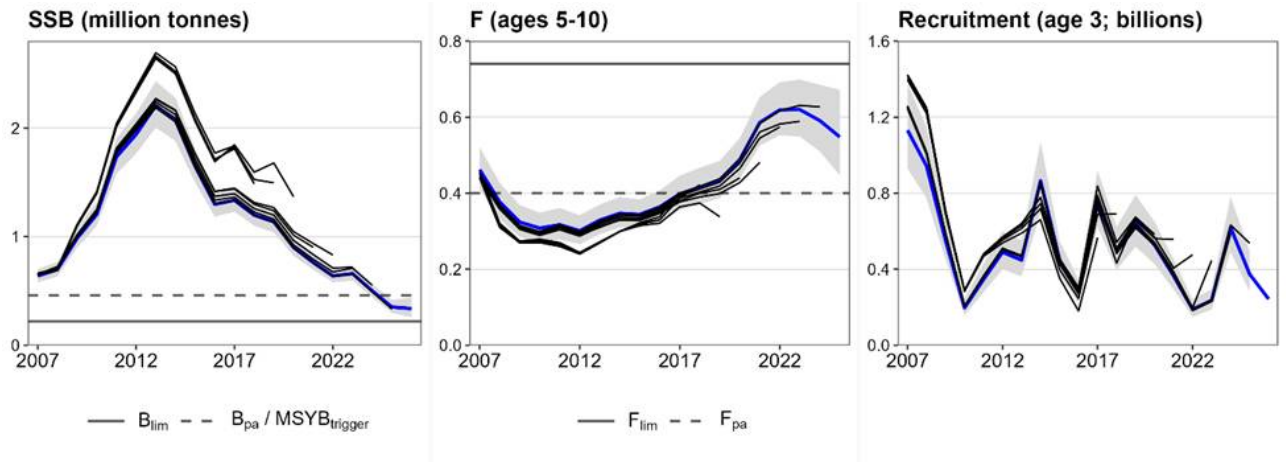


Figure 3.2c. Cod in ICES subareas 1 and 2 (Northeast Arctic). Historical assessment results. There was a benchmark revision in 2021. The shaded areas indicate the 95% confidence intervals for the 2026 assessment.

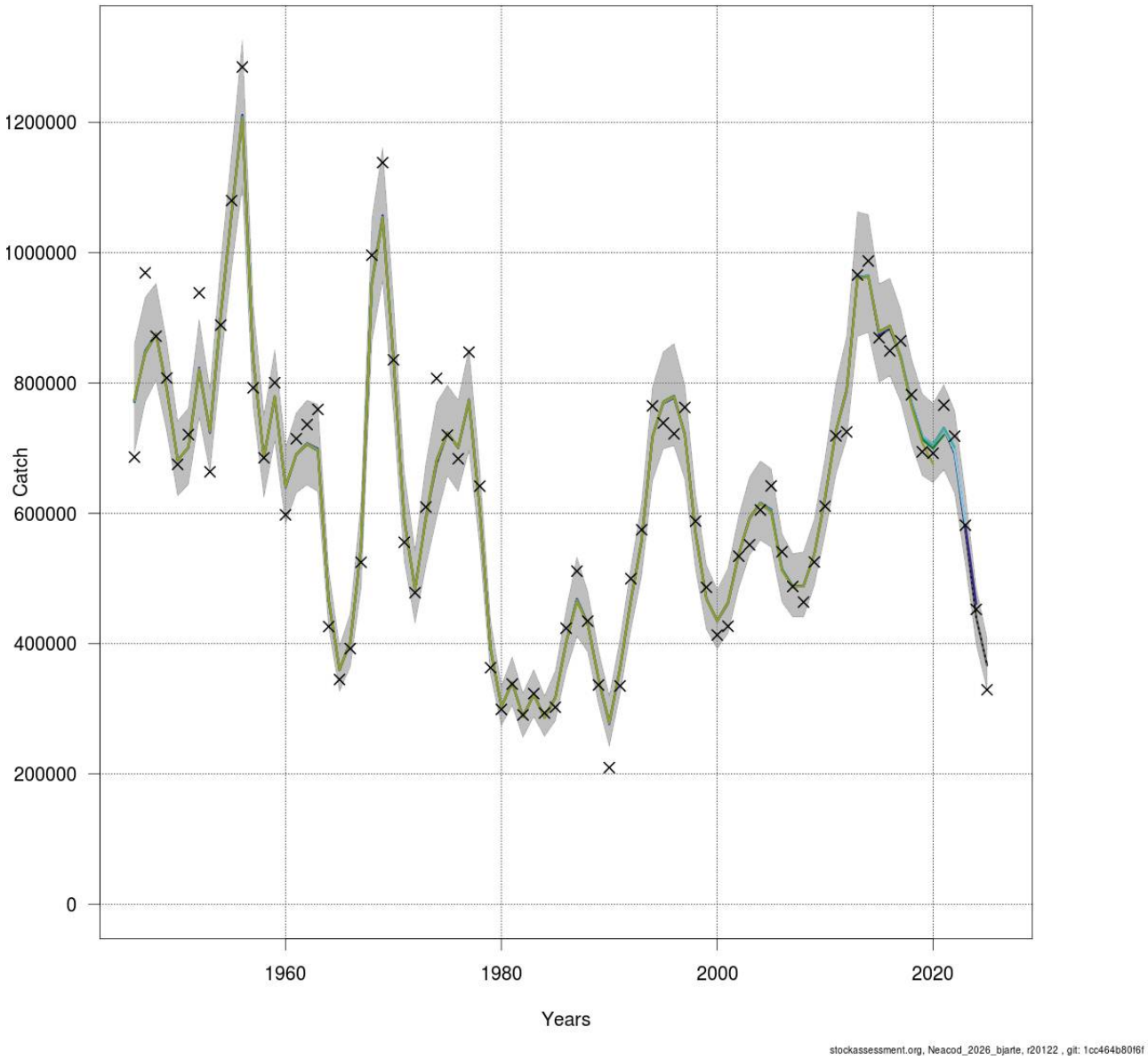


*Figure 3.2d. NEA cod final SAM run fit. Total catch in weight. Modelled catches from the final run and point wise 95% confidence intervals are shown by line and shaded area. The yearly observed total catch weight (crosses) are calculated as Catch(y)=sum(W(a,y)*C(a,y)).*

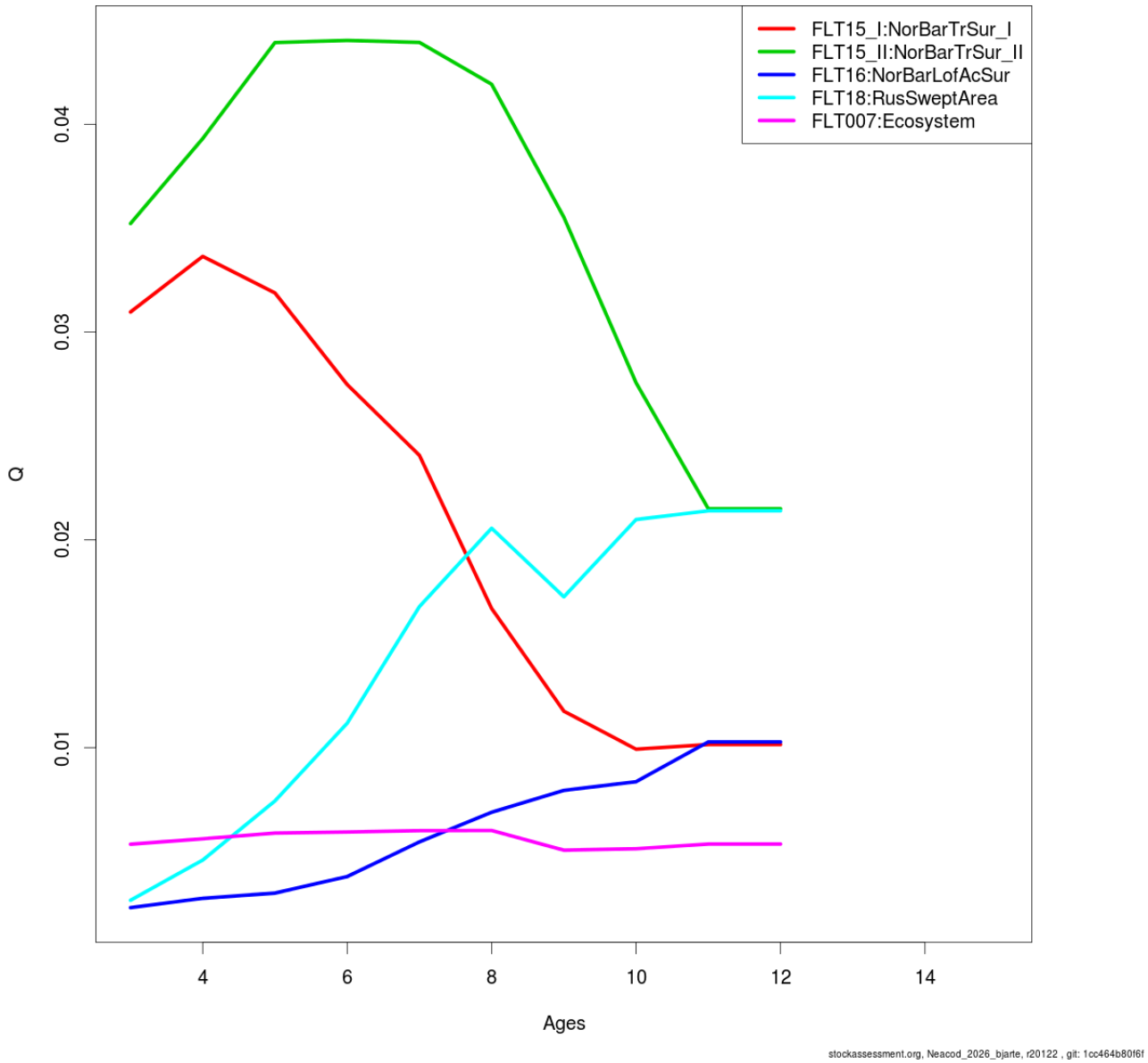


Figure 3.2e. NEA cod. Catchability of different fleets used for final SAM run fit.

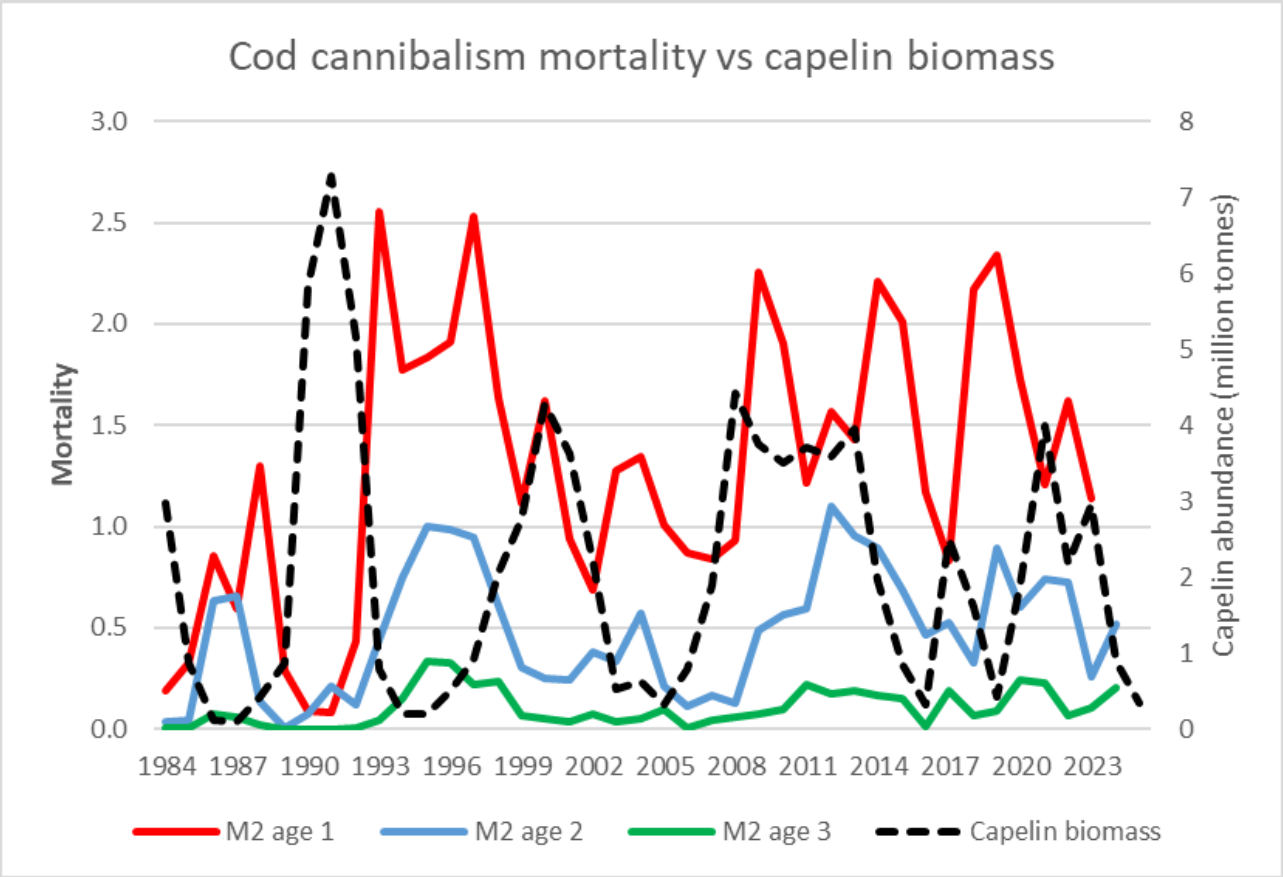


Figure 3.3. NEA cod cannibalism mortality vs. capelin abundance.

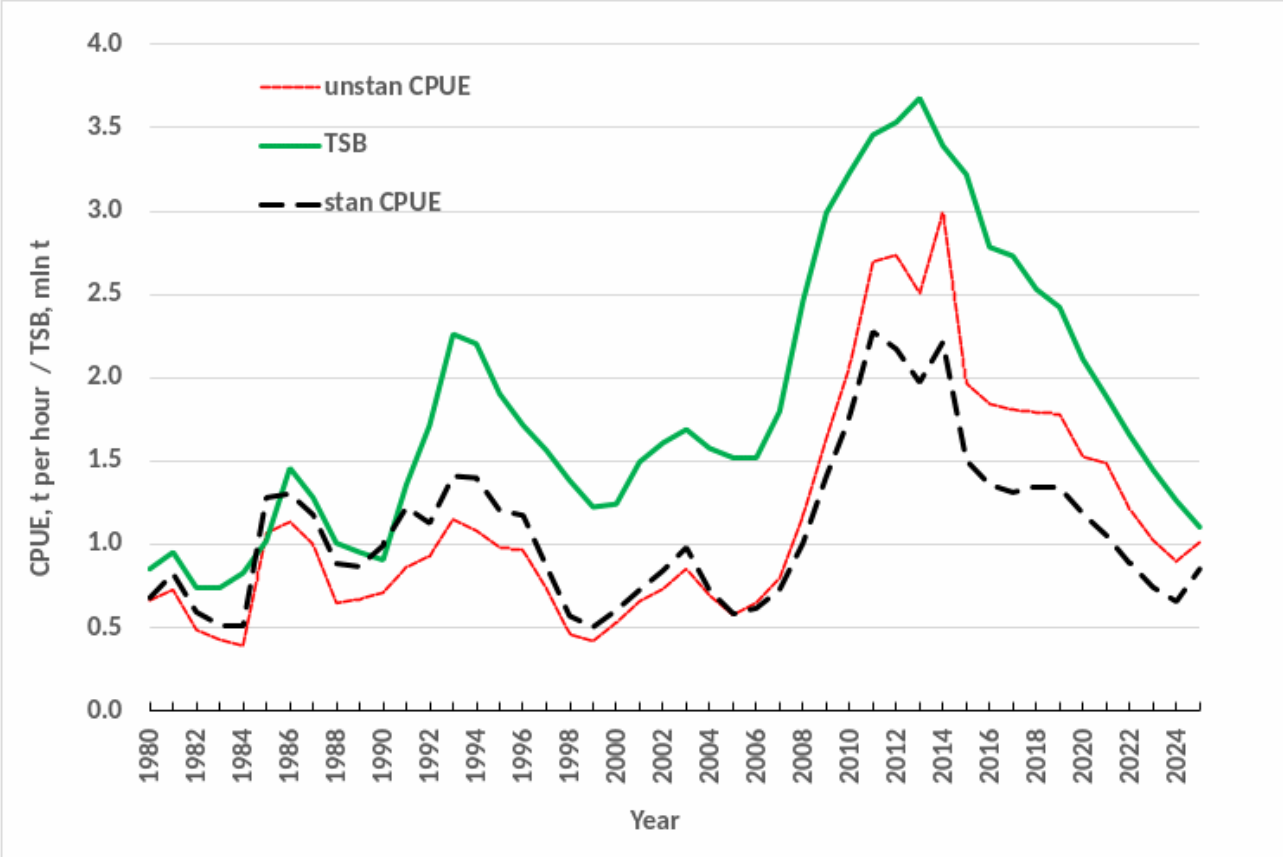


Figure 3.4a. Northeast Arctic cod. Average CPUE of the NEA cod Russian trawl fishery for the 9 main vessel types and standardized CPUE by the GLM method for the period 1980-2025 compared to the cod total stock biomass (TSB) estimated by JRN-AFWG 2026 (WD 1, 2025, updated).

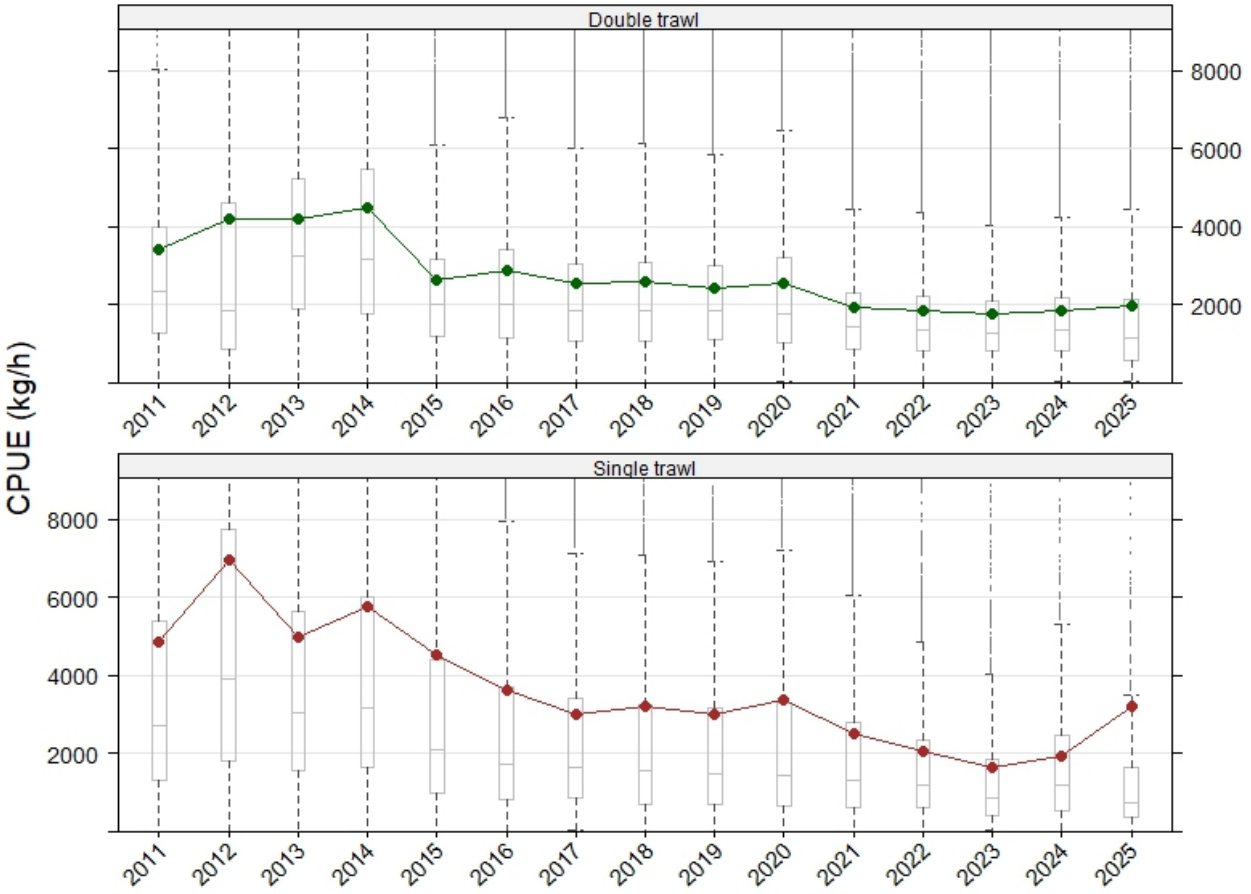
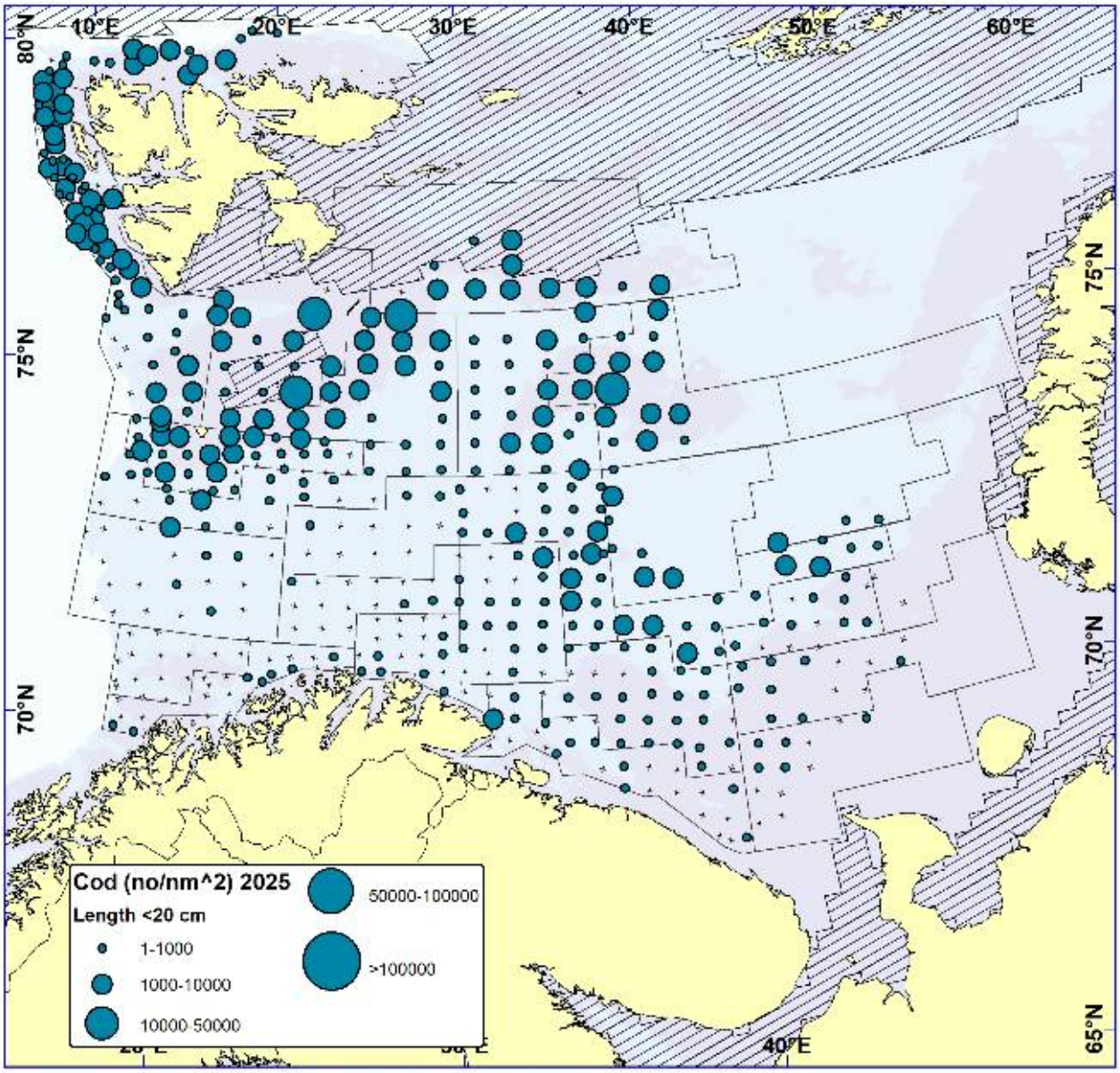
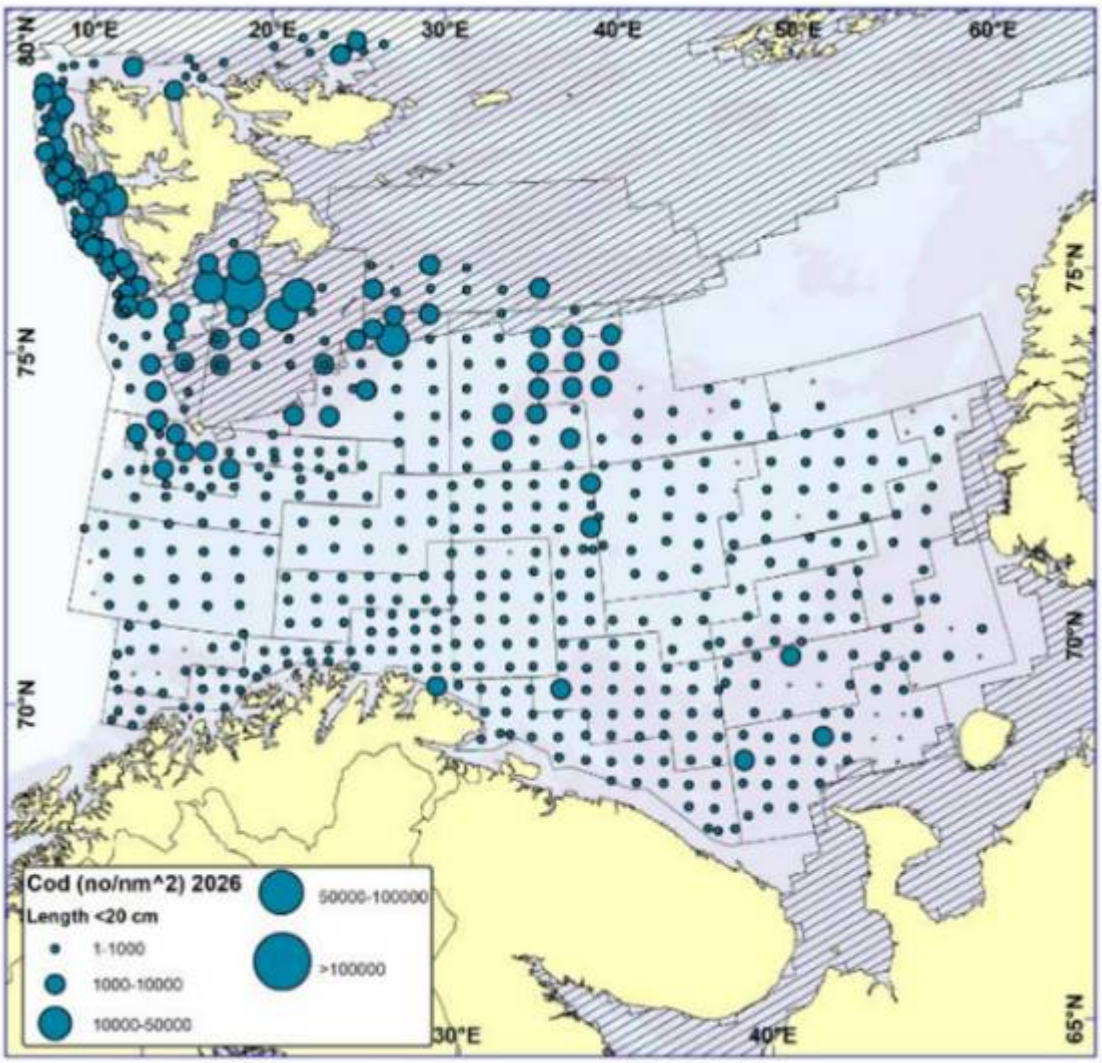


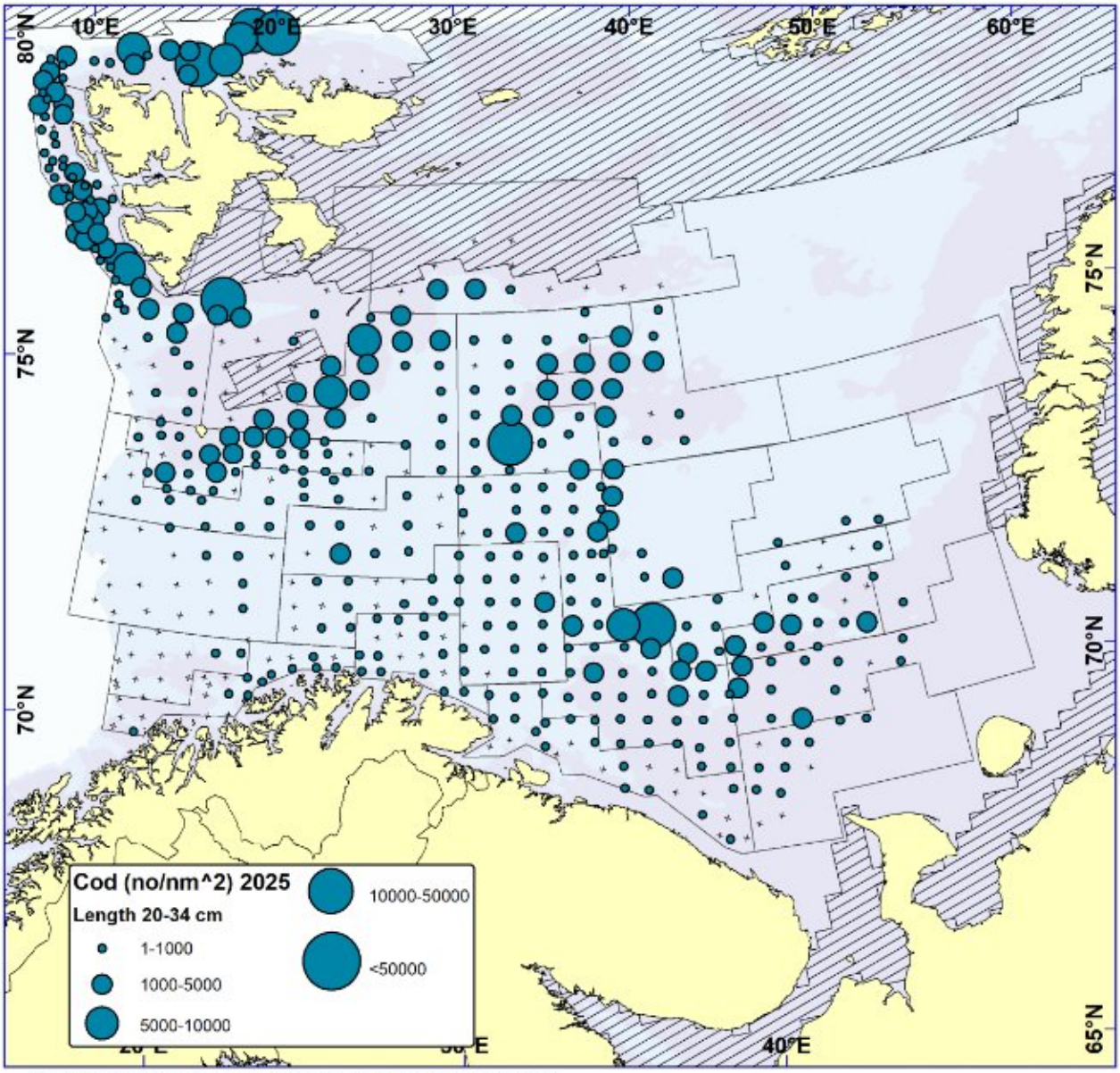
Figure 3.4b. Cod CPUE in Norwegian trawl catches where cod is the main species (double and single trawl, WD2). Connected line shows mean, line inside box shows the median, and the box shows 25 and 75 percentiles.



Ice coverage - https://noaadata.apps.nsidc.org/NOAA/G02135/north/monthly/shapefiles/shp_extent/02_Feb/



Ice coverage - https://noaadata.apps.nsidc.org/NOAA/G02135/north/monthly/shapefiles/shp_extent/02_Feb/



Ice coverage - https://noaadata.apps.nsidc.org/NOAA/G02135/north/monthly/shapefiles/shp_extent/02_Feb/

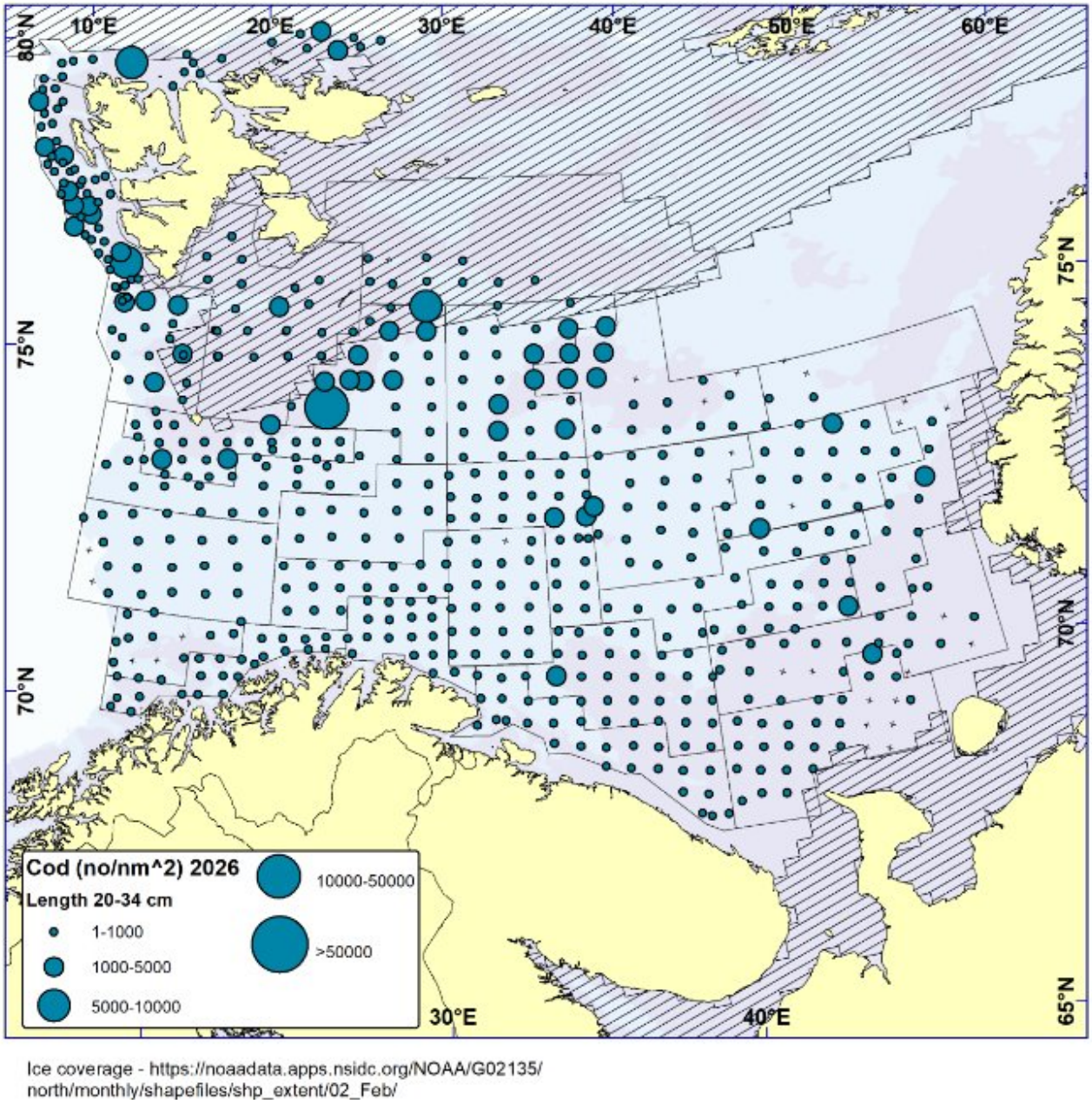
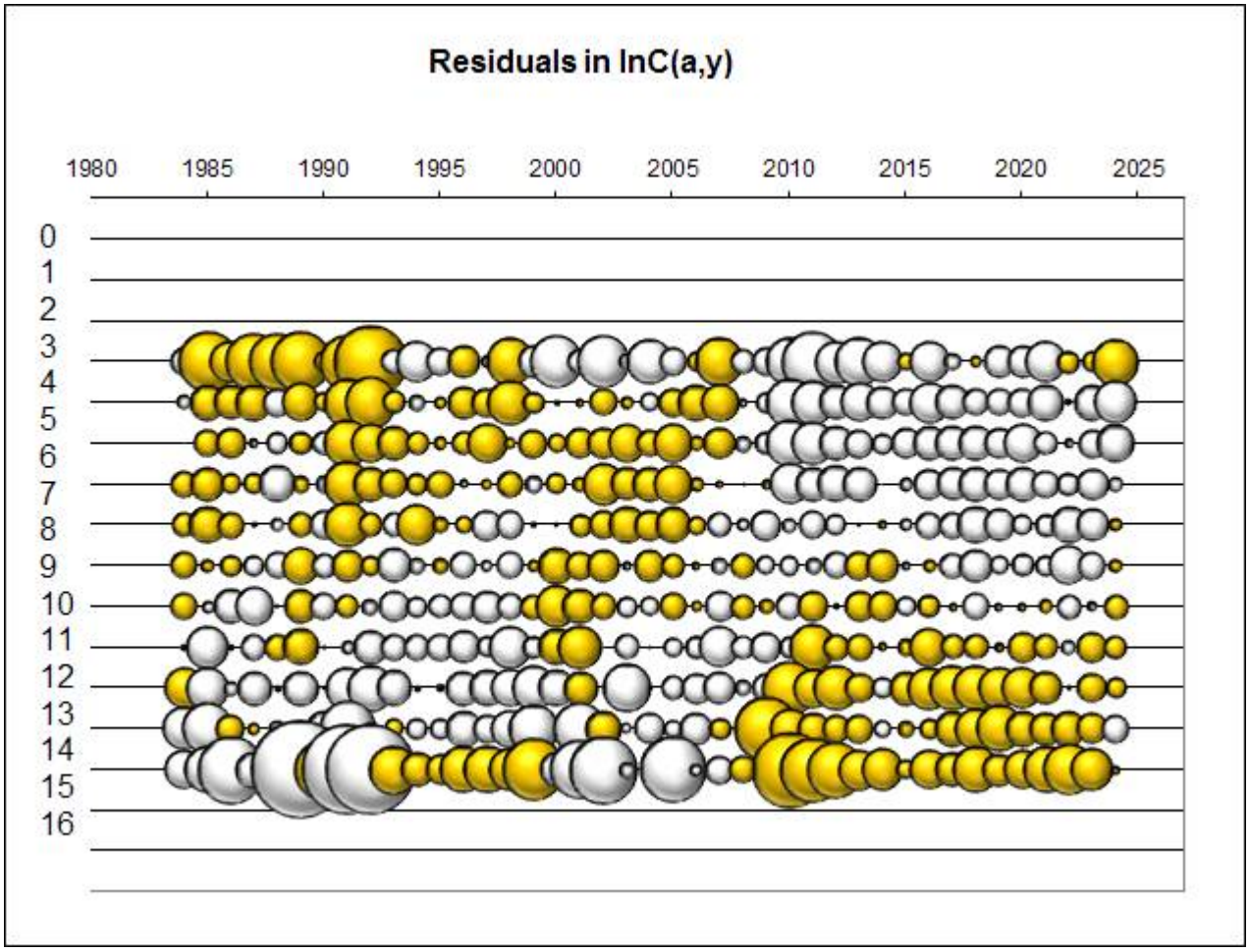
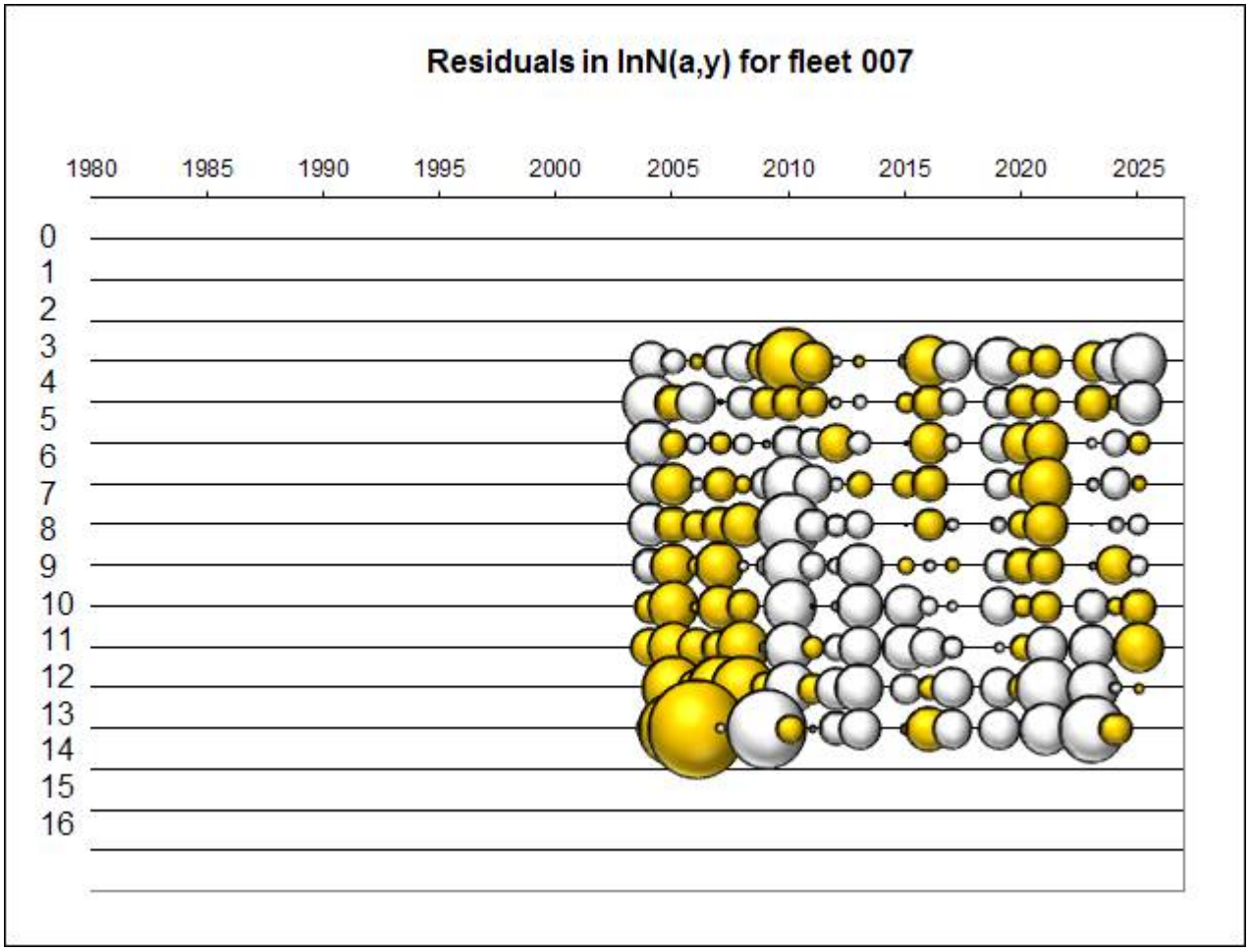
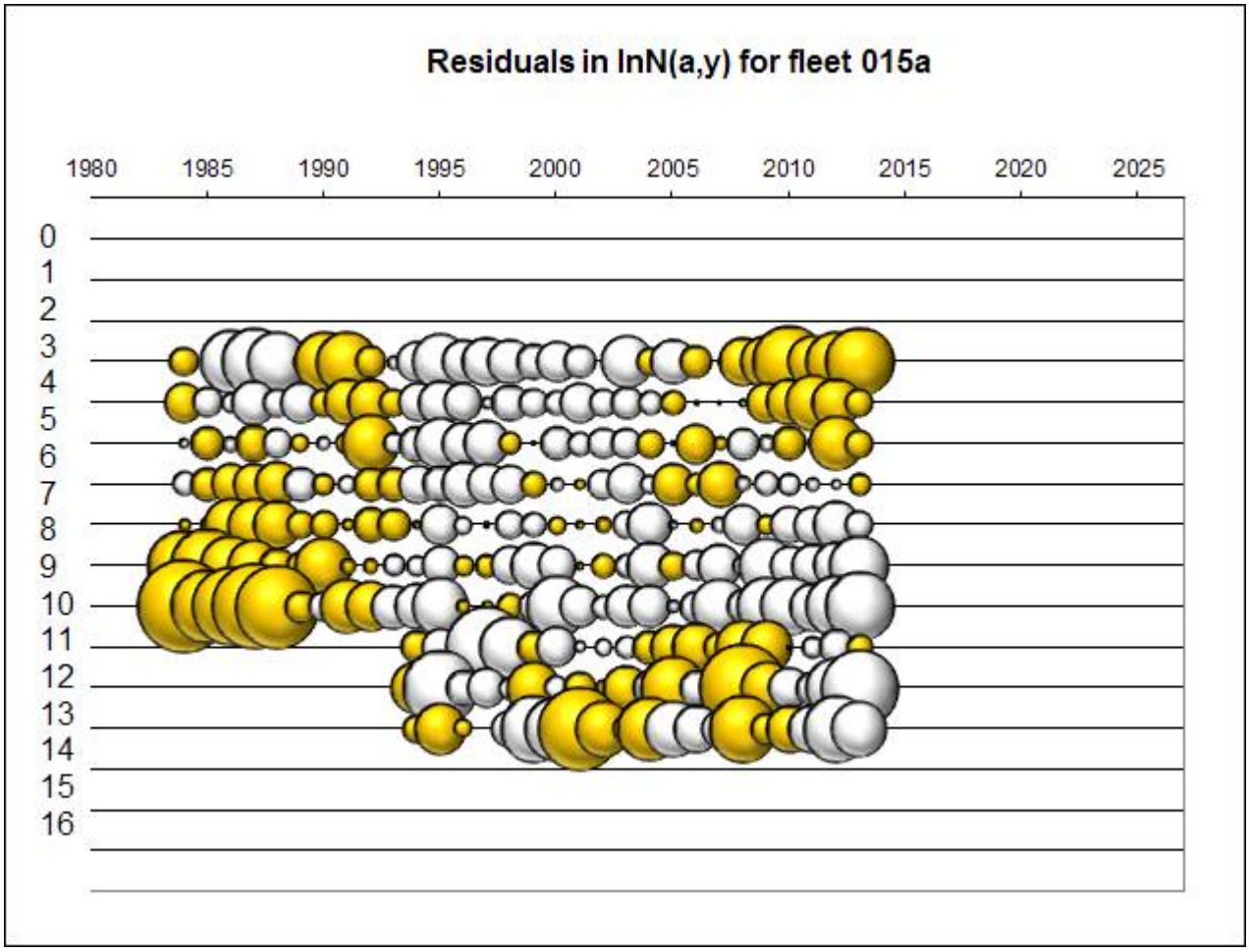
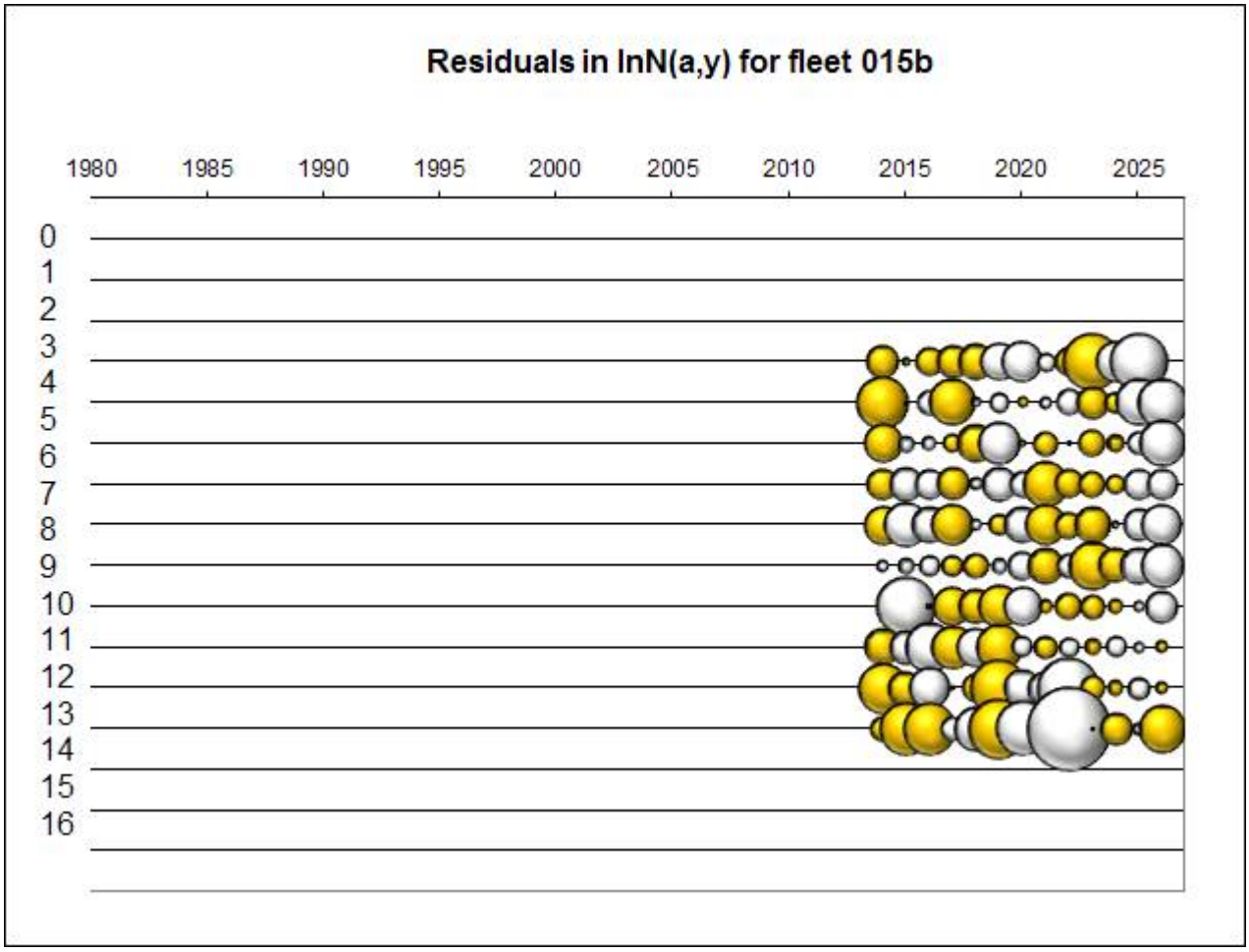


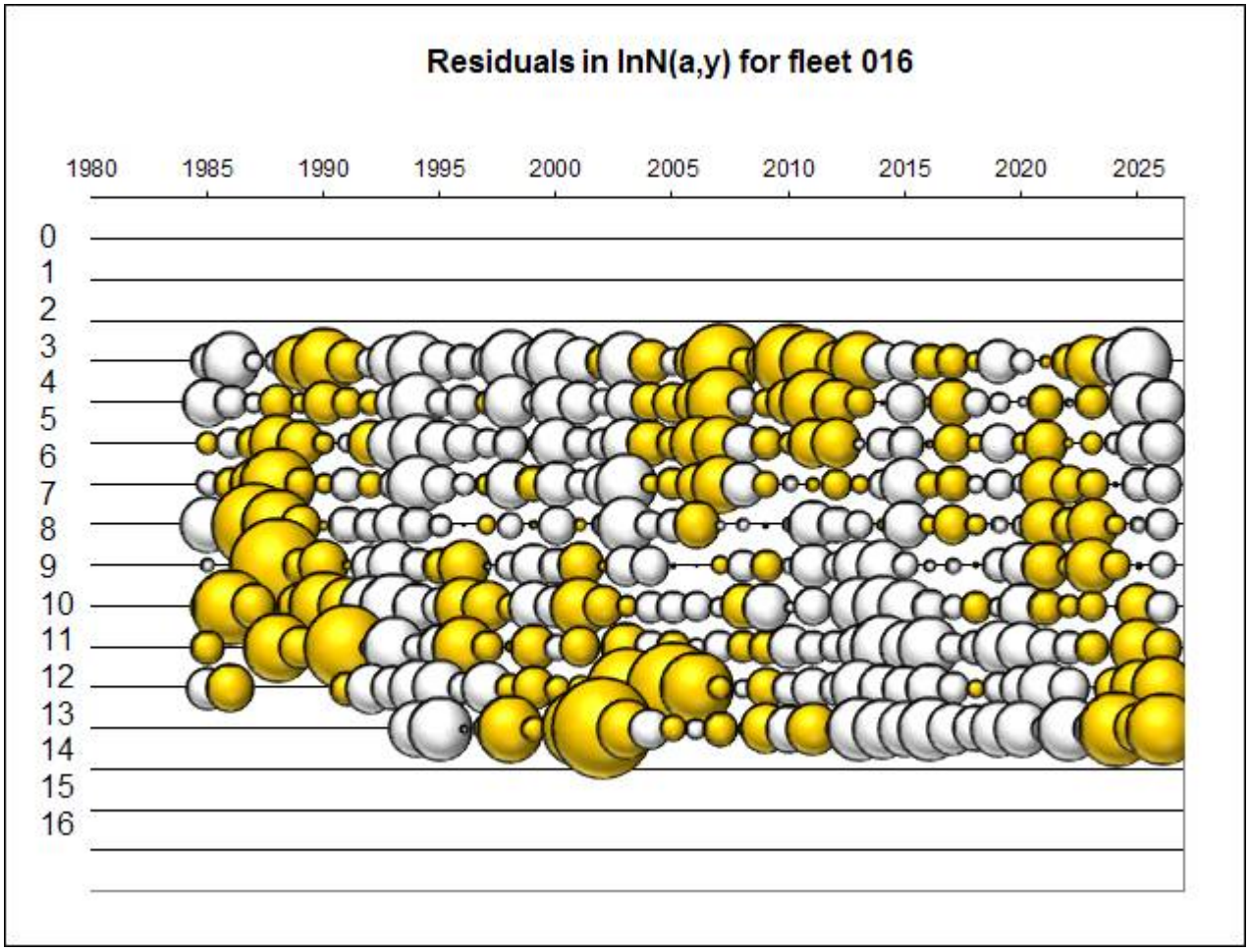
Figure 3.5. Northeast Arctic cod. Catches of cod at length less than 35 cm (no/nm 2) during the Joint Barents Sea winter survey in 2025 and 2026 .


Residuals in lnC(a,y)
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


Residuals in lnN(a,y) for fleet 007
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


Residuals in lnN(a,y) for fleet 015a
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


Residuals in lnN(a,y) for fleet 015b
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16


Residuals in lnN(a,y) for fleet 016
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

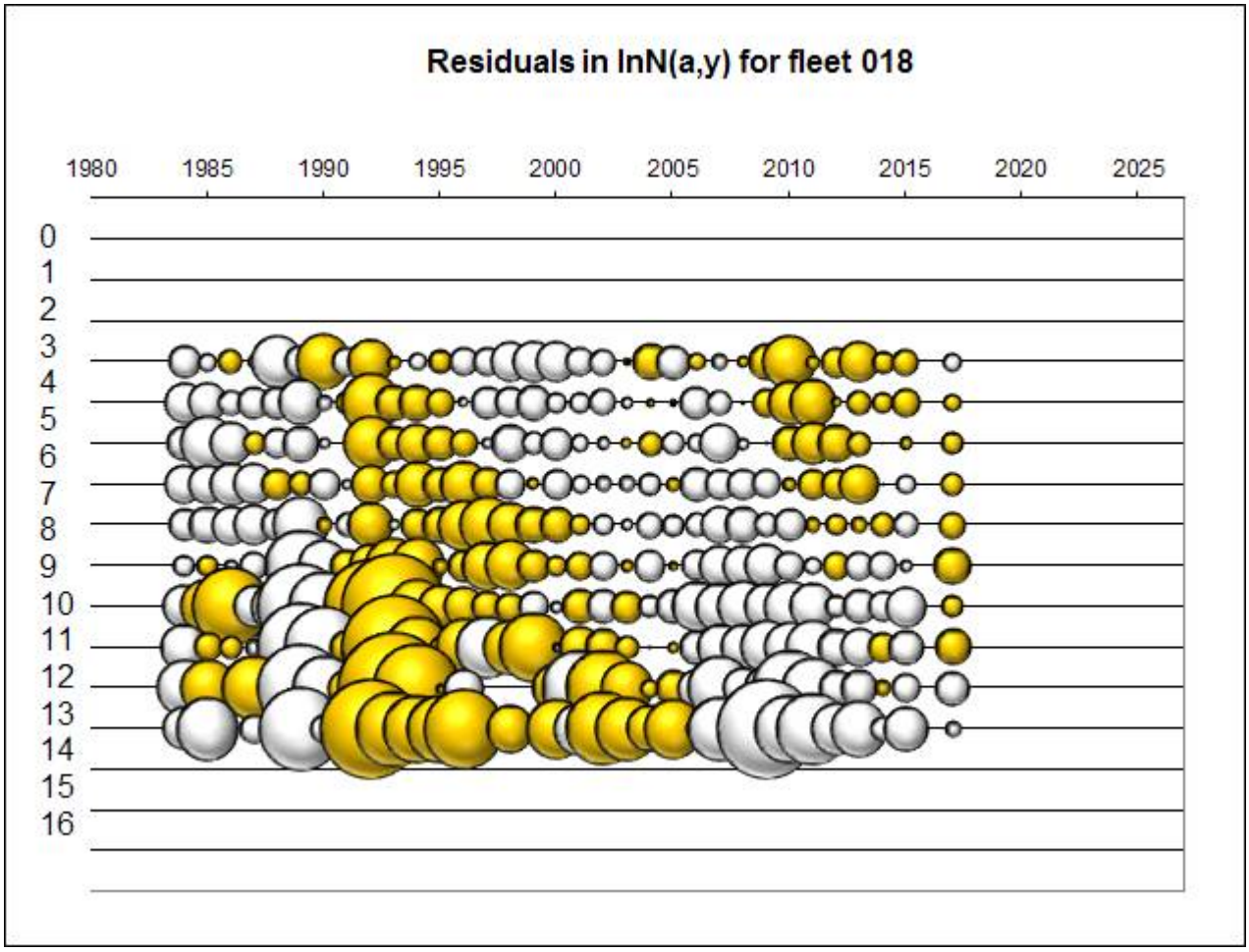


Figure 3.6a. Residuals of the TISVPA data approximation (yellow circles are positive residuals, white – negative).

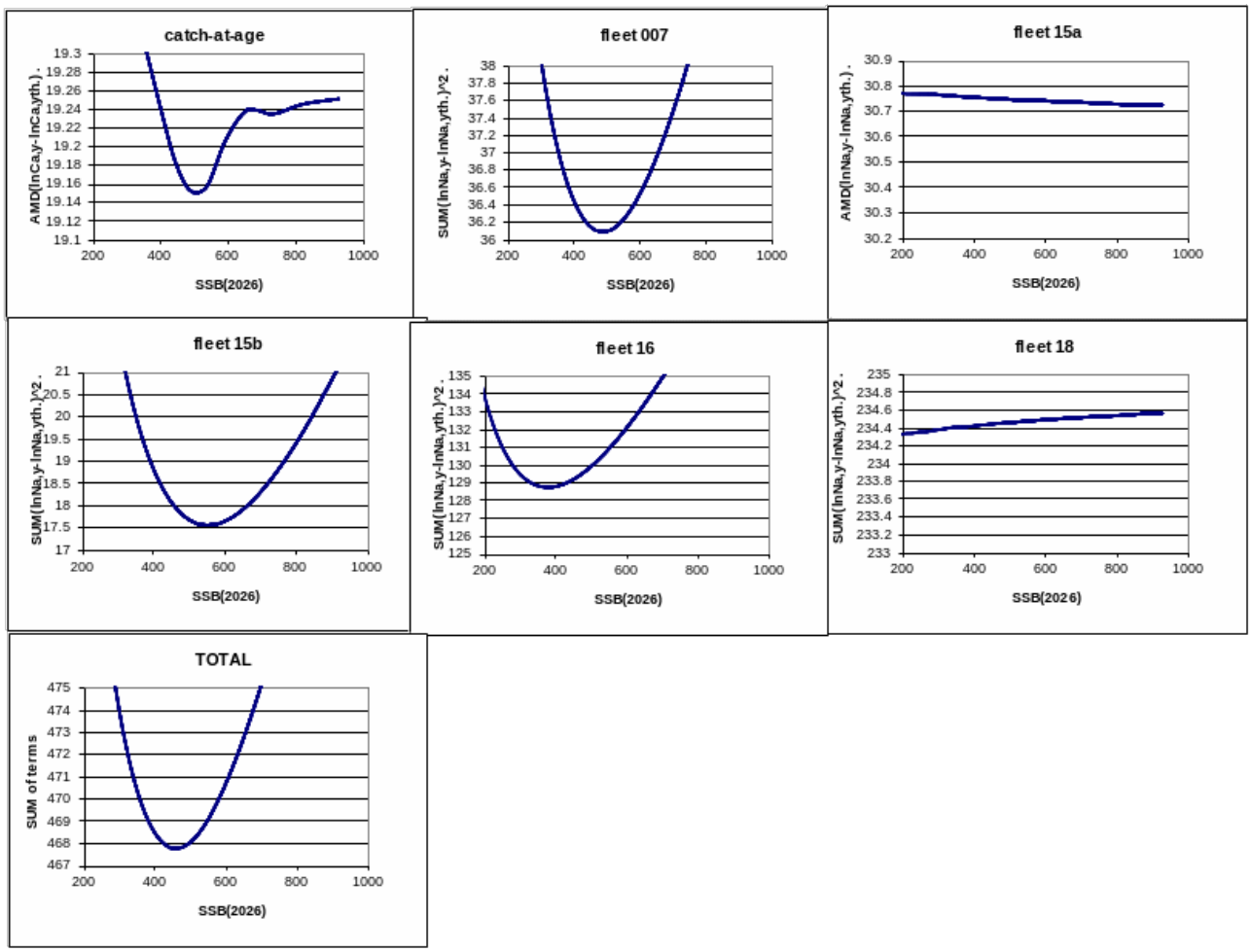
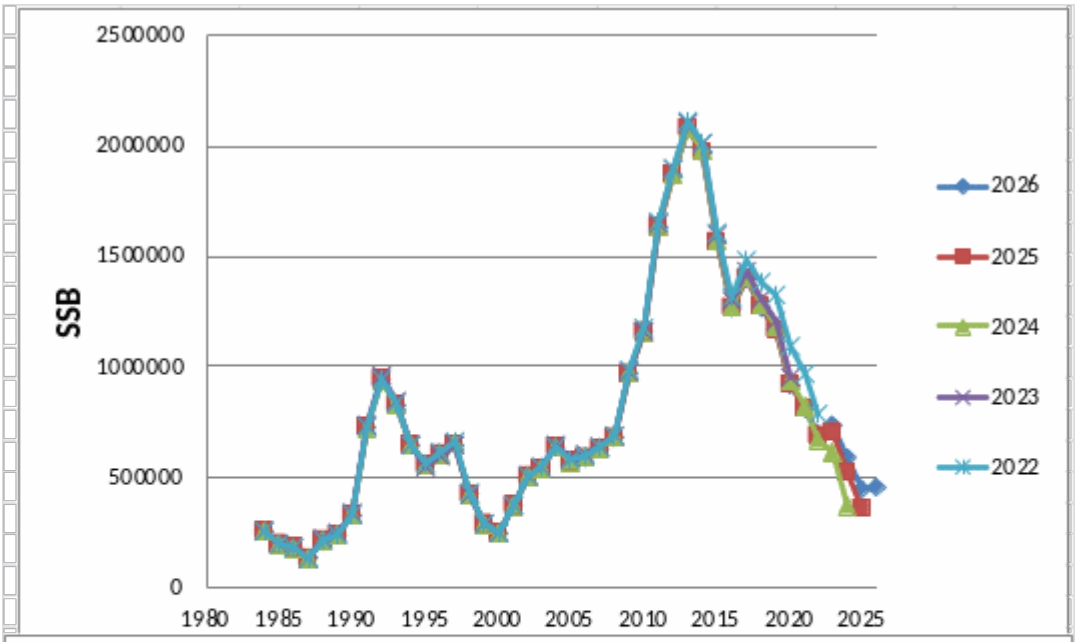
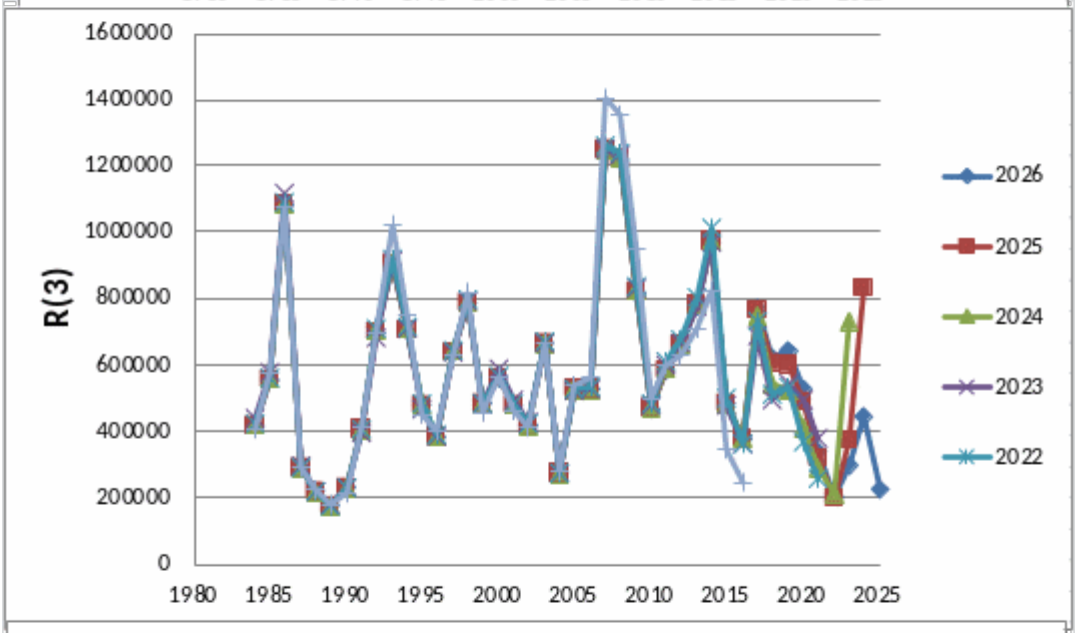


Figure 3.6b. Profiles of the components of the TISVPA objective function.


SSB
2500000
2000000
1500000
1000000
500000
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2026
2025
2024
2023
2022


R(3)
1600000
1400000
1200000
1000000
800000
600000
400000
200000
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2026
2025
2024
2023
2022

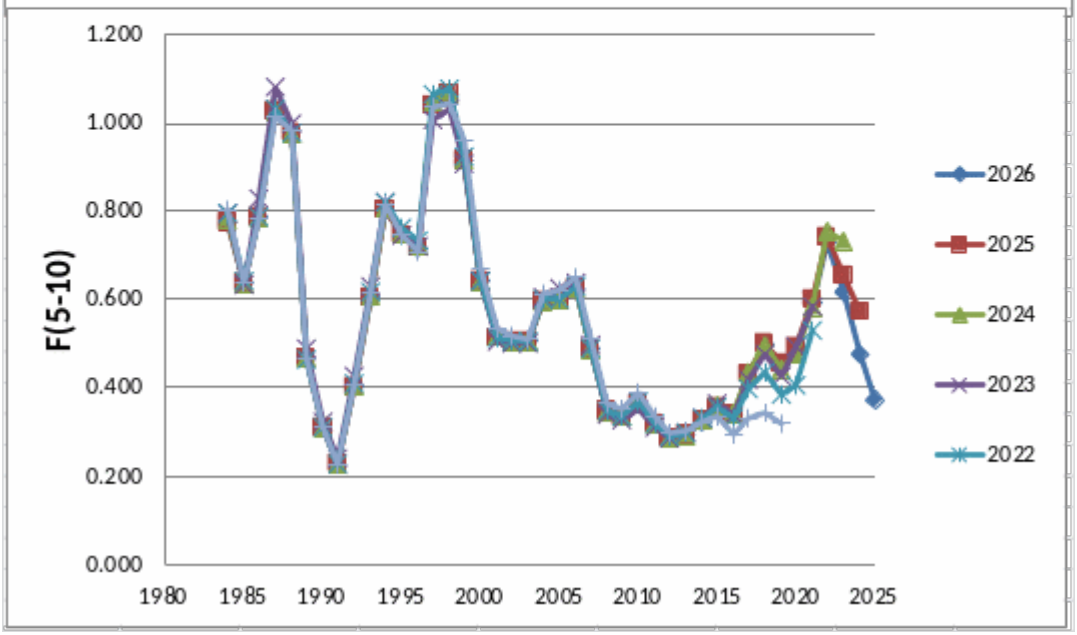

F(5-10)
1.200
1.000
0.800
0.600
0.400
0.200
0.000
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2026
2025
2024
2023
2022

Figure 3.6c. TISVPA retrospective runs.

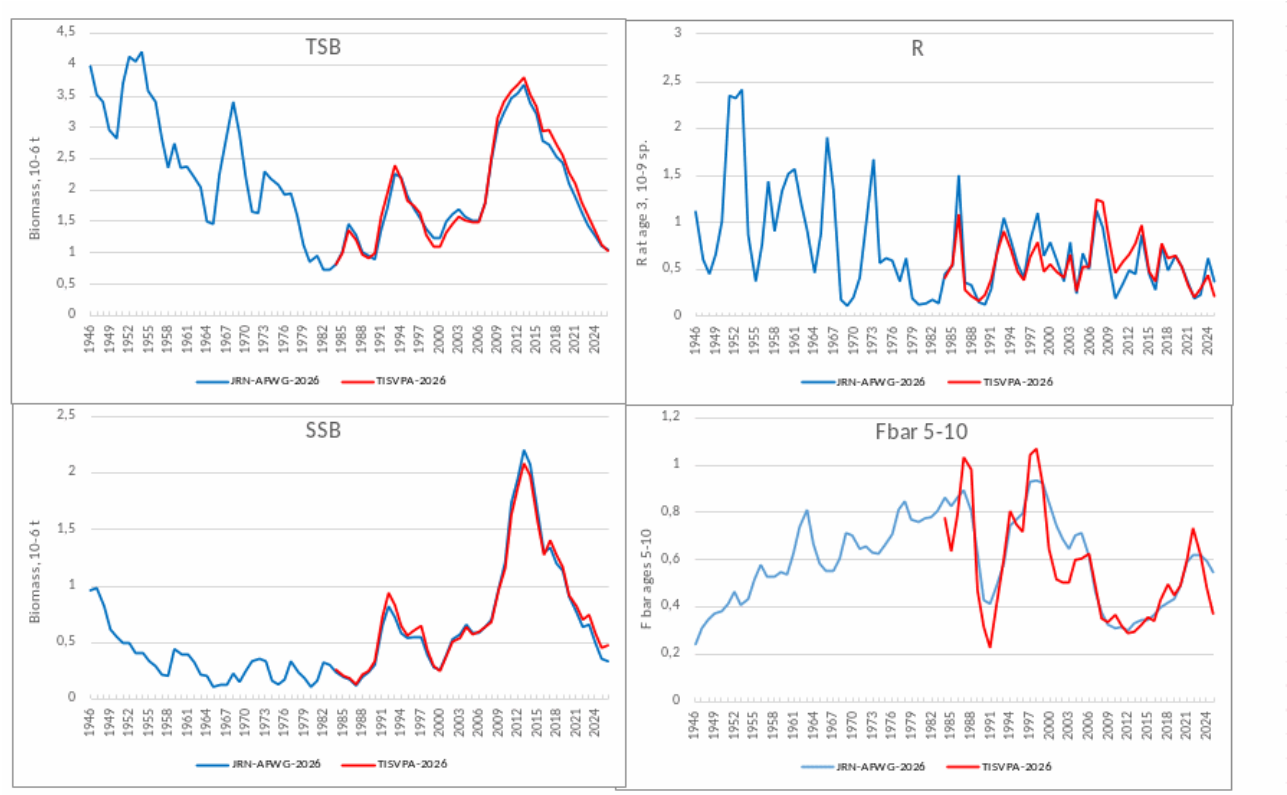
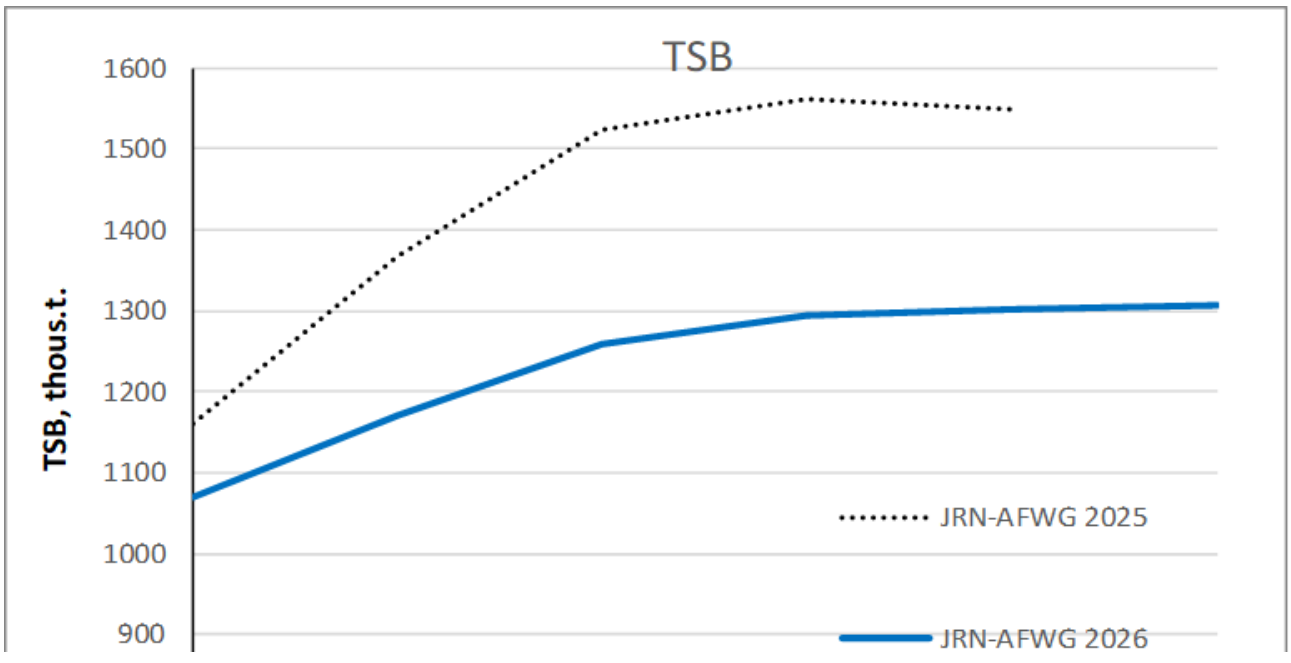


Figure 3.7. Model comparison. TSB (total stock biomass, age 3+), SSB recruitment and F in SAM and TISVPA.



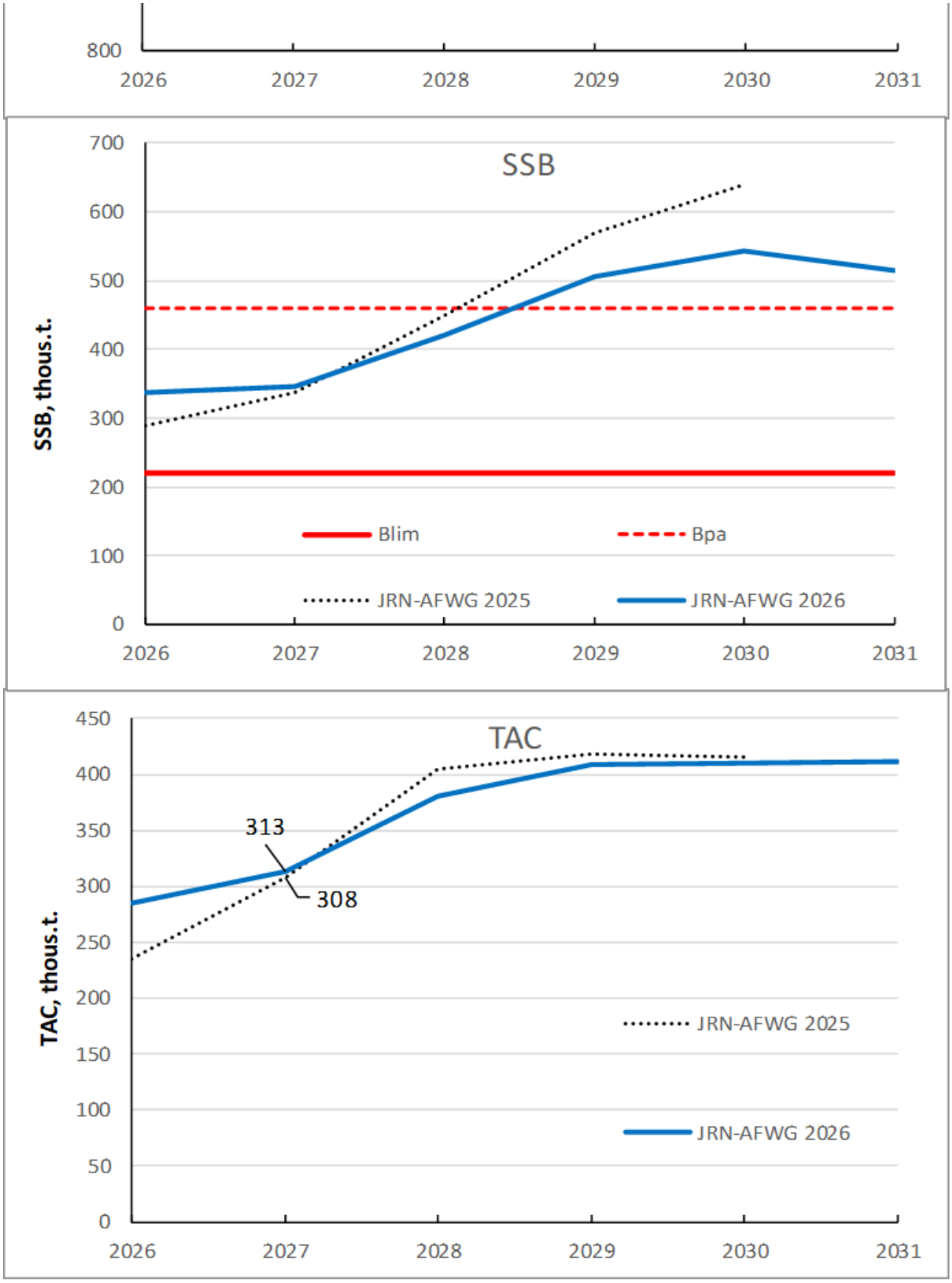


Figure 3.8. Medium term prediction of NEA cod stock dynamics and TAC according to HCR based on assessments of current year and previous year.

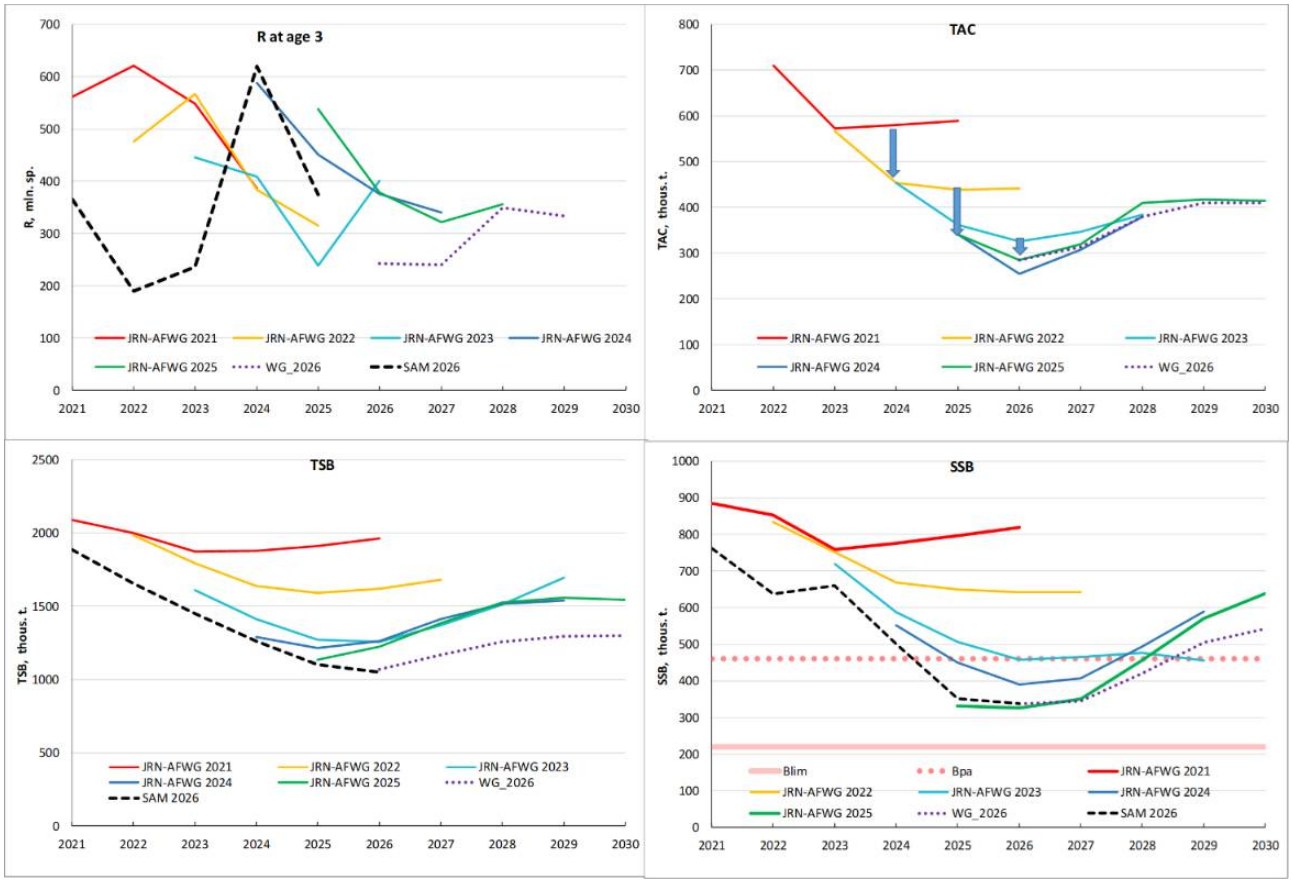


Figure 3.9. Historical retro of medium term predictions of NEA cod stock dynamics and TAC according to HCR based on assessments of current year and previous year (combined on predictions made by 2021-2026 WGs)

Table A1. North-East Arctic COD. Catch per unit effort. For data prior to 1981, see the JRN-AFWG 2023 report.

Year	Norway Single trawl	Norway double trawl	Russian [2] trawl fishery for 9 main vessel types [4]
1980			0.68
1981	1.21		0.82
198 2	1.09		0.59
1983	1.11		0.51
1984	0.96		0.51
1985	1.29		1.28
1986	1.70		1.30
1987	1.77		1.17
1988	1.03		0.88
1989	0.76		0.86
1990	0.49		0.99
1991	0.44		1.22

1992	1.29		1.12
1993	1.87		1.40
1994	1.59		1.39
1995	1.92		1.20
1996	1.81		1.17
1997	1.36		0.87
1998	0.83		0.57
1999	0.74		0.50
2000	0.92		0.60
2001	1.21		0.72
2002	1.35		0.84
2003	1.67		0.98
2004	1.67		0.72
2005	1.23		0.58
2006	0.88		0.61
2007	1.16		0.73
200 8			1.00
2009			1.40
2010			1.75
2011	4.87 [3]	3.43	2.27
2012	6.97 [3]	4.21	2.16
201 3	4.96 [3]	4.21	1.96
201 4	5.75 [3]	4.47	2.20
2015	4.54 [3]	2.62	1.50
2016	3.64 [3]	2.90	1.35
201 7	3.01 [3]	2.53	1.31
2018	3.20 [3]	2.57	1.34
2019	3.02 [3]	2.44	1.33
2020	3.38 [3]	2.56	1.18
2021	2.51 [3]	1.93	1.04
2022	2.04 [3]	1.87	0.89
2023	1.66 [3]	1.78	0.74
2024	1.92 [3]	1.86	0.65
2025 [1]	3.21 [4,6]	1.99	0.85

[1] Preliminary figures.

[2] USSR prior to 1991.

[3] 2011-2024 Norwegian data on t per hour fishing are not comparable to data from previous yearspanish

[4] standardized by GLM method (WD1, 2025)

Table A2. North-east Arctic COD. Abundance indices (millions) from the Norwegian acoustic survey in the Barents Sea in January-March. New TS and rock-hopper gear (1981-1988 back-calculated from bobbins gear). Corrected for length-dependent effective spread of trawl. Data from 1994 onwards corrected for three northern are as and the method of filling in gaps (WD 1, WKBarFar 2021).

				Age															
Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	10+	Total	12+
1981		8.00	82.00	40.00	63.00	106.00	103.00	16.00	3.00	1.00							1.00	423.0	
1982		4.00	5.00	49.00	43.00	40.00	26.00	28.00	2.00	+							0.00	197.0	
1983		60.49	2.78	5.34	14.27	17.37	11.13	5.58	2.98	0.45							0.06	120.5	
1984		745.44	146.11	39.13	13.59	11.26	7.44	2.81	0.19	0.02							0.00	966.0	
1985		69.06	446.29	153.04	141.59	19.66	7.58	3.32	0.22	0.09							0.04	840.9	
1986		353.63	243.90	499.61	134.27	65.90	8.28	2.15	0.37	0.06							0.02	1308.2	
1987		1.62	34.07	62.80	204.93	41.41	10.40	1.22	0.19	0.66							0.00	357.3	
1988		1.98	26.25	50.42	35.53	56.20	6.48	1.35	0.15	0.01							0.00	178.4	
1989		7.53	7.98	17.00	34.39	21.38	53.82	6.88	0.97	0.10							0.05	150.1	
1990		81.13	24.92	14.82	20.63	26.08	24.30	39.78	2.37	0.06							0.03	234.1	
1991		181.04	219.51	50.23	34.64	29.33	28.87	16.89	17.33	0.86							0.03	578.7	
1992		241.38	562.13	176.48	65.79	18.84	13.23	7.58	4.50	2.78							0.21	1092.9	
1993		1074.04	494.68	357.24	191.05	108.24	20.84	8.12	4.98	2.25							2.51	2264.0	
1994		902.64	624.38	323.88	374.47	205.53	70.24	13	3.59	2.6	0.71	1.15	0.11	0.13	NA	0		2522.4	0.24
1995		2175.25	212.29	137.74	139.49	197.08	66.38	15.73	2.43	0.91	0.32	0.48	0.17	NA	NA	0		2948.3	0.17
1996		1826.33	271.71	99.4	89.62	111.34	82.96	22.17	2.22	0.3	0.1	0.07	0.05	0.1	0.01	0		2506.4	0.16
1997		1698.49	565.31	158.57	44.22	49.91	40.91	23.48	5.02	0.84	0.27	0.09	NA	NA	0.01	0		2587.1	0.01
1998		2523.56	475.15	391.16	189.79	44.87	41.22	27.85	16.06	1.81	0.5	0.04	NA	NA	NA	0.06		3712.1	0.06
1999		364.84	231.51	147.62	130.29	52.03	11.93	6.94	4.13	1.47	0.24	0.01	0.03	0.01	NA	0		951.1	0.04
2000		153.42	262.81	294.83	167.25	145.55	50.75	11.33	4.7	2.75	0.85	0.18	0.11	0.03	NA	0		1094.6	0.14

2001		363.55	51.45	177.44	160.63	80.8	44.47	11.1	1.73	0.46	0.19	0.08	NA	NA	NA	0.01		891.9	0.01
2002		19.22	209.1	61.37	106.23	98.78	52.18	20.07	2.9	0.32	0.52	0.09	NA	NA	NA	0.02		570.8	0.02
2003		1505	52.53	306.71	116.8	124.62	116.52	37.69	10.05	1.93	0.31	0.07	NA	0.08	0.07	0		2272.4	0.15
2004		161.2	117.19	33.41	85.21	32.96	28.03	18.14	5.33	1.16	0.31	0.08	0	0.01	NA	0		483.0	0.01
2005		499.71	138.66	125.03	33.28	65.94	21.21	15.02	4.95	1.01	0.25	0.05	0.07	0.05	0.03	0		905.3	0.15
2006		411.21	157.95	64.77	53.82	18.35	29.52	9.5	4.9	1.28	0.2	0.13	0.3	NA	NA	0		751.9	0.3
2007		85.13	47.09	58.49	30.4	29.35	9.04	18.07	6.41	2.67	0.53	0.24	0.07	NA	NA	0		287.5	0.07
2008		50.87	94.2	199.85	288.71	116.17	72.91	21.82	14.43	2.8	0.81	0.04	0.01	0.01	NA	0		862.6	0.02
2009		204.9	25.46	107.83	182.54	138.08	41.48	13.87	4.69	4.32	0.5	0.14	0.02	0.01	NA	0		723.8	0.03
2010		620.25	43.56	22.82	87.98	160.16	154.39	44.56	14.57	3.9	2.89	0.94	0.11	0.12	0.09	0.01		1156.4	0.33
2011		266	91	40.36	28.32	65.2	106.97	101.8	19.76	6.11	1.7	0.92	0.25	0.15	0.09	0.02		728.7	0.51
2012		496.49	40.23	82.79	49.38	33.77	72.53	132.31	65.59	8.37	4.39	1.21	0.66	0.47	0.04	0.1		988.3	1.27
2013		313.11	89.17	60.55	84.49	72.18	47.75	98.41	130.54	55.32	5.41	4.02	1.3	0.73	0.2	0.07		963.3	2.3
2014		1758.58	211.04	286.89	124.18	111.14	74.47	39.41	89.89	61.31	22.64	2.56	1.31	0.16	0.05	0.19		2783.8	1.71
2015		1903.54	211.41	138.71	235.58	128.8	140.36	80.55	35.07	53.8	24.38	7.91	0.8	0.13	0.05	0.01		2961.1	0.99
2016		240.8	201.89	56.29	76.91	119.38	64.84	50.17	25.8	13.49	17.83	7.35	2.15	0.72	0.22	0.1		877.9	3.19
2017		439.4	73.3	111.54	42.35	44.25	65.3	35.75	24.31	11.97	4	2.88	3.15	0.67	0.19	0.11		859.2	4.12
2018		2057.6	280.29	109.03	149.94	53.4	54.93	66.09	34.35	10.78	6.27	1.73	2.25	1.5	0.15	0.23		2828.5	4.13
2019		1437.21	362.38	203.63	125.42	144.06	60.98	34.99	37.86	9.64	3.47	0.55	0.32	0.18	0.28	0.24		2421.2	1.02
2020		92.68	157.92	117.32	117.32	81.36	90.6	42.35	26.57	21.41	6.23	1.75	0.67	0.66	0.51	0.89		758.2	2.73
2021		45.92	28.51	64.86	59.08	55.48	38.54	30.80	12.41	6.32	4.67	2.17	0.29	0.18	0	0.21		349.4	0.68
2022		524.71	43.42	29.42	52.98	56.69	47.05	42.94	27.77	7.85	2.44	1.51	0.94	0.18	0	0.28		838.2	1.40
2023		244.43	103.24	28.66	26.54	33.54	33.83	23.81	12.62	7.08	1.58	0.33	0.11	0.04	0.00	0.08		515.9	0.23
2024		328.44	200.98	150.72	50.97	29.34	27.31	28.25	18.83	11.29	3.82	0.43	0.12	0.02	0.05	0.01		850.6	0.20

2025		198.95	106.07	130.40	153.29	54.85	27.37	23.40	19.65	8.96	3.39	0.92	0.33	0.09	0.01	0.01		727.8	0.44
2026		293.13	32.38	25.34	69.06	92.23	39.73	20.8	15.51	10.46	4.39	1.45	0.44	0.01	0	0.01		604.93	0.46

Table A3. North-East Arctic COD. Abundance indices (millions) from the Norwegian bottom trawl survey in the Barents Sea in January-March. Rock-hopper gear (1981-1988 back-calculated from bobbins gear). Corrected for length-dependent effective spread of trawl. Data f rom 1994 and onwards corrected - WD 1, WKBarFar 2021

				Age															
Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	10+	Total	12+
1981		4.60	34.30	16.40	23.30	40.00	38.40	4.80	1.00	0.30							0.00	163.1	
1982		0.80	2.90	28.30	27.70	23.60	15.50	16.00	1.40	0.20							0.00	116.4	
1983		152.90	13.40	24.95	52.34	43.33	16.96	5.82	3.21	0.97							0.05	313.9	
1984		2755.04	379.11	97.49	28.28	21.44	11.74	4.07	0.40	0.08							0.08	3297.7	
1985		49.49	660.04	166.79	125.98	19.92	7.67	3.34	0.21	0.07							0.05	1033.6	
1986		665.79	399.61	805.00	143.93	64.14	8.30	1.91	0.34	0.04							0.03	2089.1	
1987		30.72	444.98	240.38	391.15	54.35	15.70	2.00	0.45	0.03							0.00	1179.8	
1988		3.21	72.83	148.03	80.49	173.31	20.48	3.58	0.53	0.03							0.00	502.5	
1989		8.24	15.62	46.36	75.86	37.79	90.19	9.82	0.94	0.10							0.07	285.0	
1990		207.17	56.72	28.35	34.87	34.59	20.56	27.23	1.61	0.38							0.03	411.5	
1991		460.45	220.14	45.85	33.67	25.65	21.49	12.15	12.67	0.61							0.02	832.7	
1992		126.56	570.92	158.26	57.71	17.82	12.83	7.67	4.29	2.72							0.22	959.0	
1993		534.48	420.40	273.89	140.13	72.48	15.83	6.24	3.89	2.23							2.36	1471.9	
1994		1043.78	556.68	293.92	307.04	153.33	45.72	7.95	2.61	1.48	0.55	0.55	0.08	0.05	NA	0		2413.7	0.13
1995		5356.43	541.25	282.84	242.36	251.01	76.42	17.98	2.42	1.07	0.5	0.61	0.19	NA	NA	0		6773.1	0.19
1996		5899.23	791.62	163.08	117.43	138.59	108.88	24.43	2.64	0.37	0.17	0.12	0.07	0.07	0.02	0		7246.7	0.16

1997		5044.09	1422.92	317.99	68.44	74.26	59.99	26.67	4.85	0.64	0.91	0.08	NA	NA	NA	0		7020.8	0.00
1998		2490.54	496.48	355.1	166.94	31.67	26.15	17.52	8.16	0.79	0.52	0.04	NA	NA	NA	0.04		3594.0	0.04
1999		473.04	350.21	188.48	180.75	61.39	12.71	6.81	5.14	1.01	0.26	0.02	0.04	0.02	NA	0		1279.9	0.06
2000		128.57	242.33	245.81	130.03	111.73	26.75	4.56	1.84	1.21	0.33	0.1	0.03	0.02	NA	0		893.3	0.05
2001		712.77	78.03	182.79	195.11	82.9	37.96	9.45	1.17	0.44	0.19	0.04	NA	NA	NA	0.01		1300.9	0.01
2002		34.11	418.73	118.36	137.56	108.95	45.79	14.4	2.2	0.32	0.18	0.05	NA	NA	NA	0.02		880.7	0.02
2003		3022.23	65.78	376.7	126.31	93.93	66.88	17.5	4.67	1.02	0.17	0.04	NA	0.02	0.02	0		3775.3	0.04
2004		322.87	242.94	63.88	184.62	53.46	43.24	30.59	6.85	1.65	0.28	0.07	0.01	0.01	NA	0		950.5	0.02
2005		853.43	216.67	248.88	55.06	102.97	22.38	16.36	3.81	0.92	0.3	0.04	0.02	0.04	0.04	0		1520.9	0.10
2006		674.21	289.39	116.49	115.38	28.32	43.42	13.72	5.24	1.36	0.24	0.18	0.18	NA	NA	0		1288.1	0.18
2007		594.69	369.74	361.13	127.73	68.51	13.65	23.6	6.82	2.3	0.41	0.11	0.1	NA	NA	0		1568.8	0.10
2008		68.83	101.96	194.37	300.59	111.9	40.24	17.34	8.11	1.79	0.36	0.03	0.02	0.01	NA	0		845.6	0.03
2009		389.48	35.59	126.28	196.7	220.23	60.69	17.9	9.02	5.24	0.51	0.17	0.03	0.04	NA	0		1061.9	0.07
2010		1027.59	95.14	36.81	114.25	154.80	144.50	39.56	11.24	3.67	1.60	0.58	0.04	0.02	0.04	0.02		1629.9	0.12
2011		617.18	225.81	85.40	50.37	129.70	138.66	103.51	16.37	4.36	1.20	0.82	0.19	0.14	0.04	0.02		1373.8	0.39
2012		702.97	100.30	75.72	64.59	33.71	90.69	132.58	48.61	9.02	2.26	0.88	0.55	0.44	0.07	0.05		1262.4	1.11
2013		435.72	142.96	68.84	114.09	63.18	40.43	64.54	76.38	33.52	2.22	2.87	0.40	0.35	0.06	0.03		1045.6	0.84
2014		1245.71	191.48	226.85	93.79	88.59	56.39	32.74	53.05	36.19	9.81	1.01	0.95	0.15	0.02	0.08		2036.8	1.20
2015		1642.00	342.76	144.07	228.25	147.29	113.53	74.43	29.22	53.51	18.08	3.38	0.75	0.12	0.07	0.04		2797.5	0.98
2016		312.16	305.57	99.37	135.48	188.31	113.47	72.33	28.56	13.17	16.06	6.77	0.97	0.52	0.17	0.14		1293.1	1.80
2017		644.51	128.92	179.25	62.15	84.54	90.16	37.82	26.33	8.18	3.26	2.61	3.70	0.58	0.17	0.06		1272.2	4.51
2018		2714.35	500.69	139.41	184.78	61.81	64.17	73.88	25.88	9.28	5.87	1.29	2.46	1.23	0.13	0.37		3785.6	4.19
2019		1790.57	559.44	281.57	179.15	221.90	79.65	32.96	38.31	8.15	2.62	0.54	0.24	0.16	0.18	0.12		3195.6	0.70
2020		164.75	273.82	237.73	160.24	131.56	114.88	49.83	24.26	20.44	4.53	1.66	0.93	0.51	0.26	0.73		1186.1	2.43

2021		80.88	34.87	111.50	119.35	112.31	54.28	37.98	13.57	7.27	3.53	1.25	0.42	0.25	0.04	0.32		577.8	1.03
2022		667.82	65.64	51.98	88.68	86.60	66.51	44.60	30.42	5.70	2.29	2.08	1.49	0.16	0.00	0.90		1114.9	2.55
2023		305.40	163.06	41.21	39.82	46.52	43.17	32.24	14.26	7.49	1.58	0.34	0.14	0.06	0.00	0.14		695.4	0.35
2024		377.90	307.04	198.71	63.31	36.21	29.96	28.22	16.15	8.90	2.68	0.37	0.10	0.02	0.01	0.07		1069.65	0.20
2025		165.47	119.23	154.43	168.18	57.63	29.76	23.50	18.97	9.53	3.55	0.85	0.33	0.08	0.01	0.07		751.59	0.49
2026		224.72	45.49	43.06	105.07	133.55	42.26	21.00	15.20	7.89	3.51	1.22	0.36	0.03	0.00	0.03		643.39	0.42

Table A4. North East Arctic COD. Abundance at age (millions) from the Norwegian acoustic survey on the spawning grounds off Lofoten in March-April.

Year	5	6	7	8	9	10	11	12+	Sum
1985	0.68	7.45	12.36	3.11	1.15	1.01	0.45		26.21
1986	2.49	3.30	5.54	2.71	0.16		0.40	0.08	14.68
1987	8.77	7.04	0.23	2.83	0.04		0.03	0.03	18.97
1988	1.57	4.43	2.56	0.05	0.01	0.05			8.67
1989	0.04	13.20	9.73	2.20	0.38	0.12		0.06	25.73
1990	0.13	2.60	27.02	4.85	0.49	0.32			35.41
1991	0.00	5.00	19.83	32.67	2.75	0.19	0.17		60.61
1992	2.74	5.23	20.80	20.87	79.60	4.17	1.61	0.22	135.24
1993	4.87	14.58	17.35	20.22	25.44	41.95	4.74	0.71	129.86
1994	23.78	25.85	10.36	8.21	7.68	3.49	17.53	2.61	99.51
1995	6.49	35.24	12.34	2.27	3.60	2.56	2.15	7.96	72.61
1996	1.41	14.43	24.00	3.65	0.79	0.25	0.80	1.30	46.63
1997	0.40	4.95	27.56	16.50	1.50	0.42		0.75	52.08
1998	0.05	0.30	7.06	11.05	3.24	0.51	0.18	0.02	22.41
1999	0.25	1.92	4.84	14.58	8.42	0.75	0.19	0.10	31.05
2000	3.61	3.85	3.25	2.15	2.23	0.45	0.39	0.05	15.98
2001	4.33	17.61	8.03	0.96	0.33	0.36	0.26	0.09	31.97
2002	2.30	19.11	16.50	6.49	0.83	0.31	0.47	0.01	46.02
2003	2.49	29.56	30.01	13.46	1.90	0.11	0.04	0.02	77.59
2004	1.96	17.52	29.82	16.34	7.67	2.04	0.15	0.68	76.18
2005	3.33	12.93	28.75	13.06	6.51	1.55	0.06	0.16	66.35
2006	0.20	12.50	8.11	10.98	7.42	2.12	0.16	0.66	42.14
2007	1.46	3.88	28.52	8.69	5.35	2.80	0.68	0.36	51.72
2008	0.45	5.96	2.95	20.72	2.70	2.02	1.66	0.71	37.17
2009	3.42	14.48	27.64	8.10	22.31	3.07	1.56	0.37	80.95
2010	0.96	20.06	16.98	16.84	6.89	9.61	3.05	2.60	76.96
2011	2.01	51.73	170.09	44.72	17.16	5.12	6.54	0.40	297.76
2012	0.46	12.56	91.58	67.75	17.30	5.98	2.59	1.53	199.76
2013	0.22	5.89	33.69	101.76	106.39	16.08	7.05	6.48	277.56
2014	0.25	2.82	15.49	58.75	112.10	75.33	12.07	8.82	285.62
2015	0.87	1.40	15.42	14.73	42.98	44.20	24.62	11.75	155.97
2016	0.24	1.46	9.05	14.53	22.06	38.65	27.06	25.45	138.51

2017	0.17	7.51	12.84	21.94	14.79	12.70	11.67	18.84	100.46
2018	0.61	3.28	11.11	11.21	8.44	7.82	4.42	9.60	56.50
2019	0.25	2.35	13.34	36.00	17.68	18.35	5.96	9.93	103.87
2020	0.58	3.17	7.75	24.37	28.05	13.28	6.66	5.29	89.15
2021	0.34	1.68	6.13	3.90	5.04	9.68	5.99	2.77	35.53
2022	0.31	3.34	4.58	6.70	3.77	4.39	3.75	2.53	29.37
2023	0.08	0.72	4.01	5.73	6.45	1.66	1.40	1.28	21.34
2024	0.55	1.31	2.10	7.63	7.23	2.12	0.68	0.00	21.62
2025	0.00	0.13	0.68	1.64	1.98	0.53	0.57	0.19	5.73
2026	1.82	1.05	1.49	2.20	5.12	2.00	0.68	0.10	14.46

Table A5. North East Arctic COD. Length (cm) at-age in the Barents Sea from the investigations winter survey in February. Data for ages 1-11 from 1994 and onwards - WD 1, WKBarFar 2021.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1981	17.0	26.1	35.5	44.7	52.0	61.3	69.6	77.9						
1982	14.8	25.8	37.6	46.3	54.7	63.1	70.8	82.9						
1983	12.8	27.6	34.8	45.9	54.5	62.7	73.1	78.6						
1984	14.2	28.4	35.8	48.6	56.6	66.2	74.1	79.7						
1985	16.5	23.7	40.3	48.7	61.3	71.1	81.2	85.7						
1986	11.9	21.6	34.4	49.9	59.8	69.4	80.3	93.8						
1987	13.9	21.0	31.8	41.3	56.3	66.3	77.6	87.9						
1988	15.3	23.3	29.7	38.7	47.6	56.8	71.7	79.4						
1989	12.5	25.4	34.7	39.9	46.8	56.2	67.0	83.3						
1990	14.4	27.9	39.4	47.1	53.8	60.6	68.2	79.2						
1991	13.6	27.2	41.6	51.7	59.5	67.1	72.3	77.6						
1992	13.2	23.9	41.3	49.9	60.2	68.4	76.1	82.8						
1993	11.3	20.3	35.9	50.8	59.0	68.2	76.8	85.8						
1994	11.3	17.9	30.2	44.6	55.2	65.7	73.9	78.9	87.4	97.2	97.6	104.7	122.4	
1995	12.2	18.1	29.0	42.2	53.9	63.9	75.4	80.4	85.9	99.1	90.1	109.0		
1996	12.1	18.8	28.8	40.5	49.4	60.9	71.8	85.1	92.4	94.9	96.1	104.2	103.9	121.0
1997	10.8	16.9	29.7	41.0	50.6	59.4	69.6	81.2	92.3	80.4	103.2			
1998	10.5	17.8	30.8	40.9	50.9	58.5	67.7	76.7	87.2	103.0	111.4		105.9	
1999	12.0	18.4	29.0	40.0	50.4	59.4	70.4	78.4	88.5	87.6	117.0	62.0	108.0	
2000	12.8	20.7	28.4	39.7	51.5	61.4	70.4	76.3	84.9	84.3	100.0	116.2	90.0	
2001	11.6	22.6	33.0	41.2	52.2	63.3	70.4	78.3	86.0	95.7	104.7			
2002	12.0	19.6	28.9	43.6	52.1	61.9	71.4	79.5	91.2	89.7	103.7			
2003	11.4	18.1	29.1	39.7	53.4	61.7	70.6	80.8	89.1	90.1	105.4		104.3	110.5
2004	10.6	18.4	31.7	40.6	51.7	61.6	68.6	79.7	90.9	90.4	92.2	116.0	112.0	

2005	11.2	18.3	29.5	43.4	51.1	60.4	71.0	79.6	89.0	96.4	109.3	113.7	129.6	107.0
2006	12.0	19.4	30.9	42.1	53.8	60.3	66.7	76.7	84.9	98.9	95.4	84.9		
2007	13.2	20.7	29.6	41.1	52.8	62.5	70.4	78.2	87.5	92.7	101.8	121.6	110.0	
2008	12.1	22.3	33.0	43.2	51.8	64.0	69.9	81.3	88.7	95.3	108.9	103.0	102.0	
2009	11.2	21.1	32.1	42.6	53.2	61.9	76.6	81.8	89.5	97.8	99.5	94.2	110.0	
2010	11.2	18.4	31.4	42.7	52.4	60.7	70.5	80.4	88.8	96.3	102.2	99.8	100.8	126.0
2011	11.9	19.5	29.4	41.9	51.0	60.7	68.1	78.3	86.1	95.4	102.2	110.4	114.3	116.9
2012	10.6	18.4	29.7	41.0	52.4	58.1	66.5	75.6	86.0	91.8	105.9	114.0	119.0	115.5
2013	11.2	19.3	31.1	41.1	51.7	62.0	69.7	76.5	81.2	95.3	93.7	110.7	110.8	145.0
2014	9.7	17.1	29.5	40.5	52.0	59.6	70.2	76.8	81.8	87.1	97.4	98.9	107.8	91.1
2015	10.5	15.9	30.0	40.3	51.1	60.2	68.8	77.5	81.2	88.7	94.0	101.9	127.5	121.1
2016	12.2	18.3	27.7	40.6	49.8	60.5	68.3	76.6	85.5	86.5	90.5	94.1	112.0	122.5
2017	12.3	22.2	31.2	42.5	51.2	60.5	69.6	75.5	85.2	90.9	96.0	92.6	108.6	108.7
2018	11.2	19.1	32.7	42.4	51.2	61.6	69.0	77.5	83.4	87.6	97.0	99.3	101.8	106.8
2019	11.7	17.5	31.2	42.4	51.0	59.6	69.7	77.0	84.1	87.1	99.3	103.4	104.6	109.8
2020	12.0	17.5	25.5	39.5	50.2	58.6	66.7	74.8	83.0	90.0	93.9	92.4	111.2	113.9
2021	11.6	19.9	26.5	37.4	48.0	58.5	66.7	74.9	84.0	91.7	97.7	102.1	105.8	115.0
2022	10.8	20.4	32.4	39.1	49.3	58.4	68.7	75.3	84.1	92.5	98.2	102.6	113.2	
2023	11.4	19.7	32.3	42.2	50.0	59.1	67.6	75.9	81.7	86.8	104.2	104.1	115.6	
2024	11.3	18.1	30.9	42.2	50.7	59.6	66.7	76.0	80.4	85.9	96.6	99.5	117.0	117.0
2025	11.6	17.3	27.8	41.0	50.4	58.3	67.9	73.7	81.6	86.2	91.8	101.0	108.2	119.0
2026	10.5	18.0	26.8	37.8	49.0	59.5	68.1	75.2	84.7	89.2	94.7	105.9		

Table A6. North East Arctic COD. Weight (g) at-age in the Barents Sea from the investigations winter survey in February. Data for ages 1-11 from 1994 and onwards - WD 1, WKBarFar 2021.

Year \ Age	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1983	20	190	372	923	1597	2442	3821	4758						
1984	23	219	421	1155	1806	2793	3777	4566						
1985	20	171	576	1003	2019	3353	5015	6154						
1986	20	119	377	997	1623	2926	3838	7385						
1987	21	65	230	490	1380	2300	3970	6000						
1988	24	114	241	492	892	1635	3040	4373						
1989	16	158	374	604	947	1535	2582	4906	10943	5226				
1990	26	217	580	1009	1435	1977	2829	4435	10772	11045	9615			
1991	18	196	805	1364	2067	2806	3557	4502	7404	13447				
1992	20	136	619	1118	1912	2792	3933	5127	6420	8103	17705	22060		
1993	9	71	415	1179	1743	2742	3977	5758	7068	7515	7521	10744		
1994	13	56	262	796	1470	2386	3481	4603	6777	8195	8516	13972		

1995	15	54	240	658	1336	2207	3570	4715	5712	8816	6817	12331		
1996	15	62	232	627	1084	1980	3343	5514	7722	8873	9613	12865	12556	
1997	13	52	230	638	1175	1797	2931	4875	7529	5739	10194			
1998	11	52	280	635	1182	1728	2588	4026	6076	11257	14391			
1999	14	59	231	592	1178	1829	2991	4128	6321	7342				
2000	16	74	210	558	1210	1963	3036	3867	5401	6154	10023			
2001	14	106	336	646	1288	2233	3088	4439	5732	8442	11429			
2002	14	67	238	747	1229	2063	3199	4578	7525	6598	12292			
2003	13	61	234	597	1316	2014	2989	4715	6517	7500	12812			
2004	11	59	275	608	1143	1947	2623	4137	6673	7368	8109			
2005	13	61	246	723	1146	1866	2949	4226	6436	8646	12537		24221	11640
2006	13	69	280	669	1420	1970	2641	4260	5914	10179	9439	8328		
2007	19	73	235	639	1302	2190	3039	4411	6394	8056	10826	20104		
2008	15	90	335	798	1399	2442	3235	5210	6981	9641				
2009	13	83	294	704	1302	2065	4067	5087	6874	9460	9511			
2010	12	64	304	700	1296	2033	3162	4743	6562	8984	10315			22766
2011	15	66	246	668	1131	1940	2726	4013	5969	8275	10309	13159	14868	
2012	13	62	252	609	1276	1681	2489	3764	5920	7809	12199	15006	17582	
2013	11	65	269	602	1208	2055	2809	3843	4822	8447	9101	15108	14743	
2014	8	50	246	603	1226	1780	2866	3930	4927	6203	8570	9566	12239	
2015	10	44	242	602	1221	1929	2741	4043	4804	6817	7759	11544	21652	
2016	13	53	200	593	1049	1928	2674	3830	5540	6129	7110	8272	15256	21945
2017	15	102	292	720	1178	1972	3056	3962	5901	7429	9301	8599	12958	14894
2018	12	69	320	688	1228	2062	2803	4154	5409	6632	9156	10510	11810	12443
2019	12	48	273	685	1164	1870	2916	3974	5394	6068	9637	11507	12371	13993
2020	14	44	153	548	1077	1692	2476	3625	5074	6758	8040	8107	14892	15793
2021	14	68	164	462	910	1682	2484	3620	5379	7160	9313	10923	12410	
2022	11	77	311	535	1052	1716	2885	3855	5321	7751	9538	11432	14940	
2023	12	71	316	694	1111	1757	2802	4097	5119	6443	10937	10668	14732	
2024	12	57	289	701	1133	1855	2571	3834	4994	5931	8809	10805	17000	
2025	13	51	217	648	1176	1778	2678	3516	5033	6267	7722	10640	13730	
2026	11	53	195	488	996	1791	2611	3504	5387	6473	7981	12716		

Table A7. Northeast Arctic COD. Length at age in cm in the Lofoten survey.

Year/age	5	6	7	8	9	10	11	12	13	14	12+
1985	59.6	71.1	79.0	88.2	97.3	105.2	114.0				
1986	62.7	70.0	80.0	89.4	86.6		105.8				115.0
1987	58.2	64.5	76.7	86.2	88.0		118.5				116.0

1988	53.1	67.1	71.6	94.0	97.0	119.6					
1989	54.0	59.0	69.8	80.8	96.6	103.0					125.0
1990	56.9	65.1	69.2	79.5	83.7	100.1					
1991	59.0	67.3	74.4	81.0	91.3	99.8	85.0				
1992	66.3	68.7	78.3	83.9	89.2	92.2	101.9				127.0
1993	58.3	66.1	72.8	83.6	87.4	92.7	95.4				111.2
1994	64.3	70.6	82.0	87.3	90.0	95.3	92.4				101.4
1995	61.5	69.7	77.8	84.4	92.6	96.7	100.3				99.5
1996	62.2	67.1	75.9	81.0	93.6	100.9	97.4				104.1
1997	63.7	68.6	74.2	83.8	99.9	108.4					109.0
1998	55.0	62.6	70.2	80.0	92.0	98.0	96.7				115.0
1999	52.7	67.0	69.4	78.6	85.8	100.3	102.0				125.0
2000	58.4	66.5	72.6	77.0	83.9	90.6	93.7				112.4
2001	59.3	66.9	73.2	87.1	88.7	102.8	98.5				128.2
2002	58.6	66.0	73.2	80.8	88.2	101.8	91.0				101.4
2003	62.3	65.0	73.2	80.9	88.9	86.4	120.0				122.0
2004	58.8	64.7	71.2	80.1	85.6	97.0	102.6				115.8
2005	56.3	65.4	72.3	76.0	85.3	95.5	110.5				117.8
2006	56.2	63.7	72.6	77.5	82.9	88.3	89.2				116.3
2007	63.0	66.4	72.4	82.5	88.2	99.8	103.7				115.0
2008	63.8	69.1	73.6	80.9	90.0	94.9	94.9				96.5
2009	60.5	69.3	76.5	82.7	88.7	98.8	92.9				111.6
2010	59.9	64.9	73.6	83.3	89.2	96.3	100.8	103.1	118.2	123.0	
2011	57.1	64.3	70.0	79.9	91.2	98.3	101.6	103.6	110.0	102.0	
2012	65.3	65.1	69.9	76.6	85.3	98.7	104.6	103.9	116.2	89.0	
2013	63.6	68.7	73.0	78.4	83.5	90.9	99.1	96.6	103.0	116.8	
2014	55.9	66.0	74.5	77.9	82.8	86.8	93.4	99.1	109.2	116.0	
2015	61.0	66.5	72.9	78.6	83.4	89.0	95.4	99.5	106.1	114.5	
2016	64.0	63.0	74.3	81.1	88.8	93.2	95.5	97.1	103.2	117.1	
2017	58.0	64.8	70.7	81.6	87.3	94.8	98.7	99.4	102.7	106.1	
2018	67.9	67.3	72.9	79.5	89.4	93.6	99.3	104.9	104.3	107.9	
2019	59.9	69.4	74.7	81.4	87.9	93.9	98.1	106.2	111.1	109.8	
2020	66.1	68.3	75.1	81.8	88.9	95.1	96.3	106.0	109.5	109.1	
2021	63.3	66.3	74.3	78.6	89.4	93.3	96.9	103.7	103.1	108.4	
2022	61.4	67.9	72.9	81.0	88.4	96.5	100.1	98.3	99.3	104.0	
2023	60.0	69.1	76.7	80.5	87.1	93.1	99.3	107.2	114.0	120.6	
2024	52.2	64.7	73.5	77.9	81.7	91.3	96.4				

2025	59.0	65.0	73.5	80.6	86.8	91.2	97.2	99.8	97.7		
2026	51.7	64.3	71.6	79.7	88.3	97.1	97.6	108.8	116.0		

Table A8. Northeast Arctic COD. Mean weight-at-age (kg) in the Lofoten survey.

Year	5	6	7	8	9	10	11	12	13	14+	12+
1985	2.00	3.42	4.61	6.67	8.89	10.73	14.29				
1986	2.22	3.22	4.74	6.40	5.80		10.84				13.48
1987	1.44	1.94	3.61	5.40	5.64		13.15				12.55
1988	1.46	2.82	3.39	6.63	7.27	13.64					
1989	1.30	1.77	2.89	4.74	8.28	9.98					26.00
1990	1.54	2.32	2.55	3.78	4.77	8.80					
1991	2.21	2.52	3.51	5.18	7.40	11.36	5.35				
1992	2.56	2.85	3.99	5.43	6.35	8.03	9.50				17.80
1993	1.79	2.58	3.55	5.31	6.21	7.69	9.28				14.71
1994	2.31	3.27	5.06	6.39	6.64	7.92	7.73				10.10
1995	2.20	3.24	4.83	5.98	7.80	10.03	10.39				10.68
1996	2.22	2.75	4.11	5.63	7.92	10.53	10.58				12.08
1997	2.42	2.92	3.86	5.71	9.65	13.41					12.67
1998	1.88	2.09	2.98	4.85	7.92	9.91	11.05				18.34
1999	1.51	2.80	2.96	4.22	5.92	9.33	9.17				16.00
2000	1.71	2.50	3.16	3.85	5.32	7.07	7.62				12.84
2001	1.90	2.72	3.49	6.23	6.82	10.95	10.29				28.58
2002	1.87	2.57	3.52	4.71	6.18	10.56	8.70				10.48
2003	2.30	2.34	3.48	4.59	5.89	8.07	24.50				27.70
2004	1.74	2.30	3.02	4.50	5.77	7.81	9.95				13.25
2005	1.56	2.40	3.20	3.71	5.79	8.52	16.27				18.63
2006	1.54	2.35	3.44	4.19	5.43	6.57	6.19				18.15
2007	2.34	2.67	3.53	5.30	6.70	9.95	11.24				16.62
2008	2.21	2.97	3.63	4.88	6.74	8.18	7.70				9.07
2009	2.04	2.98	4.10	5.19	6.56	9.38	8.58				15.67
2010	1.90	2.46	3.47	5.13	6.26	7.83	9.59	10.77	18.31	20.84	
2011	1.66	2.28	2.89	4.52	6.82	8.82	9.55	9.08	13.38	10.70	
2012	3.07	2.47	2.93	3.89	5.37	8.79	11.53	12.28	15.04	5.41	
2013	2.49	3.05	3.52	4.46	5.54	7.56	10.26	10.23	11.49	16.61	
2014	1.90	2.52	3.80	4.04	5.06	5.96	7.36	9.01	12.20	16.95	
2015	2.16	2.62	3.42	3.95	5.21	6.53	8.32	9.95	12.45	14.21	
2016	2.53	2.31	3.72	5.05	6.79	8.03	8.93	9.02	12.12	18.46	
2017	2.01	2.52	2.94	4.91	5.75	7.16	8.18	9.10	10.49	11.59	

2018	3.25	2.77	3.41	4.53	6.51	7.94	9.65	12.05	12.04	12.85	
2019	2.12	3.02	3.76	4.81	6.07	7.44	8.71	11.06	13.86	13.40	
2020	2.75	2.79	3.64	4.69	6.06	7.78	8.70	10.86	12.93	13.95	
2021	2.30	2.62	3.76	4.40	6.59	7.39	8.56	10.15	11.821	14.79	
2022	2.61	3.00	3.59	5.01	7.15	8.34	9.34	9.35	9.41	11.63	
2023	1.86	2.94	4.16	4.84	6.00	7.19	9.36	11.88	15.31	17.69	
2024	1.13	2.32	3.95	4.38	5.68	7.16	9.72				
2025	1.44	2.50	3.46	4.59	5.87	7.02	8.41	9.44	8.17		
2026	1.16	2.28	3.32	4.55	6.04	8.26	7.98	12.57	14.74		

Table A9. Northeast Arctic COD. Results from the Russian trawl-acoustic survey in the Barents Sea and adjacent waters in the autumn. Stock number in millions.

Year					Age							
		1	2	3	4	5	6	7	8	9	10+	Total
1985	[1]	77	569	400	568	244	51	20	8	1	3	1941
1986	[1]	25	129	899	612	238	69	20	3	2	1	1998
1987	[2]	2	58	103	855	198	82	19	4	1	1	1323
1988	[2]	3	23	96	100	305	54	16	3	1	1	602
1989	[1]	1	3	17	45	57	91	75	25	13	5	332
1990	[1]	36	27	8	27	62	74	91	39	10	3	377
1991	[1]	63	65	96	45	50	54	66	49	5	1	494
1992	[1]	133	399	380	121	56	58	33	29	11	2	1222
1993	[1]	20	44	220	234	164	51	19	13	8	10	783
1994	[1]	105	38	147	275	303	314	100	35	10	8	1335
1995	[1]	242	42	111	219	229	97	21	6	2	2	971
1996	[1,3,5]	424	275	189	316	449	314	126	27	3	4	2127
1997	[4,5]	72	160	263	198	112	57	27	9	1	1	900
1998	[1]	26	86	279	186	57	23	10	4	1	0	672
1999	[1]	19	79	166	260	98	20	8	5	2	1	658
2000	[1,rev]	24	82	191	159	127	48	6	3	1	1	642
2001	[1]	38	59	148	204	120	70	14	2	1		656
2002	[1,5,6]	83	2	106	85	140	151	67	30	7	1	672
2003		69	36	25	218	142	167	163	60	23	4	908
2004		375	35	170	85	345	194	229	167	49	19	1669
2005		112	48	65	154	70	214	68	47	17	8	803
2006	[7]	12	20	39	49	78	32	64	23	13	8	341
2007		13	35	165	372	208	189	74	113	32	20	1221
[1]	October-December											

[2]	September-October
[3]	Area IIb not covered
[4]	Areas IIa, IIb covered in October-December, part of Area I covered in February-March 1998
[5]	Adjusted for incomplete area coverage
[6]	Area IIa not covered
[7]	Area I not fully covered

Table A10. Northeast Arctic COD. Abundance indices (millions) from the Russian bottom trawl survey in the Barents Sea. Total (Sub-area I and Division IIa and IIb) .

Year			Age												
	0	1	2	3	4	5	6	7	8	9	10	11	12	13+	Sum
1982	849.3	1905.3	33.2	141.3	152.5	72.1	19.8	55.1	17.4	3.7	1.9	1.5	0.1	0.0	3253.3
1983	1872.2	2003.4	73.2	52.0	64.2	50.6	35.8	17.9	25.2	9.4	0	0	0	0	4203.9
1984	363.3	180.5	104.4	118.9	70.0	48.9	35.7	15.4	6.9	6.1	1.7	1.5	0.6	0.2	954.0
1985	284.6	15.6	129.0	118.8	159.2	106.8	36.5	16.5	3.7	0.8	1.6	0.1	2.1	0.0	875.3
1986	329.9	7.6	31.7	162.2	153.2	149.3	48.1	18.9	4.2	0.2	0.6	0.0	0.0	0.0	905.9
1987	7.7	1.3	46.9	55.7	307.6	90.0	70.1	18.4	6.0	2.5	0.4	0.1	0.3	0.0	607.0
1988	92.5	2.9	31.3	99.3	93.8	287.9	58.3	26.0	4.7	2.4	0.1	0.0	0.0	0.0	699.2
1989	355.8	3.0	14.7	49.0	97.8	106.2	145.4	116.7	29.9	11.2	4.7	1.8	0.7	0.5	937.4
1990	1248.4	31.1	51.0	16.7	48.7	62.7	97.2	153.8	67.3	15.3	4.9	0.9	0.2	0.0	1798.2
1991	974.0	64.0	91.1	107.7	48.4	53.2	58.3	68.5	74.7	9.8	1.4	0.3	0.0	0.0	1551.4
1992	1204.8	157.7	151.1	67.5	30.8	23.9	27.3	21.8	17.5	2.5	2.5	0.4	0.0	0.0	1707.8
1993	484.8	38.0	158.6	160.4	113.5	68.1	41.6	35.4	8.7	0.3	0.7	0.1	0.1	0.0	1110.3
1994	1606.6	833.2	69.9	136.3	130.9	101.9	35.4	12.8	4.9	2.1	1.1	0.6	0.2	0.0	2935.9
1995	5703.5	471.9	36.9	58.9	106.5	139.5	84.9	25.1	8.3	1.9	1.8	0.9	0.6	0.0	6640.8
1996	2660.3	396.5	128.5	73.3	78.4	103.5	77.3	34.8	13.2	1.9	0.5	1.2	0.2	0.0	3569.6
1997	1371.4	353.9	135.3	134.2	83.5	61.3	60.2	34.8	11.6	3.2	3.0	0.0	0.0	0.0	2252.4
1998	304.8	276.8	89.6	202.8	136.3	78.8	47.0	25.9	13.0	4.8	0.5	0.0	0.1	0.0	1180.4
1999	266.9	40.1	118.4	158.7	207.2	98.0	30.1	12.3	9.4	4.2	0.4	0.0	0.0	0.0	945.7
2000	1436.5	37.7	103.6	183.9	128.6	178.6	77.3	11.4	5.2	2.3	0.9	0.4	0.0	0.0	2166.4
2001	321.6	233.8	77.3	122.4	155.7	129.0	106.1	30.4	5.0	1.4	0.5	2.5	1.3	0.0	1187.1
2002	1797.9	26.7	135.6	98.0	147.3	147.3	89.6	60.0	18.2	2.9	0.8	0.1	0.1	0.0	2524.4
2003	489.5	517.5	26.8	124.6	105.7	116.6	120.3	53.5	24.1	4.0	0.9	0.3	0.0	0.1	1583.9
2004	1770.4	158.4	87.5	32.9	157.6	88.0	111.1	77.6	27.9	9.3	2.3	0.4	0.2	0.0	2523.6
2005	2298.0	323.9	61.7	140.8	63.1	183.2	74.4	60.5	24.4	8.8	2.8	0.6	0.1	0.0	3242.4
2006	427.4	52.4	63.2	92.7	161.3	77.7	180.1	66.2	34.2	16.1	4.3	1.7	0.7	0.0	1178.1
2007	177.5	37.0	148.6	257.9	161.7	190.3	84.6	152.5	55.3	22.6	8.6	4.9	1.1	0.7	1303.3
2008	1468.6	45.2	86.3	220.3	308.8	163.5	147.2	83.0	86.3	29.1	11.5	3.3	1.7	0.2	2654.9

2009	1877.7	287.8	21.9	97.4	231.7	368.7	201.6	117.5	62.0	41.3	20.5	6.5	3.2	0.9	3338.7
2010	2210.4	214.9	47.0	33.4	107.0	250.5	371.5	181.7	78.9	39.5	29.9	15.6	5.5	2.0	3587.7
2011	2296.1	125.9	80.0	88.2	50.8	143.2	306.5	330.0	91.7	43.9	17.6	17.5	7.0	3.5	3602.1
2012	1096.0	196.2	45.1	81.5	111.4	83.9	212.2	335.8	187.8	43.2	19.5	4.6	5.7	1.9	2424.8
2013	297.1	654.0	107.6	74.7	117.4	117.7	88.4	234.9	313.2	136.7	30.6	9.2	5.4	4.5	2191.5
2014	909.7	211.0	72.1	139.9	136.8	172.5	148.3	111.1	192.9	129.7	38.3	9.3	3.5	2.0	2277.1
2015	572.9	465.4	51.5	65.7	158.3	174.2	193.2	161.0	92.5	115.8	76.1	24.2	6.5	4.9	2162.0
2016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
2017	4325.9	5257.4	94.5	145.6	88.4	106.3	195.2	123.1	56.7	26.6	12.0	12.0	7.5	2.8	10454.0
2018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
2019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Table A11. Northeast Arctic COD. Length-at-age (cm) from Russian surveys in November-December.

Year	Age												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1984	15.7	22.3	30.7	44.3	51.7	63.6	73.4	82.5	88.4	97.0	-	-	-
1985	15.0	21.1	30.6	43.2	53.7	61.2	72.8	83.0	92.8	101.3	-	-	-
1986	15.2	19.7	28.3	39.0	51.8	62.2	70.9	83.0	91.3	104.0	-	-	-
1987	-	19.2	27.9	33.4	41.4	59.1	69.2	80.1	95.7	102.6	-	-	-
1988	11.3	21.3	28.7	36.2	43.9	53.3	65.3	79.5	85.0	-	-	-	-
1989	-	20.8	28.8	34.8	46.0	53.9	61.8	69.8	78.7	88.6	-	-	-
1990	16.0	24.0	30.4	46.5	54.9	62.5	69.7	77.6	87.8	102.0	-	-	-
1991	11.5	22.4	30.6	43.0	55.9	64.6	72.8	78.5	87.9	101.8	-	-	-
1992	11.3	21.3	31.9	50.1	59.8	69.1	78.6	84.0	90.8	97.5	-	-	-
1993	12.1	17.4	29.1	43.4	52.7	64.3	73.9	81.2	89.1	91.8	-	-	-
1994	12.2	20.3	26.3	33.7	47.4	58.7	70.6	80.8	90.1	96.1	-	-	-
1995	11.6	19.8	27.6	33.8	45.2	60.5	71.1	83.5	92.9	99.1	-	-	-
1996	10.2	20.0	28.1	36.7	48.7	58.9	70.5	80.0	93.6	102.7	-	-	-
1997	9.6	18.5	28.8	38.2	50.8	62.0	70.5	80.1	88.9	103.5	-	-	-
1998	11.4	19.0	28.0	36.4	50.5	61.0	70.7	80.3	91.1	102.5	-	-	-
1999	11.7	19.7	27.9	35.3	51.6	60.6	70.6	78.9	86.8	94.3	-	-	-
2000	10.7	20.8	30.1	34.7	49.8	61.1	71.6	82.0	88.3	85.7	104.2	-	-
2001	10.6	19.4	29.8	37.3	50.4	61.9	71.9	81.4	91.0	98.7	103.8	-	-
2002	10.7	19.2	29.9	38.2	52.5	60.4	70.6	82.2	91.3	97.2	104.1	-	-
2003	9.8	18.9	28.3	34.9	49.2	62.2	71.0	81.5	92.3	100.9	104.3	-	-
2004	9.8	19.6	29.3	38.4	49.1	60.0	70.5	80.0	91.0	98.0	106.0	-	-
2005	11.2	19.4	29.7	38.5	48.7	59.3	69.3	79.2	87.7	96.1	104.4	-	-
2006	13.0	21.9	31.6	42.7	53.2	60.1	70.2	79.1	88.3	95.2	107.7	-	-

2007	10.7	21.5	30.8	42.2	53.6	63.7	71.0	79.6	87.3	95.9	-	-	-
2008	10.2	20.0	30.3	40.2	53.7	64.5	74.6	82.7	89.5	98.2	102.3	110.2	111.9
2009	12.9	19.3	29.5	38.4	50.7	61.5	70.7	81.7	89.9	94.7	101.8	105.9	109.4
2010	11.1	19.3	28.7	38.5	48.9	59.1	68.0	78.4	88.2	97.3	102.5	108.4	117.7
2011	11.2	20.3	29.2	38.5	49.5	58.6	68.7	78.2	90.0	97.9	106.9	109.3	116.0
2012	11.0	20.3	31.1	40.8	50.8	60.7	68.4	77.6	87.4	97.7	105.2	111.7	116.6
2013	9.5	19.5	29.0	40.3	50.4	59.3	67.3	75.3	84.4	95.3	104.5	111.9	119.4
2014	10.1	20.1	29.8	39.2	50.7	60.9	69.4	77.9	85.1	93.6	102.7	113.3	122.8
2015	11.5	19.0	28.5	37.5	48.0	58.4	67.4	76.3	83.5	91.0	98.8	107.1	117.9
2016	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	14.6	20.6	30.6	40.2	51.5	59.3	67.1	76.2	84.9	92.6	97.9	104	110.1
2018	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A12. Northeast Arctic COD. Weight (g) at age from Russian surveys in November-December.

Year	Age												
	0	1	2	3	4	5	6	7	8	9	10	11	12
1984	26	90	250	746	1187	2234	3422	5027	6479	9503	-	-	-
1985	26	80	245	762	1296	1924	3346	5094	7360	6833	11167	-	-
1986	25	63	191	506	1117	1940	2949	4942	7406	9300	-	-	-
1987	-	54	182	316	672	1691	2688	3959	8353	10583	13107	-	-
1988	15	78	223	435	789	1373	2609	4465	5816	-	-	-	-
1989	-	73	216	401	928	1427	2200	3133	4649	6801	8956	-	-
1990	28	106	230	908	1418	2092	2897	4131	6359	10078	13540	-	-
1991	26	93	260	743	1629	2623	3816	4975	7198	11165	15353	-	-
1992	10	76	273	1165	1895	2971	4377	5596	7319	9452	12414	-	-
1993	11	46	211	717	1280	2293	3509	4902	6621	7339	8494	-	-
1994	12	69	153	316	919	1670	2884	4505	6520	8207	9812	-	-
1995	11	61	180	337	861	1987	3298	5427	7614	9787	10757	-	-
1996	7	64	191	436	1035	1834	3329	5001	8203	10898	11358	-	-
1997	6	48	203	487	1176	2142	3220	4805	6925	10823	12426	-	-
1998	11	55	187	435	1186	2050	3096	4759	7044	11207	12593	-	-
1999	10	58	177	371	1214	1925	3064	4378	6128	7843	11543	-	-
2000	8	74	232	379	1101	2128	3341	5054	6560	8497	12353	-	-
2001	9	58	221	459	1125	2078	3329	4950	7270	9541	11672	-	-
2002	8	65	232	505	1299	1964	3271	5325	7249	9195	11389	-	-
2003	6	49	205	492	972	1993	2953	4393	6638	9319	11085	-	-

2004	6	55	231	543	1079	1798	2977	4110	5822	8061	12442	-	-
2005	10	59	223	521	1034	1910	3036	4619	6580	9106	12006	-	-
2006	13	72	270	707	1332	1953	2969	4340	6410	8622	12436	-	-
2007	10	96	252	669	1344	2277	3140	4691	6178	8567	10014	-	-
2008	7	58	228	558	1332	2305	3527	5001	6519	8848	10339	13276	15196
2009	15	54	214	495	1116	2024	3090	4876	6592	8087	10262	11472	13268
2010	9	54	191	794	989	1784	2719	4246	6384	8747	10499	12117	14199
2011	10	63	206	486	1037	1691	2827	4312	6698	8979	11557	12915	15694
2012	9	62	237	561	1087	1877	2688	3974	5930	8495	11000	13377	14826
2013	5	55	202	546	1062	1718	2541	3667	5258	7821	10509	13161	16581
2014	7	64	221	508	1079	1849	2734	3994	5418	7480	10100	14163	18404
2015	11	55	198	452	947	1735	2588	3728	5081	6827	8877	11623	15626
2016	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	22	69	248	571	1150	1771	2539	3819	5426	7554	9236	11220	13536
2018	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A13. Northeast Arctic COD. Sum of acoustic abundance estimates (millions) in the Joint winter Barents Sea survey (Table A2) and the Norwegian Lofoten acoustic survey (Table A4).

						Age								
Year	1	2	3	4	5	6	7	8	9	10	11	12	13+	12+
1985	69.1	446.3	153.0	141.6	20.4	15.1	15.7	3.3	1.3	1.0	0.5	na	na	0.0
1986	353.6	243.9	499.6	134.3	68.4	11.6	7.7	3.1	0.3	0.0	0.4	na	na	0.1
1987	1.6	34.1	62.8	204.9	50.2	17.4	1.4	3.0	0.7	0.0	0.0	na	na	0.0
1988	2.0	26.3	50.4	35.5	57.8	10.9	4.0	0.3	0.0	0.1	0.0	na	na	0.0
1989	7.5	8.0	17.0	34.4	21.4	67.0	16.6	3.2	0.5	0.2	0.0	na	na	0.1
1990	81.1	24.9	14.8	20.6	26.2	26.9	66.8	7.3	0.6	0.3	0.0	na	na	0.0
1991	181.0	219.5	50.2	34.6	29.3	33.9	36.7	50.0	3.7	0.2	0.2	na	na	0.0
1992	241.4	562.1	176.5	65.8	21.5	18.4	28.4	25.4	82.4	4.3	1.7	na	na	0.2
1993	1074.0	494.7	357.2	191.1	113.1	35.4	25.5	25.2	27.7	44.2	4.9	na	na	0.8
1994	902.6	624.4	323.9	374.5	229.3	96.1	23.4	11.8	10.3	4.2	18.7	na	na	2.9
1995	2175.3	212.3	137.7	139.5	203.6	101.6	28.1	4.7	4.5	2.9	2.6	na	na	8.1
1996	1826.3	271.7	99.4	89.6	112.8	97.4	46.2	5.9	1.1	0.4	0.9	na	na	1.5
1997	1698.5	565.3	158.6	44.2	50.3	45.9	51.0	21.5	2.3	0.7	0.1	na	na	0.8
1998	2523.6	475.2	391.2	189.8	44.9	41.5	34.9	27.1	5.1	1.0	0.2	na	na	0.1
1999	364.8	231.5	147.6	130.3	52.3	13.9	11.8	18.7	9.9	1.0	0.2	na	na	0.1
2000	153.4	262.8	294.8	167.3	149.2	54.6	14.6	6.9	5.0	1.3	0.6	na	na	0.2
2001	363.6	51.5	177.4	160.6	85.1	62.1	19.1	2.7	0.8	0.6	0.3	na	na	0.1

2002	19.2	209.1	61.4	106.2	101.1	71.3	36.6	9.4	1.2	0.8	0.6	na	na	0.0
2003	1505.0	52.5	306.7	116.8	127.1	146.1	67.7	23.5	3.8	0.4	0.1	na	na	0.2
2004	161.2	117.2	33.4	85.2	34.9	45.6	48.0	21.7	8.8	2.4	0.2	na	na	0.7
2005	499.7	138.7	125.0	33.3	69.3	34.1	43.8	18.0	7.5	1.8	0.1	na	na	0.3
2006	411.2	158.0	64.8	53.8	18.6	42.0	17.6	15.9	8.7	2.3	0.3	na	na	1.0
2007	85.1	47.1	58.5	30.4	30.8	12.9	46.6	15.1	8.0	3.3	0.9	na	na	0.4
2008	50.9	94.2	199.9	288.7	116.6	78.9	24.8	35.2	5.5	2.8	1.7	na	na	0.7
2009	204.9	25.5	107.8	182.5	141.5	56.0	41.5	12.8	26.6	3.6	1.7	na	na	0.4
2010	620.3	43.6	22.8	88.0	161.4	175.0	61.8	31.4	10.8	12.5	4.0	2.0	0.9	2.9
2011	266.0	91.0	40.4	28.3	67.4	159.5	272.7	64.5	23.3	6.8	7.5	0.4	0.5	0.9
2012	496.5	40.2	82.8	49.4	34.4	89.5	226.6	133.5	25.7	10.4	3.8	1.8	1.0	2.8
2013	313.1	89.2	60.6	84.5	72.4	54.1	133.6	233.8	161.7	21.5	11.1	5.5	3.2	8.8
2014	1758.6	211.0	286.9	124.2	111.5	77.7	55.3	149.0	173.9	98.0	14.6	6.8	3.8	10.5
2015	1903.5	211.4	138.7	235.6	130.0	144.2	96.4	49.8	96.9	68.6	32.5	6.6	6.1	12.7
2016	240.8	201.9	56.3	76.9	119.9	66.4	59.4	40.9	35.6	56.5	34.4	17.6	11.0	28.6
2017	439.4	73.3	111.5	42.4	44.4	74.2	48.6	48.4	26.8	16.7	14.6	15.1	7.8	23.0
2018	2057.6	280.3	109.0	149.9	54.0	58.4	77.5	45.6	19.3	14.1	6.1	6.0	7.8	13.7
2019	1437.2	362.4	203.6	125.4	144.6	63.9	49.3	73.9	27.3	21.8	6.5	2.9	8.1	11.1
2020	92.7	157.9	117.3	117.3	81.9	94.3	50.6	50.9	49.5	19.5	8.4	2.6	5.4	8.0
2021	45.9	28.5	64.9	59.1	55.8	40.2	36.9	16.3	11.4	14.3	8.2	1.9	1.6	3.4
2022	524.7	43.4	29.4	53.0	57.0	50.4	47.5	34.5	11.6	6.8	5.3	2.2	1.8	3.9
2023	244.4	103.2	28.7	26.5	33.6	34.6	27.8	18.3	13.5	3.2	1.7	0.8	0.7	1.5
2024	328.4	201.0	150.7	51.0	29.9	28.6	30.4	26.5	18.5	5.9	1.1	0.1	0.1	0.2
2025	199.0	106.1	130.4	153.3	54.9	27.5	24.1	21.3	10.9	3.9	1.5	0.5	0.2	0.7
2026	293.1	32.4	25.3	69.1	94.1	40.8	22.3	17.7	15.6	6.4	2.1	0.5	0.1	0.6

Table A14. Swept area estimates (millions) of Northeast Arctic Cod from the Joint Norwegian- Russian ecosystem survey in August-September (2020 data are taken from WD 01 AFWG 2021).

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13+
2004	543.0	330.6	329.7	147.7	421.5	150.2	79.8	40.2	10.1	2.2	0.5	0.1	0.1	0.1
2005	180.2	440.7	146.6	216.6	55.8	100.9	28.0	15.6	5.7	1.2	0.5	0.1	0.0	0.1
2006	276.0	479.0	509.7	186.1	205.6	59.9	69.8	17.6	8.1	2.6	0.6	0.2	0.0	0.0
2007	101.0	333.3	505.4	586.2	159.2	79.1	24.6	26.9	6.0	2.2	0.9	0.1	0.2	0.0
2008	483.4	130.9	372.6	652.6	483.4	132.3	51.1	12.8	17.5	3.3	0.9	0.2	0.2	0.2
2009	903.3	569.7	93.5	202.3	280.6	289.6	101.7	31.9	12.7	7.3	2.6	0.8	0.3	0.2
2010	652.6	310.3	84.2	56.8	177.0	397.2	424.9	142.7	38.5	10.5	6.8	1.6	0.3	0.3
2011	2083.0	509.8	160.0	123.6	101.5	240.2	300.4	178.4	32.3	7.7	1.8	1.3	0.6	0.3
2012	1412.7	1454.3	255.9	229.1	146.4	70.0	150.8	165.2	84.5	12.7	4.4	1.6	1.4	0.6

2013	2281.8	914.2	659.0	249.1	183.6	125.7	63.2	118.2	130.2	53.8	9.1	3.3	1.5	0.9
2014	2445.2	308.2	155.1	190.0	108.6	93.9	52.8	30.4	50.2	36.3	12.1	3.4	1.0	1.4
2014 *	***2445.2***	***339.0***	***184.0***	***226.3***	***122.2***	***103.4***	***67.7***	***42.1***	***81.3***	***78.9***	***28.1***	***4.7***	***1.3***	***1.5***
2015	350.9	725.3	154.0	174.4	225.2	141.3	72.6	48.6	26.2	35.3	26.6	7.9	1.7	1.0
2016	1164.8	350.8	341.3	77.2	93.7	121.6	70.1	44.4	27.2	13.8	13.2	5.4	1.7	1.4
2017	2316.3	757.5	260.6	375.0	141.5	104.9	120.9	62.6	28.0	11.2	6.4	4.4	4.5	2.7
2018*	***1841.2***	***2100.3***	***413.8***	***183.6***	***148.9***	***60.0***	***37.6***	***57.1***	***20.2***	***14.4***	***5.8***	***3.6***	***3.5***	***2.8***
2019	313.4	560.2	475.2	416.6	232.3	215.1	76.6	42.2	44.4	16.1	4.9	2.2	1.1	1.8
2020**	115.6	63.5	106.3	139.5	135.6	93.4	82.9	30.8	14.2	10.7	3.1	1.0	0.5	1.0
2021	749.1	62.1	51.2	84.7	99.8	81.1	45.7	33.6	12.4	4.7	5.0	2.4	1.0	0.7
2022***	399.2	218.2	39.6	25.6	32.8	34.4	33.8	18.6	9.8	2.5	0.8	0.5	0.1	0.2
2023	359.7	322.1	275.2	69.9	40.1	57.1	52.7	45.0	23.3	9.3	2.2	0.8	0.6	0.3
2024	300.9	226.0	237.0	234.4	68.2	46.8	41.0	29.0	14.5	7.7	2.5	0.6	0.2	0.1
2025	601.4	154.6	109.5	169.2	181.0	45.3	22.3	21.0	15.2	6.4	2.2	1.2	0.0	0.1

*data adjusted taking into account not complete area coverage

** revised

*** incomplete and unsynoptic coverage

Table A15. Mean weight at age of cod (g), data from bottom trawls Barents Sea Ecosystem survey. StoX calculations.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2004		30	127	415	823	1464	2448	3266	4608	6323	9444	18331	13830	-	15924			
2005		37	162	428	985	1723	2553	3697	4808	5958	8583	7662	-	8799	-			
2006		39	155	473	1068	1759	2723	3725	5220	6798	10769	8904	9520	-	-			
2007		52	173	523	1237	2078	3004	4163	5860	7638	11251	-	12683	-	15529			
2008		39	193	511	1154	1958	3187	4262	5793	7741	9563	12039	11149	16320	-			
2009		29	164	462	989	1614	2453	4034	5313	6334	7595	8221	12001	12040	-			
2010		37	152	470	946	1634	2551	3801	5381	6921	7986	9063	8868	13406	19217			
2011		35	143	419	991	1672	2523	3500	4812	6826	9403	12623	10379	10945	-			
2012		34	149	418	904	1634	2388	3276	4344	6466	8459	9798	11181	14621	10895			
2013		28	129	429	918	1553	2249	3230	4443	5805	8454	9817	12531	14308	17723			
2014		28	148	374	897	1684	2244	3501	4511	5933	7183	7894	11979	7602	13250			
2015		28	149	414	823	1483	2297	3219	4490	5635	6962	8478	12148	10385	15370			
2016		45	162	527	914	1563	2308	3324	4492	6472	7476	8689	10939	7485	16645			
2017		37	185	441	953	1660	2414	3398	4821	5876	7173	8345	9968	12765	12445			
2018		-	-	-	-	-	-	-	-	-	-	-	-	-	-			
2019		28	103	386	899	1458	2208	3369	4508	6355	7734	9351	9147	11394	11403			
2020		38	125	343	864	1514	2311	3204	4609	6020	7589	8685	10474	12242	13537	10724	14504	19800

2021		41	200	359	714	1278	2224	3196	4482	6355	7527	9165	10910	12089		15930	17193	
2022*		33	171	499	828	1451	2415	3688	5088	7208	7524	12754	9535				17880	
2023		37	152	584	899	1533	2331	3371	5354	6170	7201	9392	9284	8430	15030			
2024		32	129	443	996	1763	2518	3436	4553	6207	5245 **							
2025		34	121	382	872	1615	2351	3275	4800	6408	6807	8581						

*revised

** Biofox value -> 6454 was used for calculation of combined WEST data for this age group

Table A 16. Mean weight at age of cod (k g), combined data from winter survey and Lofoten survey.

Year/age	1	2	3	4	5	6	7	8	9	10	11
1985	0.02	0.171	0.576	1.003	2.018	3.386	4.696	6.636	8.245	10.321	14.290
1986	0.02	0.119	0.377	0.997	1.645	3.010	4.488	6.518	4.218	0.000	13.480
1987	0.021	0.065	0.23	0.49	1.390	2.155	3.913	5.438	0.322		12.550
1988	0.024	0.114	0.241	0.492	0.907	2.116	3.269	4.937	3.635	13.640	
1989	0.016	0.158	0.374	0.604	0.948	1.581	2.762	4.791	8.835	8.582	
1990	0.026	0.217	0.58	1.009	1.436	2.010	2.716	3.995	5.425	8.992	
1991	0.018	0.196	0.805	1.364	2.067	2.764	3.532	4.945	7.401	11.645	5.350
1992	0.02	0.136	0.619	1.118	1.994	2.808	3.975	5.376	6.352	8.034	9.500
1993	0.009	0.071	0.415	1.179	1.745	2.675	3.686	5.399	6.280	7.680	9.280
1994	0.013	0.056	0.262	0.796	1.557	2.624	4.181	5.846	6.675	7.966	7.778
1995	0.015	0.054	0.24	0.658	1.364	2.565	4.124	5.326	7.379	9.895	9.738
1996	0.015	0.062	0.232	0.627	1.098	2.094	3.742	5.586	7.866	10.057	10.502
1997	0.013	0.052	0.23	0.638	1.185	1.918	3.433	5.515	8.889	10.408	12.405
1998	0.011	0.052	0.28	0.635	1.183	1.731	2.667	4.362	7.259	10.577	11.657
1999	0.014	0.059	0.231	0.592	1.180	1.964	2.978	4.200	5.980	8.848	9.642
2000	0.016	0.074	0.21	0.558	1.222	2.001	3.064	3.862	5.365	6.471	8.379
2001	0.014	0.106	0.336	0.646	1.319	2.371	3.257	5.078	6.186	10.084	10.558
2002	0.014	0.067	0.238	0.747	1.244	2.199	3.344	4.669	6.554	8.078	9.277
2003	0.013	0.061	0.234	0.597	1.335	2.080	3.207	4.643	6.206	7.649	17.062
2004	0.011	0.059	0.275	0.608	1.177	2.083	2.870	4.411	5.889	7.752	9.310
2005	0.013	0.061	0.246	0.723	1.166	2.068	3.114	3.852	5.877	8.538	14.573
2006	0.013	0.069	0.28	0.669	1.421	2.083	3.009	4.212	5.501	6.881	7.646
2007	0.019	0.073	0.235	0.639	1.351	2.334	3.340	4.923	6.598	9.649	11.132
2008	0.015	0.09	0.335	0.798	1.402	2.482	3.282	5.015	6.863	8.598	7.822
2009	0.013	0.083	0.294	0.704	1.320	2.302	4.089	5.152	6.611	9.391	8.657
2010	0.012	0.064	0.304	0.7	1.300	2.082	3.251	4.951	6.366	8.095	9.757
2011	0.015	0.066	0.246	0.668	1.146	2.050	2.830	4.367	6.592	8.681	9.647

2012	0.013	0.062	0.252	0.609	1.295	1.792	2.664	3.827	5.551	8.373	11.741
2013	0.011	0.065	0.269	0.602	1.212	2.163	2.988	4.103	5.292	7.782	9.842
2014	0.008	0.05	0.246	0.603	1.228	1.804	3.121	3.975	5.015	6.018	7.575
2015	0.01	0.044	0.242	0.602	1.227	1.936	2.849	4.015	4.981	6.630	8.187
2016	0.013	0.053	0.2	0.593	1.051	1.936	2.835	4.240	6.315	7.431	8.541
2017	0.015	0.102	0.292	0.72	1.181	2.024	3.026	4.363	5.817	7.223	8.405
2018	0.012	0.069	0.32	0.688	1.251	2.099	2.890	4.246	5.893	7.356	9.512
2019	0.012	0.048	0.273	0.685	1.165	1.908	3.139	4.384	5.833	7.221	8.788
2020	0.014	0.044	0.153	0.548	1.089	1.729	2.650	4.133	5.633	7.455	8.566
2021	0.014	0.068	0.164	0.462	0.918	1.721	2.696	3.807	5.916	7.314	8.762
2022	0.011	0.077	0.311	0.535	1.061	1.801	2.953	4.079	5.915	8.126	9.399
2023	0.012	0.071	0.316	0.694	1.113	1.782	2.997	4.330	5.537	6.824	9.661
2024	0.012	0.057	0.289	0.701	1.133	1.876	2.666	3.991	5.262	6.370	9.367
2025	0.013	0.051	0.217	0.648	1.176	1.781	2.700	3.598	5.184	6.370	7.983
2026	0.011	0.053	0.195	0.488	0.999	1.804	2.659	3.636	5.602	7.033	7.982

4. Haddock in subareas 1 and 2 (Northeast Arctic)

4.1 Introductory note

On 30th March 2022 all Russian participation in ICES was suspended. Due to the temporary suspension of Russian scientists from ICES in 2022 and the Russian withdrawal from ICES in 2025, this year's assessment was as in 2022-2025 conducted by a Joint Russian-Norwegian Arctic Fisheries Working Group (JRN-AFWG) consisting of scientists from VNIRO (Russia) and IMR (Norway). The ICES AFWG 2026 report chapter on haddock was therefore not updated. In the present report, we have kept the main structure of the NEA haddock chapters in ICES AFWG reports from the last years.

4.2 Status of the fisheries

4.2.1 Historical development of the fisheries

Haddock is fished by trawl as bycatch in the fishery for cod. Also, a directed trawl fishery for haddock is conducted. The proportion of the total catches taken by direct fishery varies between years. On average approximately 70% of the catches are taken by trawl. Norway takes about half of the quota with other gear, in particular long line and Demersal seine. Demersal has become more important in the Norwegian fisheries the last 10 years. Some of the longline catches are from a directed fishery, which is restricted by national quotas. In the Norwegian management, the quotas are set separately for trawl and other gears. The fishery is also regulated by a minimum landing size (40 cm), a minimum mesh size in trawls and Demersal seine, a maximum bycatch of undersized fish, closure of areas with high density/catches of juveniles and other seasonal and area restrictions.

The exploitation rate of haddock has been variable. The highest fishing mortalities for haddock have occurred at low to intermediate stock levels. However, the more restrictive quota regulations introduced around 1990 have resulted in a more stable pattern in the exploitation rate.

The exceptionally strong year classes 2005–2006 contributed to the strong increase to all-time high stock levels and high catch levels in the last decade. Their importance in the catches is currently minimal. Currently, the 2021 year-class dominated the catches, with 26% of the total catch in weight in 2025, with the 2017, 2018 and 2020 year-classes contributing 16%, 18% and 16%, respectively. The strong 2016 year class constituted 6% of the catches in 2025, the contribution by older fish was negligible.

4.2.2 Catches prior to 2026 (Table 4.1–Table 4.3, Figure 4.1)

Provisional official landings for 2025 are about 127 kt, which is slightly below the agreed TAC (130 kt) but 19% above the advice (107 kt).

The highest landings of haddock historically were 322 kt in 1973. Since 1973 the highest catches observed was 316 kt in 2012. The landings in 2018-2025 were below 200 kt (Figure 4.1).

In 2006 it was decided to include reported Norwegian landings of haddock from the Norwegian statistical areas 06 and 07 (i.e. between 62°N and Lofoten Islands). These areas were not previously included in the total landings of NEA haddock as input for this stock assessment (ICES CM 2006/ACFM:19; ICES CM 2006/ACFM:25).

Estimates of unreported catches (IUU catches) of haddock have been added to reported landings for the years from 2002 to 2008. Two estimates of IUU catches were available, one Norwegian and one Russian. At the

benchmark in 2011 it was decided to base the final assessment on the Norwegian IUU estimates (ICES CM 2011/ACOM:38; Table 4.1).

We continue to include the estimates of IUU catches 2002–2008. The IUU catches are assumed to be negligible for the period 2009–2025 and therefore set to zero.

4.2.3 Catch advice and TAC for 2026

The catch advice for 2026 was 153 293 tonnes - following the Harvest Control Rule, and a F of 0.35 – an increase of 43% from the advice the year before, and 18% from the agreed TAC. The Joint Norwegian-Russian Fisheries Commission set the TAC equal to the advice. Russia and Norway can transfer the unused part of their own quota, restricted to a maximum of 10% of own quotas from 2025 to 2026.

4.3 Status of research

4.3.1 Survey results

Russia provided indices for 1982–2015 and 2017 for the Barents Sea trawl and acoustic survey (TAS) which was carried out in October–December (FLT01, RU-BTr-Q4). The survey was discontinued in 2018.

The Joint Barents Sea winter survey provides two index series used for tuning and recruitment forecast (bottom trawl: FLT02, NoRu-BTr-Q1 and acoustics: FLT04, NoRu-Aco-Q1). The survey area has been extended from 2014 with additional northern areas (N) covered. The extended area is now included in total and standard survey index calculations for haddock (WKDEM 2020) and is done using the StoX software (Johnsen et al. 2019). Overall, this survey tracks both strong and poor year classes well. The indices from the Joint winter survey of cod and haddock in the Barents Sea are provided in the annual survey reports from this survey (e.g., Fall et al. 2023). In 2026, the survey coverage was good.

The Joint Barents Sea ecosystem survey provides indices by age from bottom trawl data (FLT007, Eco-NoRu-Q3 Btr) used for tuning and recruitment forecast. At the benchmark in 2011 it was decided to include this survey as tuning series. Tuning indices by age from the Joint ecosystem survey is calculated using the BIOFOX programme (Prozorkevich and Gjøsæter 2014). The survey covered the distribution of haddock well in 2025. The estimates for cod and haddock are provided to the group as an excel file.

The survey indices for ages used in tuning can be found in Table 4.9, and the survey indices used in recruitment forecast can be found in Table 4.16.

4.4 Data used in the assessment

4.4.1 Catch-at-age (Table 4.4)

Relevant data of estimated catch-at-age was obtained from InterCatch for the period 2008–2020 and is presented together with historical values from 1950–2007 in Table 4.4. Catch at age from 2021 to 2025, instead of using InterCatch, the same algorithm was realized in Excel. Excel was used for comparison with InterCatch for data 2008-2020, and no differences between InterCatch and Excel allocations were detected.

Age and length composition of the landings in 2025 were available from Norway and Russia in Subarea 1, Division 2.a and 2b. Norwegian catch at age data was calculated using StoX-R Eca. International landings data were downloaded from https://data.ices.dk/ except for Belarus that reports directly to Russian authorities. The biological sampling of NEA haddock catches is considered good for the most important ages in the fisheries.

4.4.2 Catch-weight-at-age (Table 4.5)

The mean weight-at-age in the catch was obtained as a weighted average of the weight-at-age in the catch from Norway and Russia.

4.4.3 Stock-weight-at-age (Table 4.6)

Since 1983 the stock weights-at-age (Table 4.6) are calculated using the average of the weight-at-age estimate from the Joint Barents Sea winter survey and the Russian bottom trawl survey. These averages are assumed to give representative values for the beginning of the year (see stock annex for details). However, the Russian bottom trawl survey has been discontinued and therefor stock weights-at-age were calculated using a correction factor (WKDEM 2020). Since the benchmark in 2006 stock weight at age has been smoothed (ICES 2006, see stock annex for details).

4.4.4 Maturity-at-age (Table 4.7)

Since the benchmark 2006, smoothed estimates were produced separately for the Russian autumn survey and the Joint winter survey and then combined using arithmetic average. These averages are assumed to give representative values for the beginning of the year. However, the Russian bottom trawl survey has been discontinued and therefore stock weights-at-age were calculated using a correction factor (see WKDEM 2020, see stock annex for details).

4.4.5 Natural mortality (Table 4.8)

Natural mortality used in the assessment was 0.2. For ages 3–6 mortality predation by cod is added (see stock annex). For the period from 1984 and onwards actual estimates of predation by cod was used. For the years 1950–1983 the average natural mortality for 1984–2025 was used (age groups 3–6). Estimated mortality from predation by cod in this year's assessment is based on the 'final run' cod assessment. The proportion of F and M before spawning was set to zero.

4.4.6 Data for tuning (Table 4.9)

The following survey series are included in the data for tuning, the last age for all surveys is the plus group. Data are lacking (no survey) for FLT01 in 2016, and for FLT007 in 2018 and 2022 (not included due to poor/not synoptic coverage).

Name	Acronym	Place	Season	Age	Year	prior weight
FLT01: Russian bottom trawl	RU-BTr-Q4	Barents Sea	October–December	3–8+	1991–2017	1
FLT02: Joint Barents Sea survey–acoustic	BS-NoRU-Q1(Aco)	Barents Sea	February–March	3–9+	1993–2026	1
FLT04: Joint Barents Sea survey–bottom trawl	BS-NoRu-Q1 (BTr)	Barents Sea	February–March	3–10+	1994–2026	1
FLT007: Joint Russian-Norwegian ecosystem autumn survey in the Barents Sea–bottom trawl	Eco-NoRu-Q3 (Btr)	Barents Sea	August–September	3–9+	2004–2025	1

4.4.7 Changes in data from last year (Table 4.6–Table 4.7, Table 4.9)

At the benchmark (WKDEM 2020) it was decided that historic values (1950–1993) of stock weight and maturity should not be updated in the following years. Due to the smoothing procedure (see stock annex) the stock weight and maturity at age back to 1994 are updated every year.

Natural mortality includes cod predation for the ages 3–6. The data from 1984 and onwards are updated every year after the update of the cod assessment. The averages from 1994-2025 are used for the historic period

(1950–1983) and were updated and used in the assessment.

4.5 Assessment models and settings (Table 4.10)

At the benchmark in 2020 it was decided to continue using the SAM model as the main model.

The SAM configuration was revised during the benchmark in 2020. The main changes to the configuration were to include:

1) age group 3 in the winter survey indices (Fleet 02 and 04),

2) plus group in all survey series (new option in SAM),

3) prediction variance link for the observation variances (new option in SAM, Breivik *et al.,* 2021) 4) correlation structure in observation variance for the surveys (Berg and Nielsen, 2016).

The configuration, settings and tuning of SAM that were decided on during the benchmark (WKDEM 2020) were used in the current assessment. The configuration file is given in Table 4.10 and in the stock annex.

XSA, with revised settings, and TISVPA are both used as additional models for comparison.

4.6 Results of the assessment (Table 4.11–Table 4.14 and Figure 4.1–Figure 4.3)

The man feature of the assessment is that the stock reached an all-time high level around 2011 due to the strong 2004–2006 year-classes combined with reduced fishing pressure. Since then, the stock has declined (Table 4.11; Figure 4.1).

The estimated SSB is higher than the SSB in 2026, which was the lowest since 2003 but below the long-term average. The estimate of SSB for 2026 is 165kt which is above MSY $B_{trigger}$ = 80kt (Figure 4.1). The residuals and retrospective patterns are shown in Figure 4.2 and 4.3.

Fbar increased from 2013 to 2021 and has been over F_{msy} since 2017.

4.7 Comparison with last year’s assessment (Figure 4.4)

The text table below compares this year’s estimates with last year’s estimates. Compared to last year, the current estimate of the total stock (TSB) in 2025 was almost identical to the estimate from 2025 whereas the spawning stock (SSB) estimate is 6% higher. Fbar in 2024 was lower compared to last year’s assessment. Current estimates for 2025 for ages 3-4 and 9-13? were lower compared to last year’s assessment. The estimates of ages 5-8 were higher resulting in higher 2025 SSB estimates compared to last year’s assessment. The weak 2018 and 2019 year-classes were estimated to be 55% and 24% stronger in 2025 in this year’s assessment compared to last year’s. Ratios are calculated on original numbers (not rounded as shown in table).

Assessment year, model	**F 2024**	**Numbers 2025 (ages)**											SSB (2025)	TSB (2025)
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13+**		
2026 SAM	0.43	494847	278704	63352	20775	34143	28195	12070	1569	492	245	469	157942	494692
2025 SAM	0.47	532133	282978	58948	13390	27447	24704	15639	2125	664	312	585	149209	493213
2026/2025 SAM	0.91	0.93	0.98	1.07	1.55	1.24	1.14	0.77	0.74	0.74	0.79	0.80	1.06	1.00

Additional assessment methods (Table 4.15, Figure 4.5–Figure 4.6)

4.7.1 XSA (Figure 4.5)

The Extended Survivors Analysis (XSA) was used to tune the VPA by available index series. As last years, FLR was used for the assessment of haddock (see stock annex), and thus all results concerning XSA are obtained using FLR. The settings used were the same as set in the benchmark in 2015 (WKARCT 2015). At this meeting the comparison confirmed that usage XSA with survivor estimate shrinkage 0.5 gave similar result to the estimates from SAM.

The estimated consumption of NEA haddock by NEA cod is incorporated into the XSA analysis by first constructing a catch number-at-age matrix, adding the numbers of haddock eaten by cod to the catches for the years where such data are available (1984–2025). The summary of XSA stock estimates with shrinkage value 0.5 are presented in Table 4.15. A retrospective estimate for XSA gave same signals as for the main model SAM (Figure 4.5 and 4.6).

4.7.2 TISVPA (Figure 4.5)

The TISVPA (Triple Instantaneous Separable VPA) model (Vasilyev 2005, 2006) represents fishing mortality coefficients (more precisely – exploitation rates) as a product of three parameters: f(year)*s(age)*g(cohort). The generation-dependent parameters, which are estimated within the model, are intended to adapt traditional separable representation of fishing mortality to situations when several year classes may have peculiarities in their interaction with fishing fleets caused by different spatial distribution, higher attractiveness of more abundant schools to fishers, or by some other reasons. The TISVPA model was presented at benchmark groups for haddock stock (WKARCT 2015, WKDEM, 2020) and it was decided to apply to NEA haddock using the same data as SAM except that natural mortality values from cannibalism were taken from the SAM runs. All the input data, including catch-at-age, weight-at-age in stock and in catches, maturity-at-age were the same as used in SAM. All results of model run presented in WD #7. Generally, the biomass estimates of this model were higher than SAM estimates, which can be explained by different assumptions about catchability of indices. The retrospective pattern for TISVPA shows the same trends as both the SAM and XSA models (Figure 4.5).

4.7.3 Model comparisons (Figure 4.6)

Results from SAM, XSA and TISVPA are compared in Figure 4.6. Comparison of results of SAM, TISVPA and XSA with previous year settings shows that the models estimate similar trends. The TISVPA model is more flexible for settings than the others and taking into account a possible decrease in survey data consistency, it was attempted to do tuning of surveys not at abundance but to age proportions because of the probable change in effective survey catchability.

4.8 Predictions, reference points and harvest control rules (Table 4.16–Table 4.21)

4.8.1 Recruitment (Table 4.16–Table 4.17)

Recruitment at age 3 of the 2023 year-class in 2026 was estimated to 287 millions using SAM. The SAM estimates have been used for intermediate year predictions since the benchmark in 2020. RCT3 (R version) estimated this year class to be 319 millions. The RCT3 program (R version) was used to estimate the recruiting year classes 2024–2025 in 2027 and 2028 used in the forecast with survey data from the ecosystem survey and winter survey (acoustics and bottom trawl). Input data and results are shown in Tables 4.16 and 4.17, respectively.

The text table below shows the recruitment estimates for the year classes 2013–2025 from assessments and

RCT3 forecasts (shaded cells). In the most recent years, it is noticeable that the 2018 year-class was less than 50% of the initial RCT3 estimate. The SAM estimates for the 2019-2022 year-classes were higher than the RCT3 estimates, whereas the 2023 year-class is weaker estimated with the SAM in 2023 compared to RCT3 forecasts. The correlation between SAM estimate at age 3 for the year-classes 2017-2023 year compared to the RCT3 forecast for the quota year was r^2 =0.65.

Year Class												
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
2013	255	235	184	174	177	219	213	215	211	206	207	207
2014	248	247	193	146	148	202	195	198	195	191	193	193
2015		422	386	333	336	384	367	370	362	353	354	355
2016			996	933	930	875	821	831	804	775	776	785
2017				576	629	497	441	449	432	414	415	417
2018					344	294	158	164	162	154	156	156
2019						39	26	38	45	45	45	45
2020							88	89	157	164	166	173
2021								303	372	469	428	439
2022									231	353	532	495
2023										340	385	287
2024											649	594
2025												284

4.8.2 Prediction data (Table 4.18, Figure 4.7)

The input data for the prediction are presented in Table 4.18.

Stock numbers for 2027–2028 at age 3 are taken from RCT3, and abundance-at-ages 3–13+ in 2026 from the SAM assessment.

The average fishing pattern observed in 2023–2025 scaled to F in 2025 was used for distribution of fishing mortality-at-age for 2026–2028 (Figure 4.7). The proportion of M and F before spawning was set to 0.

Input data to projection of weight at age in the stock, weight at age in the catch, maturity and mortality followed the stock annex (WKDEM, 2020).

4.8.3 Biomass reference points (Figure 4.1)

Biological and fisheries reference points for NEA haddock were last set following a thorough analysis as part of the WKNEAMP-2 (ICES, 2016) harvest Control Rule evaluation in 2016. The revised model developed during the 2020 benchmark produced better fits to the data but only a small change in the reconstructed stock (WKDEM, 2020). A brief analysis at WKDEM 2020 indicated that the reference points from the current model are very similar to the previously estimated values. Given the more thorough analysis at WKNEAMP-2 (ICES, 2016), this is taken as indicating that there was no evidence to deviate from the reference points set in 2016.

At the last benchmark (WKDEM 2020) it was proposed to keep B_{lim} = 50 000 t and B_{pa} = 80 000 t with the rationale that B_{lim} is equal to B_{loss}, and $B_{pa} = B_{lim}*\exp(1.645*\sigma)$, where σ = 0.3. This gives a 95% probability of maintaining SSB above B_{lim} taking into account the uncertainty in the assessments and stock dynamics. B_{MSY}

trigger was proposed equal to B_{pa}, $B_{trigger}$ was then selected as a biomass that is encountered with low probability if F_{MSY} is implemented, as recommended by WKFRAME2 (ICES CM 2011/ACOM:33). Values of reference points compared with current stock values are reflected in Figure 4.1.

4.8.4 Fishing mortality reference points (Figure 4.1)

Biological and fisheries reference points for NEA haddock were last set following a thorough analysis as part of the WKNEAMP-2 (ICES, 2016) Harvest Control Rule evaluation in 2016. The revised model developed during the 2020 benchmark produced better fits to the data but only a small change in the reconstructed stock (ICES WKDEM 2020). A brief analysis at WKDEM 2020 indicated that the reference points from the current model are very similar to the previously estimated values. Given the more thorough analysis at WKNEAMP-2 (ICES, 2016), this is taken as indicating that there was no evidence to deviate from the reference points set in 2016.

There is no standard method of estimating F_{lim} nor F_{pa}, and ACOM accepted to use geometric mean recruitment (146 million) and B_{lim} as basis for the F_{lim} estimate. F_{lim} is then based on the slope of line from origin at SSB = 0 to the geometric mean recruitment (146 million) and SSB = B_{lim}. The SPR value of this slope give F_{lim} value on SPR curve; F_{lim} = 0.77 (found using Pasoft). Using the same approach as for B_{pa}; $F_{pa} = F_{lim} *\exp(-1.645* \sigma)$ = 0.47.

F_{MSY} = 0.35 has been estimated by long-term stochastic simulations. Values of reference points compared with current stock values are reflected in Figure 4.1.

The estimates of cod's consumption of haddock were revised following the cod benchmark in early 2021. At the AFWG 2021 meeting, the haddock F_{MSY} was checked with the new updated mortality estimates and found to still be valid and precautionary.

4.8.5 Harvest control rule

The harvest control rule (HCR) was evaluated by ICES in 2007 (ICES CM 2007/ACFM:16) and found to be in agreement with the precautionary approach. The agreed HCR for haddock with last modifications is as follows (Protocol of the 40th Session of The Joint Norwegian Russian Fisheries Commission (JNRFC), 14 October 2011):

- TAC for the next year will be set at level corresponding to F_{MSY}.
- The TAC should not be changed by more than +/- 25% compared with the previous year TAC.
- If the spawning stock falls below B_{pa}, the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from F_{MSY} at B_{pa} to F = 0 at SSB equal to zero. At SSB-levels below B_{pa} in any of the operational years (current year and a year ahead) there should be no limitations on the year-to-year variations in TAC.

As mentioned above F_{lim} and F_{pa} were revised in 2011. The new values of F_{lim} = 0.77 and F_{pa} = 0.47 are higher than the previous values (0.49 and 0.35, respectively). In the 2012 meeting of the JNRFC the proposals of ICES were accepted, and the current HCR management is based on F_{MSY} instead of $F_{pa.}$ This corresponds to the goal of the management strategy for this stock and should provide maximum sustainable yield.

In 2014, JNRFC decided that from 2015 onwards, Norway and Russia can transfer to next year or borrow from last year maximum 10% of the country's quota. At its 45th session in October 2015, the Joint Norwegian-Russian Fisheries Commission (JNRFC) decided that a number of alternative harvest control rules (HCRs) for Northeast Arctic haddock should be evaluated by ICES. This was done by WKNEAMP (ICES 2015/ACOM:60, ICES C. M. 2016/ACOM:47). Six HCRs for NEA haddock including the existing one were tested. At its 46th

session in October 2016, the JNRFC decided not to change the HCR. Prediction results and catch options for 2026 (Table 4.19–Table 4.20). The current HCR was evaluated in 2025 and presented in 2026 (see WD#3) and found to be precautionary. While the current HCR remains precautionary, a more better alternative has been identified. This modified rule, similar to the current one but without the ±25% interannual TAC change restriction, demonstrates several advantages: higher average catches, significantly lower recruitment overfishing risk, and reduced interannual catch variability. This alternative HCR variant can therefore be recommended for consideration in JRNFC. The projection shows an increase in SSB from 165 kt in 2026 to 187 kt in 2027 (Table 4.19). TAC constraint is used for 2026. The TAC set by the Joint Norwegian-Russian Fisheries Commission for 2026 was 153 kt, which was accordance with the HCR.

Catch options for 2027 are shown in the text table below (weights in tonnes).

Basis	Total catch (2027)	F ages 4−7 (2027)	SSB (2028)	% SSB change *	% TAC change **	% Advice change ***
Advice basis						
Management plan	180 336	0.35	209 354	12	18	18
Other scenarios						
MSY approach: F_{MSY}	180 336	0.35	209 354	12	18	18
F = 0	0	0.00	299 789	60	-100	-100
$F = F_{2025}$	193 832	0. 38	202 902	9	26	26
F_{pa}	230 101	0.47	185 822	-1	50	50

* SSB 2028 relative to SSB 2027.

** Catch in 2027 relative to TAC in 2026 (153 293 t)

*** Catch value for 2027 relative to advice value for 2026 (153 293 t)

Detailed information about expected catches by following the HCR in 2027 and 2028 is given in Table 4.20. The forecast covers all catches. It is then implied that all types of catches are to be counted against this TAC.

4.8.6 Comments to the assessment and predictions (Figure 4.2-4.4 and Figure 4.7-4.8)

The one step ahead residuals did not show strong patterns (Figure 4.2). The leave one out analysis did not result in any large changes to the results.

The retrospective bias was reduced after the revision at the 2020 benchmark (WKDEM 2020). Mohn’s Rho has increased in the years following the benchmark, especially for SSB, but was somewhat lower for the assessment of this year, compared to that of last year (Figure 4.3). This year’s assessment was well aligned with the two previous assessments of R3, SSB and TSB, but the recruitment forecast for 2025 and 2026 showed deviations (Figure 4.4).

Retrospective bias (Mohn’s Rho), 5-year peel	R	SSB	F	TSB
AFWG 2018	−3%	24%	−7%	14%
AFWG 2019	−5%	18%	−7%	7%
WKDEM 2020 (Benchmark)	−2%	3%	−3%	1%

AFWG 2020	−4%	−3%	0%	−5%
AFWG 2021	1%	6%	−7%	3%
JRN_AFWG 2022	-2%	5%	-6%	1%
JRN_AFWG 2023	0%	7%	-6%	3%
JRN_AFWG 2024	4%	17%	-13%	12%
JRN_AFWG 2025	2%	16%	-12%	11%
JRN_AFWG 2026	-1%	11%	-7%	7%

The 2015-2017 year-classes that have dominated the catches are now being fished out, and the following 2018-2020 year-classes are weak, so there are few older fish in the stock (Figure 4.8). The 2021 and 2022 year-classes are estimated to be above average, and the 2023 year-class about average. The incoming 2024 year-class is estimated as strong. However, abundance estimates and forecast for the youngest fish are highly uncertain.

The growth forecast of the youngest fish is highly uncertain. We have overpredicted the weight in the catch for the youngest fish in most years following the last benchmark, leading to too high quota advice, especially when the stock is dominated by younger fish. During this year's meeting, we explored different ways to forecast the weight in catch, detailed in working documents 6 and 9 (Trochta et al. 2026 WD6, Solberg 2026 WD9). This work should be continued.

In the forecast from last year, 31% of the catches in 2025 were predicted to come from the 2021 year-class, and 11% from the 2022 year-class. The actual catches in 2025 of the youngest fish were lower, 26% and 6%, respectively, illustrating the difficulties in accurately forecasting selectivity.

Typically, haddock grows above the minimum catching size during the year when they are 4 years old. The selectivity pattern used in the forecast does not currently depend on the expected growth of a cohort and the proportion of fish by age above minimum catching size. The effect on the selectivity pattern of large incoming year-classes should be further explored in future method revision, as has been implemented for Icelandic haddock (ICES 2025).

Haddock typically matures when they are six years. A high proportion of the catches in 2026 and 2027 is predicted to be made up of immature fish, implying growth overfishing, so that a large proportion of the fish are caught before they reach the optimum catching size (Figure 4.8). This will result in a significant loss in overall yield.

All of this highlights the importance of how the short-term forecast is conducted. Therefore, there is a need for a mini-benchmark focusing on the forecast settings for NEA haddock.

In the forecast, 7% of the catches in 2027 are expected to come from the 2024 year-class. The 2023 year-class is expected to grow over the minimum catching size in 2027 and contribute 12% of the catches in 2027 (Figure 4.8). However, the accuracy of this prediction is highly dependent on the fishing pattern and growth of this year class. Given the current fishing pattern and the high proportion of young fish in the stock, we predict growth overfishing to occur in the incoming year-classes.

Following a request to report if the existing HCR for NEA haddock remained precautionary, an analysis was presented to JRN-AFWG in 2026 (Kovalev et al 2026, WD3). The same rules were tested, and the same tool was applied in testing as last comprehensive evaluation in 2016, but the input data was updated. The current

rule with F_{msy}=0.35 was still found to be precautionary. However, increasing F above F_{msy} rapidly increases the risk of SSB to fall under B_{lim} . Setting the quota over the advice as done recently in 2024 and 2025 lead to a high risk to the stock and should be avoided. Excluding the stability constraint from current rule increases long-term yield and stability of the catches in the long term and lower the risk of recruitment overfishing. Therefore, the JRN-AFWG recommends dropping the stability constraint.

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Table 4. 1 . Northeast Arctic haddock. Total nominal catch (t) by fishing areas.

Year	Subarea 1	Division 2.a	Division 2.b	un-reported[2)]	Total[3)]	Norw. stat.areas 06 and 07[4)]
1960	125026	27781	1844	-	154651	6000
1961	165156	25641	2427	-	193224	4000
1962	160561	25125	1723	-	187409	3000
1963	124332	20956	936	-	146224	4000
1964	79262	18784	1112	-	99158	6000
1965	98921	18719	943	-	118583	6000
1966	125009	35143	1626	-	161778	5000
1967	107996	27962	440	-	136398	3000
1968	140970	40031	725	-	181726	3000
1969	89948	40306	566	-	130820	2000
1970	60631	27120	507	-	88258	-
1971	56989	21453	463	-	78905	-
1972	221880	42111	2162	-	266153	-
1973	285644	23506	13077	-	322227	-
1974	159051	47037	15069	-	221157	10000
1975	121692	44337	9729	-	175758	6000
1976	94054	37562	5648	-	137264	2000
1977	72159	28452	9547	-	110158	2000
1978	63965	30478	979	-	95422	2000
1979	63841	39167	615	-	103623	6000
1980	54205	33616	68	-	87889	5098
1981	36834	39864	455	-	77153	4767
1982	17948	29005	2	-	46955	3335
1983	5837	16859	1904	-	24600	3112
1984	2934	16683	1328	-	20945	3803

Year	Subarea 1	Division 2.a	Division 2.b	un-reported	Total	Norw. stat.areas 06 and 07
1985	27982	14340	2730	-	45052	3583
1986	61729	29771	9063	-	100563	4021
1987	97091	41084	16741	-	154916	3194
1988	45060	49564	631	-	95255	3756
1989	29723	28478	317	-	58518	4701
1990	13306	13275	601	-	27182	2912
1991	17985	17801	430	-	36216	3045
1992	30884	28064	974	-	59922	5634
1993	46918	32433	3028	-	82379	5559
1994	76748	50388	8050	-	135186	6311
1995	75860	53460	13128	-	142448	5444
1996	112749	61722	3657	-	178128	5126
1997	78128	73475	2756	-	154359	5987
1998	45640	53936	1054	-	100630	6338
1999	38291	40819	4085	-	83195	5743
2000	25931	39169	3844	-	68944	4536
2001	35072	47245	7323	-	89640	4542
2002	40721	42774	12567	18736/5310	114798/101372	6898
2003	53653	43564	8483	33226/9417	138926/115117	4279
2004	64873	47483	12146	33777/8661	158279/133163	3743
2005	53518	48081	16416	40283/9949	158298/127964	5538
2006	51124	47291	33291	21451/8949	153157/140655	5410
2007	62904	58141	25927	14553/3102	161525/150074	7110
2008	58379	60178	31219	5828/-	155604/149776	6629
2009	57723	66045	76293	0	200061	4498
2010	62604	86279	100318	0	249200	3661
2011	86931	99307	123546	0	309785	4169
2012	90141	96807	128679	0	315627	3869
2013	68416	64810	60520	0	193744	4000
2014	61537	58320	57665	0	177522	3433
2015	75195	61567	57993	0	194756	3902
2016	78714	95140	59561	0	233416	3233
2017	94772	75455	57362	0	227589	2987
2018	80902	58522	51853	0	191276	4437
2019	87446	50967	36989	0	175402	2812
2020	98341	57397	26730	0	182468	3196

Year	Subarea 1	Division 2.a	Division 2.b	un-reported	Total	Norw. stat.areas 06 and 07
2021	109914	58006	36823	0	204743	2363
2022	85887	63415	27604	0	176906	2255
2023	92760	70916	15223	0	178899	2698
2024	70393	59778	9821	0	139992	3631
2025(1	50757	56863	19424	0	127044	1907

1) Provisional figures, preliminary catches estimated by JRN AFWG in April 2026

2) Figures based on Norwegian/Russian IUU estimates. From 2009, IUU estimates are made by a Joint Russian-Norwegian analysis group under the Russian-Norwegian Fisheries Commission.

3) In 2002–2008, the Norwegian IUU estimates were used in final assessment.

4) Included in total landings and in landings in Division 2.a.

Table 4. 2 . Northeast Arctic haddock. Total nominal catch (‘000 t) by trawl and other gear for each area.

	Subarea 1		Division 2.a		Division 2.b		Unreported[2]
Year	Trawl	Others	Trawl	Others	Trawl	Others	
1967	73.7	34.3	20.5	7.5	0.4	-	-
1968	98.1	42.9	31.4	8.6	0.7	-	-
1969	41.4	47.8	33.2	7.1	1.3	-	-
1970	37.4	23.2	20.6	6.5	0.5	-	-
1971	27.5	29.2	15.1	6.7	0.4	-	-
1972	193.9	27.9	34.5	7.6	2.2	-	-
1973	242.9	42.8	14	9.5	13.1	-	-
1974	133.1	25.9	39.9	7.1	15.1	-	-
1975	103.5	18.2	34.6	9.7	9.7	-	-
1976	77.7	16.4	28.1	9.5	5.6	-	-
1977	57.6	14.6	19.9	8.6	9.5	-	-
1978	53.9	10.1	15.7	14.8	1	-	-
1979	47.8	16	20.3	18.9	0.6	-	-
1980	30.5	23.7	14.8	18.9	0.1	-	-
1981	18.8	17.7	21.6	18.5	0.5	-	-
1982	11.6	11.5	23.9	13.5	-	-	-
1983	3.6	2.2	8.7	8.2	0.2	1.7	-
1984	1.6	1.3	7.6	9.1	0.1	1.2	-
1985	24.4	3.5	6.2	8.1	0.1	2.6	-
1986	51.7	10.1	14	15.8	0.8	8.3	-
1987	79	18.1	23	18.1	3	13.8	-
1988	28.7	16.4	34.3	15.3	0.6	0	-

	Subarea 1		Division 2.a		Division 2.b		Unreported
1989	20	9.7	13.5	15	0.3	0	-
1990	4.4	8.9	5.1	8.2	0.6	0	-
1991	9	8.9	8.9	8.9	0.2	0.2	-
1992	21.3	9.6	11.9	16.1	1	0	-
1993	35.3	11.6	14.5	17.9	3	0	-
1994	58.6	18.2	26.1	24.3	7.9	0.2	-
1995	63.9	12	29.6	23.8	12.1	1	-
1996	98.3	14.4	36.5	25.2	3.4	0.3	-
1997	57.4	20.7	44.9	28.6	2.5	0.3	-
1998	26	19.6	27.1	26.9	0.7	0.3	-
1999	29.4	8.9	19.1	21.8	4	0.1	-
2000	20.1	5.9	18.8	20.4	3.7	0.1	-
2001	28.4	6.7	23.4	23.8	7	0.3	-
2002	30.5	10.2	19.5	23.3	12.5	0.1	18.7/5.3
2003	42.7	10.9	21.9	21.7	8.1	0.4	33.2/9.4
2004	52.4	12.5	27	20.5	11.5	0.6	33.8/8.7
2005	38.5	15	24.9	20.9	13	1.6	40.3/9.9
2006	40.1	11	22	25.3	30.1	3.2	21.5/8.9
2007	51.8	11.1	30.5	27.7	20.4	5.5	14.6/3.1
2008	46.8	11.6	30.9	29.3	24.9	6.3	5.8/-
2009	49	8.8	40.1	25.3	67.1	7.8	0
2010	43.6	19	50	35.7	87	10.4	0
2011	55.8	31.1	61.1	38.9	107.7	14.3	0
2012	58.8	31.3	57.5	39.2	103.2	24.8	0
2013	40.1	28.3	37.7	26.9	52.1	8.1	0
2014	35.2	26.3	32.5	25.8	49	8.6	0
2015	49.1	26.1	34.6	27	48.5	9.4	0
2016	56.4	22.3	62.5	32.5	45.4	14.1	0
2017	65	29.8	50.7	24.7	47.1	10.3	0
2018	51.7	29.2	36.9	21.6	43.2	8.6	0
2019	53.9	33.5	30.4	20.4	31.0	5.9	0
2020	66.7	31.6	35.1	22.3	23.2	3.5	0
2021	81.4	28.5	41.0	17.0	31.0	5.8	0
2022	63.4	22.5	44.7	18.7	22.1	5.5	0
2023	69.6	23.2	51.7	19.2	11.1	4.1	0
2024	52.7	17.7	35.9	23.8	4.9	5.0	0

	Subarea 1		Division 2.a		Division 2.b		Unreported
2025(1	37.3	13.4	35.2	21.7	11.8	7.6	0

1) Provisional

2) Figures based on Norwegian/Russian IUU estimates.

Table 4. 3 . Northeast Arctic haddock. Nominal catch (t) by countries. Subarea 1 and divisions 2.a and 2.b combined. (Data provided by Working Group members).

Year	Faroe Islands	France	GDR (–1990) & Greenland (1992–)	Germany	Norway[4]	Poland	UK	Russia[2]	Others	T ot al[3]
1960	172	-	-	5597	46263	-	45469	57025	125	154651
1961	285	220	-	6304	60862	-	39650	85345	558	193224
1962	83	409	-	2895	54567	-	37486	91910	58	187408
1963	17	363	-	2554	59955	-	19809	63526	-	146224
1964	-	208	-	1482	38695	-	14653	43870	250	99158
1965	-	226	-	1568	60447	-	14345	41750	242	118578
1966	-	1072	11	2098	82090	-	27723	48710	74	161778
1967	-	1208	3	1705	51954	-	24158	57346	23	136397
1968	-	-	-	1867	64076	-	40129	75654	-	181726
1969	2	-	309	1490	67549	-	37234	24211	25	130820
1970	541	-	656	2119	37716	-	20423	26802	-	88257
1971	81	-	16	896	45715	43	16373	15778	3	78905
1972	137	-	829	1433	46700	1433	17166	196224	2231	266153
1973	1212	3214	22	9534	86767	34	32408	186534	2501	322226
1974	925	3601	454	23409	66164	3045	37663	78548	7348	221157
1975	299	5191	437	15930	55966	1080	28677	65015	3163	175758
1976	536	4459	348	16660	49492	986	16940	42485	5358	137264
1977	213	1510	144	4798	40118	-	10878	52210	287	110158
1978	466	1411	369	1521	39955	1	5766	45895	38	95422
1979	343	1198	10	1948	66849	2	6454	26365	454	103623
1980	497	226	15	1365	66501	-	2948	20706	246	92504
1981	381	414	22	2402	63435	**Spain**	1682	13400	-	81736
1982	496	53	-	1258	43702	-	827	2900	-	49236
1983	428	-	1	729	22364	139	259	680	-	24600
1984	297	15	4	400	18813	37	276	1103	-	20945
1985	424	21	20	395	21272	77	153	22690	-	45052
1986	893	12	75	1079	52313	22	431	45738	-	100563
1987	464	7	83	3105	72419	59	563	78211	5	154916
1988	1113	116	78	1323	60823	72	435	31293	2	95255

Year	Faroe Islands	France	GDR (–1990) & Greenland (1992–)	Germany	Norway	Poland	UK	Russia	Others	T ot al
1989	1217	-	26	171	36451	1	590	20062	-	58518
1990	705	-	5	167	20621	-	494	5190	-	27182
1991	1117	-	**Greenland**	213	22178	-	514	12177	17	36216
1992	1093	151	1719	387	36238	38	596	19699	1	59922
1993	546	1215	880	1165	40978	76	1802	35071	646	82379
1994	2761	678	770	2412	71171	22	4673	51822	877	135186
1995	2833	598	1097	2675	76886	14	3111	54516	718	142448
1996	3743	6	1510	942	94527	669	2275	74239	217	178128
1997	3327	540	1877	972	103407	364	2340	41228	304	154359
1998	1903	241	854	385	75108	257	1229	20559	94	100630
1999	1913	64	437	641	48182	652	694	30520	92	83195
2000	631	178	432	880	42009	502	747	22738	827	68944
2001	1210	324	553	554	49067	1497	1068	34307	1060	89640
2002	1564	297	858	627	52247	1505	1125	37157	682	114798
2003	1959	382	1363	918	56485	1330	1018	41142	1103	138926
2004	2484	103	1680	823	62192	54	1250	54347	1569	158279
2005	2138	333	15	996	60850	963	1899	50012	1262	158751
2006	2390	883	1830	989	69272	703	1164	53313	1162	153157
2007	2307	277	1464	1123	71244	125	1351	66569	2511	161525
2008	2687	311	1659	535	72779	283	971	68792	1759	155604
2009	2820	529	1410	1957	104354	317	1315	85514	1845	200061
2010	3173	764	1970	3539	123384	379	1758	111372	2862	249200
2011	1759	268	2110	1724	158202	502	1379	139912	4763	309785
2012	2055	322	3984	1111	159602	441	833	143886	3393	315627
2013	1886	342	1795	500	99215	439	639	85668	3260	193744
2014	1470	198	1150	340	91306	187	355	78725	3791	177522
2015	2459	145	1047	124	95094	246	450	91864	3327	194756
2016	2460	340	1401	170	108718	200	575	115710	3838	233416
2017	2776	108	1810	170	113132	228	372	106714	2279	227588
2018	2333	183	1317	385	93839	169	453	90486	2173	191276
2019	1515	143	1208	204	93860	280	456	76125	1611	175402
2020	1392	96	910	282	88108	45	320	89030	2286	182468
2021	1722	105	1101	365	100673	131	78	98296	2390	204743
2022	1831	164	1101	268	89044	99	138	82364	1897	176906
2023	1993	235	672	296	91325	139	112	81751	2376	178899

Year	Faroe Islands	France	GDR (–1990) & Greenland (1992–)	Germany	Norway	Poland	UK	Russia	Others	T ot al
2024	1637	188	645	180	71226	0	152	64423	1541	139992
2025 (1	1989	271	658	220	66659	0	121	55327	1799	127044

1) Provisional figures, preliminary catches estimated by JRN AFWG in June 2026., 2) USSR prior to 1991, 3) Figures based on Norwegian IUU estimates in 2002–2008 (see table 4.1), 4) Included landings in Norwegian statistical areas 06 and 07 (from 1983)

Table 4. 4 . Northeast Arctic haddock. Catch numbers-at-age (numbers, ´000).

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
1950	0	4446	3189	37949	35344	18849	28868	9199	1979	1093	853	867	1257
1951	4069	222	65643	9178	18014	13551	6808	6850	3322	1182	734	178	436
1952	0	13674	6012	151996	13634	9850	4693	3237	2434	606	534	185	161
1953	392	8031	64528	13013	70781	5431	2867	1080	424	315	393	202	410
1954	1726	493	6563	154696	5885	27590	3233	1302	712	319	126	68	349
1955	0	989	1154	10689	176678	4993	28273	1445	271	100	50	30	20
1956	97	3012	16437	5922	14713	127879	3182	8003	450	200	80	60	45
1957	828	243	2074	24704	7942	12535	46619	1087	1971	356	17	40	119
1958	153	2312	1727	5914	31438	5820	12748	17565	822	1072	226	79	296
1959	169	2425	20318	7826	7243	14040	3154	2237	5918	285	316	71	113
1960	2319	3613	39910	70912	13647	7101	6236	1579	2340	2005	497	70	42
1961	362	5531	15429	56855	63351	8706	3578	4407	788	527	1287	67	80
1962	0	4524	39503	30868	48903	33836	3201	1341	1773	242	247	483	28
1963	3	2143	28466	72736	18969	13579	9257	1239	559	409	80	84	212
1964	149	834	22363	49290	30672	5815	3527	2716	833	104	206	235	190
1965	0	3498	5936	46356	40201	12631	1679	974	897	123	204	123	471
1966	0	2577	26345	22631	63176	29048	5752	582	438	189	186	25	30
1967	0	53	15907	41346	13496	25719	8872	1616	218	175	155	75	41
1968	0	33	657	67632	41267	7748	15599	5292	655	182	101	115	70
1969	0	1061	1524	1968	44634	19002	3620	4937	1628	316	43	43	23
1970	480	281	23444	2454	1906	22417	8100	2012	2016	740	166	26	96
1971	15	3535	1978	24358	1257	918	9279	3056	826	1043	369	130	35
1972	133	9399	230942	22315	42981	3206	1611	6758	2638	900	989	538	120
1973	0	5956	70679	260520	24180	6919	422	426	1692	529	147	339	95
1974	281	3713	9685	41706	88120	5829	4138	382	618	2043	935	276	659
1975	1321	4355	10037	14088	33871	49711	2135	1236	92	131	500	147	287
1976	3475	7499	13994	13454	6810	20796	40057	1247	1350	193	280	652	671

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
1977	184	18456	55967	22043	7368	2586	7781	11043	311	388	96	101	182
1978	46	2033	47311	18812	4076	1389	1626	2596	6215	162	258	3	139
1979	0	48	17540	35290	10645	1429	812	546	1466	2310	181	87	55
1980	0	0	627	22878	21794	2971	250	504	230	842	1299	111	50
1981	1	68	486	2561	22124	10685	1034	162	162	72	330	564	69
1982	2	29	883	900	3372	12203	2625	344	75	80	91	321	238
1983	3	351	1173	2636	1360	2394	2506	1799	267	37	60	100	132
1984	7	754	1271	1019	1899	657	950	2619	352	87	2	22	53
1985	4	2952	29624	1695	564	1009	943	886	1763	588	124	64	93
1986	506	650	23113	68429	1565	783	896	393	702	1144	443	130	414
1987	9	83	5031	87170	64556	960	597	376	212	230	419	245	73
1988	7	139	1439	12478	47890	20429	397	178	74	88	168	198	80
1989	611	221	2157	4986	16071	25313	3198	147	1	28	28	53	96
1990	2	446	1015	2580	2142	4046	6221	840	134	42	14	13	44
1991	23	533	4421	3564	2416	3299	4633	3953	461	83	9	18	27
1992	49	2793	11571	11567	4099	2642	2894	3327	3498	486	35	32	18
1993	498	272	13487	19457	13704	4103	1747	1886	2105	1965	201	96	25
1994	95	187	3374	47821	36333	13264	2057	903	1453	2769	1802	259	49
1995	2	85	2003	16109	72644	19145	6417	746	361	770	655	804	116
1996	35	478	1662	6818	36473	73579	13426	2944	573	365	533	598	767
1997	70	94	2280	5633	12603	32832	49478	5636	778	245	126	158	463
1998	547	1476	1701	11304	9258	8633	13801	19469	2113	330	59	54	377
1999	104	568	16839	8039	15365	6073	4466	6355	6204	647	117	109	220
2000	46	692	1520	29986	6496	5149	2406	1657	1570	1744	183	70	184
2001	374	1758	12971	5230	32049	5279	2941	1137	1161	1169	747	169	288
2002	59	603	7132	46335	11084	21985	2602	1602	482	448	581	349	98
2003	123	611	6803	31448	56480	11736	14541	1637	2178	858	411	413	395
2004	58	1295	7993	21116	41310	41226	4939	4914	598	1252	296	139	465
2005	102	865	11452	19369	22887	37067	24461	2393	2997	990	201	263	1059
2006	271	2496	4539	35040	27571	15033	16023	8567	1259	1298	222	175	321
2007	575	3914	30707	15213	45992	18516	10642	7889	2570	678	605	197	185
2008	440	2089	14536	44192	15926	31173	9145	4520	2846	1181	274	214	166
2009	483	1364	15379	55013	52498	13679	15382	3800	1669	887	285	353	321
2010	457	620	6545	52006	80622	50306	9273	5324	1954	1114	533	242	621
2011	909	806	1277	8501	90394	100522	39496	4397	2340	668	437	269	708
2012	268	611	7814	4206	18007	93055	82721	14445	1325	448	217	216	568

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
2013	402	904	1778	12780	3805	12297	58024	29930	4976	957	331	212	535
2014	528	649	6948	4503	14563	6833	16304	39620	16439	2431	619	440	545
2015	303	1334	1645	27317	8526	16624	7950	20538	25534	6677	1556	295	312
2016	294	655	5774	3482	33177	9563	18045	12030	21875	13492	4757	876	248
2017	724	1898	30744	46463	16895	48927	10518	14992	9 485	8447	6 640	1872	317
2018	679	1438	9424	16291	34060	8466	18882	5123	8902	4125	3564	4504	1040
2019	797	968	13908	28572	24171	32555	6278	6803	2601	3618	1225	1715	1400
2020	122	1298	10797	62206	46715	18137	10773	3051	2839	1445	996	915	1092
2021	263	641	2882	31573	99086	31202	7412	3595	1985	1161	814	802	966
2022	49	752	2836	18050	50522	55469	11172	2368	1016	544	285	335	479
2023	60	6615	10603	8935	29024	46726	27135	3052	888	337	175	222	313
2024	42	1420	18364	18151	11128	22770	23900	9319	953	388	152	158	262
2025	53	968	12752	37562	17065	8270	13348	10107	3450	352	99	60	135

Table 4. 5 . Northeast Arctic haddock. Catch weights-at-age (kg).

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
1950	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1951	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1952	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1953	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1954	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1955	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1956	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1957	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1958	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1959	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1960	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1961	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1962	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1963	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1964	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1965	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1966	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1967	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1968	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1969	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
1970	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1971	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1972	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1973	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1974	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1975	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1976	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1977	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1978	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1979	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1980	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1981	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1982	0.299	0.519	0.75	1.038	1.321	1.617	1.873	2.147	2.418	2.698	2.931	3.094	3.461
1983	0.188	0.689	1.033	1.408	1.71	2.149	2.469	2.748	3.069	3.687	4.516	3.094	3.461
1984	0.408	0.805	1.218	1.632	2.038	2.852	2.845	3.218	3.605	4.065	4.407	4.734	5.099
1985	0.319	0.383	0.835	1.29	1.816	2.174	2.301	2.835	3.253	3.721	4.084	4.137	4.926
1986	0.218	0.325	0.612	1.064	1.539	1.944	2.362	2.794	3.25	3.643	4.14	4.559	5.927
1987	0.143	0.221	0.497	0.765	1.179	1.724	2.135	2.551	3.009	3.414	3.84	4.415	5.195
1988	0.279	0.551	0.55	0.908	1.097	1.357	1.537	1.704	2.403	2.403	2.486	2.531	2.834
1989	0.258	0.55	0.684	0.84	0.998	1.176	1.546	1.713	1.949	2.14	2.389	2.522	2.797
1990	0.319	0.601	0.793	1.172	1.397	1.624	1.885	2.112	2.653	3.102	3.18	3.438	3.319
1991	0.216	0.616	0.941	1.281	1.556	1.797	2.044	2.079	2.311	2.788	3.408	2.896	3.274
1992	0.055	0.458	0.906	1.263	1.535	1.747	2.043	2.2	2.298	2.494	2.49	2.673	2.923
1993	0.381	0.64	0.94	1.204	1.487	1.748	1.994	2.237	2.417	2.654	2.906	3.184	3.363
1994	0.278	0.521	0.614	0.906	1.287	1.602	1.968	2.059	2.39	2.545	2.881	2.918	3.222
1995	0.258	0.446	0.739	0.808	1.107	1.556	1.838	2.234	2.416	2.602	2.965	3.163	3.786
1996	0.287	0.427	0.683	0.868	1.045	1.363	1.71	1.886	2.214	2.37	2.438	2.707	2.896
1997	0.408	0.575	0.682	1.028	1.151	1.369	1.637	1.856	2.073	2.5	2.279	2.532	2.609
1998	0.409	0.593	0.748	0.974	1.262	1.433	1.641	1.863	2.069	2.335	2.511	2.8	2.849
1999	0.435	0.695	0.826	1.079	1.261	1.485	1.634	1.798	2.032	2.237	2.339	2.611	2.865
2000	0.378	0.577	0.853	1.186	1.395	1.588	1.808	1.989	2.264	2.415	2.587	2.647	3.098
2001	0.391	0.647	0.751	1.104	1.459	1.709	1.921	2.182	2.331	2.609	2.757	3.376	3.338
2002	0.159	0.407	0.687	1.001	1.363	1.643	1.975	2.086	2.294	2.487	2.612	2.847	3.501
2003	0.198	0.384	0.594	0.875	1.113	1.364	1.361	1.972	1.636	1.877	2.088	2.351	2.842
2004	0.328	0.429	0.636	0.886	1.183	1.508	1.821	2.075	2.339	2.58	2.527	3.153	3.197
2005	0.285	0.492	0.722	0.906	1.121	1.343	1.619	2.036	2.177	2.382	2.527	2.496	2.81

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
2006	0.311	0.567	0.745	1.041	1.287	1.504	1.72	2.082	2.377	2.738	3.082	3.02	3.43
2007	0.329	0.431	0.652	0.899	1.197	1.435	1.722	1.99	2.309	2.715	2.987	2.947	3.591
2008	0.383	0.484	0.658	0.901	1.242	1.515	1.781	2.18	2.33	2.664	3.019	3.326	3.829
2009	0.378	0.508	0.707	1.024	1.28	1.538	1.806	2.107	2.398	2.531	2.606	3.089	3.541
2010	0.317	0.499	0.642	0.887	1.137	1.396	1.702	1.907	2.095	2.404	2.534	3.064	3.249
2011	0.423	0.513	0.811	0.953	1.093	1.254	1.462	1.715	1.978	2.328	2.305	2.55	2.76
2012	0.271	0.506	0.756	1.004	1.174	1.371	1.514	1.715	2.051	2.444	2.414	2.615	2.932
2013	0.469	0.542	0.821	1.014	1.217	1.401	1.571	1.714	1.914	2.168	2.24	2.516	2.807
2014	0.469	0.645	0.792	1.033	1.253	1.417	1.625	1.793	1.941	2.081	2.479	2.703	3.011
2015	0.473	0.647	0.876	1.054	1.327	1.571	1.777	1.934	2.025	2.216	2.481	2.99	3.455
2016	0.497	0.743	0.882	1.115	1.369	1.662	1.917	2.089	2.301	2.567	3.076	3.286	3.331
2017	0.449	0.608	0.874	1.088	1.378	1.666	1.879	2.146	2.258	2.476	2.72	2.98	3.713
2018	0.443	0.663	0.820	1.051	1.339	1.629	1.927	2.156	2.372	2.588	2.728	2.773	3.175
2019	0.341	0.508	0.729	0.955	1.275	1.581	1.834	2.151	2.378	2.607	2.868	2.934	3.382
2020	0.364	0.523	0.629	0.788	1.131	1.489	1.821	2.126	2.426	2.651	2.771	3.147	3.359
2021	0.257	0.445	0.57	0.773	0.997	1.351	1.716	2.15	2.388	2.682	3.073	3.201	4.139
2022	0.175	0.436	0.642	0.808	1.093	1.329	1.651	2.031	2.473	2.727	3.000	3.278	4.297
2023	0.248	0.394	0.684	1.02	1.203	1.458	1.673	1.98	2.334	2.676	3.122	3.223	3.849
2024	0.21	0.418	0.627	0.896	1.233	1.463	1.719	1.957	2.263	2.695	2.946	3.529	3.964
2025	0.307	0.382	0.572	0.885	1.205	1.525	1.723	1.978	2.277	2.826	3.361	3.496	4.305

Table 4. 6 a. Northeast Arctic haddock. Smoothed stock weights-at-age (kg). The data from 1950–1993 is unchanged since AFWG 2019, the data from 1994 and onward have been updated this year.

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
1950-1979	0.031	0.145	0.354	0.653	1.016	1.427	1.867	2.327	2.771	3.195	3.597	3.597	3.597
1980	0.063	0.262	0.454	0.878	1.159	1.675	2.292	3.134	3.31	3.553	3.792	3.792	3.792
1981	0.051	0.274	0.603	0.805	1.315	1.582	2.118	2.728	3.51	3.679	3.904	3.904	3.904
1982	0.036	0.224	0.631	1.049	1.217	1.782	2.017	2.553	3.14	3.853	4.016	4.016	4.016
1983	0.035	0.164	0.524	1.098	1.558	1.663	2.255	2.448	2.97	3.524	4.165	4.165	4.165
1984	0.028	0.158	0.391	0.926	1.632	2.093	2.121	2.718	2.865	3.363	3.878	3.878	3.878
1985	0.03	0.127	0.379	0.700	1.394	2.195	2.626	2.572	3.158	3.261	3.728	3.728	3.728
1986	0.035	0.136	0.311	0.682	1.069	1.898	2.761	3.138	3.005	3.568	3.632	3.632	3.632
1987	0.042	0.161	0.331	0.569	1.047	1.473	2.411	3.307	3.616	3.412	3.946	3.946	3.946
1988	0.039	0.189	0.383	0.603	0.887	1.452	1.895	2.915	3.822	4.054	3.787	3.787	3.787
1989	0.037	0.175	0.445	0.689	0.936	1.248	1.878	2.317	3.395	4.297	4.449	4.449	4.449
1990	0.031	0.169	0.413	0.789	1.054	1.312	1.635	2.308	2.728	3.844	4.73	4.73	4.73
1991	0.025	0.141	0.402	0.737	1.193	1.458	1.714	2.035	2.732	3.122	4.256	4.256	4.256

Year	1	2	3	4	5	6	7	8	9	10	11	12	13+
1992	0.023	0.114	0.34	0.721	1.119	1.63	1.881	2.127	2.437	3.142	3.491	3.491	3.491
1993	0.025	0.107	0.279	0.616	1.100	1.537	2.08	2.308	2.54	2.831	3.531	3.531	3.531

Table 4.6b. Northeast Arctic haddock. Smoothed stock weights-at-age (kg), updated from 1994 and onwards this year.

Year	3	4	5	6	7	8	9	10	11	12	13
1994	0.939	0.952	0.957	0.962	0.967	0.968	0.967	0.96	0.953	1	1
1995	0.251	0.505	0.94	1.651	2.177	2.707	2.858	2.824	2.972	3.632	4.172
1996	0.263	0.472	0.798	1.315	2.12	2.64	3.159	3.303	3.22	3.171	3.947
1997	0.279	0.488	0.747	1.136	1.72	2.575	3.086	3.619	3.71	3.412	3.489
1998	0.344	0.514	0.769	1.063	1.495	2.128	3.028	3.538	4.036	3.879	3.73
1999	0.344	0.625	0.816	1.1	1.417	1.879	2.54	3.474	3.948	4.172	4.19
2000	0.364	0.629	0.973	1.158	1.452	1.777	2.27	2.964	3.879	4.102	4.481
2001	0.294	0.66	0.98	1.365	1.522	1.827	2.153	2.663	3.374	4.033	4.407
2002	0.306	0.54	1.027	1.365	1.769	1.91	2.211	2.546	3.058	3.552	4.352
2003	0.274	0.563	0.852	1.432	1.779	2.197	2.294	2.597	2.929	3.245	3.862
2004	0.249	0.505	0.883	1.204	1.85	2.197	2.617	2.702	2.985	3.127	3.552
2005	0.289	0.463	0.798	1.243	1.577	2.279	2.617	3.035	3.087	3.185	3.427
2006	0.285	0.53	0.742	1.136	1.624	1.974	2.709	3.05	3.437	3.275	3.489
2007	0.294	0.526	0.834	1.057	1.505	2.028	2.365	3.138	3.452	3.616	3.6
2008	0.22	0.544	0.834	1.181	1.4	1.879	2.427	2.783	3.548	3.632	3.93
2009	0.22	0.417	0.858	1.181	1.558	1.768	2.27	2.838	3.175	3.73	3.947
2010	0.249	0.417	0.672	1.212	1.549	1.942	2.142	2.663	3.236	3.365	4.033
2011	0.289	0.463	0.667	0.962	1.586	1.942	2.341	2.52	3.058	3.427	3.681
2012	0.297	0.536	0.742	0.962	1.284	1.985	2.341	2.743	2.9	3.245	3.746
2013	0.368	0.549	0.84	1.057	1.276	1.631	2.377	2.743	3.131	3.098	3.568
2014	0.341	0.67	0.864	1.189	1.4	1.622	1.987	2.783	3.131	3.335	3.412
2015	0.393	0.625	1.034	1.219	1.568	1.768	1.976	2.358	3.191	3.32	3.648
2016	0.355	0.707	0.973	1.442	1.596	1.952	2.142	2.346	2.722	3.381	3.632
2017	0.358	0.645	1.091	1.357	1.871	1.996	2.354	2.52	2.722	2.928	3.681
2018	0.351	0.654	1	1.512	1.769	2.303	2.39	2.756	2.9	2.914	3.23
2019	0.277	0.64	1.014	1.398	1.944	2.186	2.736	2.797	3.146	3.098	3.215
2020	0.268	0.509	0.993	1.416	1.809	2.387	2.604	3.168	3.191	3.335	3.412
2021	0.265	0.501	0.81	1.39	1.829	2.232	2.831	3.035	3.58	3.381	3.648
2022	0.289	0.497	0.792	1.143	1.799	2.268	2.657	3.257	3.437	3.746	3.697
2023	0.341	0.53	0.787	1.129	1.513	2.232	2.683	3.094	3.678	3.616	4.05
2024	0.271	0.625	0.84	1.114	1.487	1.889	2.657	3.108	3.499	3.846	3.93

2025	0.294	0.505	0.973	1.189	1.468	1.869	2.281	3.079	3.531	3.664	4.155
2026	0.249	0.544	0.798	1.357	1.558	1.848	2.246	2.689	3.484	3.697	3.981

Table 4. 7 a. Northeast Arctic haddock. Proportion mature at age. The data from 1950-1993 is unchanged since AFWG 2019. Age 1-2 are 0, and ages 11-13+ set to 1 (not shown).

Year	3	4	5	6	7	8	9	10	
1950-1979	0.027	0.101	0.311	0.622	0.845	0.944	0.982	0.994	
1980	0.026	0.076	0.243	0.649	0.86	0.95	0.984	0.995	
1981	0.056	0.104	0.303	0.549	0.857	0.948	0.984	0.995	
1982	0.053	0.161	0.332	0.577	0.77	0.947	0.983	0.995	
1983	0.057	0.183	0.472	0.665	0.8	0.906	0.983	0.995	
1984	0.044	0.196	0.51	0.801	0.862	0.921	0.967	0.995	
1985	0.027	0.149	0.522	0.796	0.928	0.953	0.973	0.989	
1986	0.021	0.103	0.454	0.758	0.928	0.977	0.984	0.991	
1987	0.021	0.076	0.294	0.713	0.918	0.976	0.993	0.994	
1988	0.025	0.074	0.24	0.576	0.898	0.975	0.993	0.998	
1989	0.032	0.09	0.25	0.534	0.822	0.966	0.993	0.998	
1990	0.046	0.127	0.305	0.578	0.798	0.937	0.99	0.997	
1991	0.041	0.164	0.358	0.623	0.82	0.925	0.98	0.997	
1992	0.03	0.147	0.449	0.704	0.855	0.936	0.976	0.994	
1993	0.018	0.113	0.396	0.741	0.878	0.95	0.979	0.992	

Table 4.7b. Northeast Arctic haddock. Proportion mature at age. The data from 1950-1993 is unchanged since AFWG 2019. Age 1-2 are 0, and ages 11-13+ set to 1 (not shown).

Year	3	4	5	6	7	8	9	10
1994	0.028	0.089	0.286	0.668	0.867	0.956	0.968	0.964
1995	0.03	0.08	0.22	0.525	0.855	0.95	0.985	0.986
1996	0.032	0.084	0.197	0.436	0.748	0.944	0.981	0.995
1997	0.045	0.092	0.207	0.399	0.666	0.88	0.978	0.993
1998	0.045	0.127	0.227	0.417	0.632	0.827	0.943	0.991
1999	0.049	0.129	0.302	0.448	0.647	0.8	0.912	0.972
2000	0.036	0.139	0.305	0.548	0.676	0.813	0.896	0.954
2001	0.038	0.099	0.328	0.548	0.764	0.834	0.904	0.946
2002	0.032	0.107	0.244	0.579	0.767	0.892	0.915	0.95
2003	0.028	0.089	0.259	0.471	0.789	0.892	0.951	0.957
2004	0.035	0.078	0.22	0.49	0.698	0.906	0.951	0.976
2005	0.033	0.097	0.195	0.436	0.715	0.849	0.958	0.977
2006	0.036	0.095	0.236	0.395	0.669	0.86	0.925	0.98
2007	0.023	0.102	0.236	0.459	0.624	0.827	0.932	0.962

2008	0.023	0.066	0.247	0.459	0.691	0.796	0.912	0.965
2009	0.028	0.066	0.166	0.475	0.688	0.841	0.894	0.954
2010	0.035	0.078	0.164	0.345	0.701	0.841	0.922	0.943
2011	0.036	0.098	0.195	0.345	0.57	0.851	0.922	0.96
2012	0.049	0.103	0.238	0.395	0.566	0.754	0.926	0.96
2013	0.043	0.143	0.249	0.462	0.624	0.751	0.867	0.962
2014	0.055	0.127	0.331	0.479	0.694	0.796	0.865	0.929
2015	0.047	0.156	0.302	0.583	0.704	0.844	0.894	0.927
2016	0.047	0.134	0.358	0.545	0.795	0.854	0.923	0.943
2017	0.046	0.138	0.314	0.614	0.764	0.909	0.928	0.96
2018	0.032	0.132	0.321	0.564	0.814	0.89	0.96	0.963
2019	0.031	0.09	0.311	0.571	0.777	0.921	0.949	0.981
2020	0.03	0.088	0.225	0.56	0.783	0.898	0.966	0.976
2021	0.035	0.087	0.217	0.44	0.774	0.904	0.954	0.985
2022	0.043	0.097	0.214	0.433	0.673	0.898	0.956	0.979
2023	0.031	0.127	0.238	0.424	0.661	0.829	0.954	0.979
2024	0.036	0.089	0.302	0.462	0.654	0.824	0.914	0.978
2025	0.028	0.102	0.22	0.545	0.691	0.818	0.909	0.956
2026	0.023	0.079	0.244	0.436	0.764	0.844	0.907	0.953

Table 4. 8 . Northeast Arctic haddock. Consumption of Haddock by NEA Cod (mln. spec) age 0–6, and total biomass ages 0–6 consumed.

Age	0	1	2	3	4	5	6	Biomass
1984	2235.28	1029.88	15.40	0.09	0.00	0.00	0.00	55.95
1985	2142.04	1457.07	5.24	0.00	0.00	0.00	0.00	56.45
1986	93.77	614.83	231.53	170.48	0.00	0.00	0.00	111.23
1987	0.00	1098.98	0.00	0.00	0.00	0.00	0.00	6.04
1988	0.00	17.86	0.49	8.71	0.00	0.20	0.00	2.55
1989	21.77	226.07	0.00	0.00	0.00	0.00	0.00	10.11
1990	48.01	135.88	33.72	3.27	0.00	0.00	0.00	13.90
1991	0.00	354.29	13.00	0.00	0.00	0.00	0.00	15.62
1992	134.39	1740.92	125.90	0.95	0.00	0.00	0.00	88.04
1993	874.96	1516.74	146.49	32.94	3.17	2.69	0.00	72.06
1994	1431.05	1587.85	75.70	24.22	7.08	0.84	0.01	50.72
1995	189.95	2984.16	174.26	12.62	28.24	27.90	0.32	117.26
1996	368.66	1572.67	155.73	38.08	5.16	2.44	3.18	67.31
1997	0.00	964.98	39.65	26.70	1.66	0.73	0.49	44.69
1998	0.00	1784.72	27.82	1.74	2.57	0.45	0.00	36.83

Age	0	1	2	3	4	5	6	Biomass
1999	0.00	1054.75	25.61	0.36	0.00	0.00	0.00	29.95
2000	838.03	1450.47	72.23	2.24	1.16	0.19	0.08	59.67
2001	1076.79	605.89	53.54	4.71	0.07	0.00	0.00	52.26
2002	461.57	2463.24	243.18	39.81	2.26	0.36	0.16	128.29
2003	1163.51	3606.36	214.16	39.17	12.65	1.21	0.00	167.01
2004	5421.32	2881.88	305.21	39.88	9.92	2.47	0.00	198.99
2005	7518.29	6604.87	274.71	55.29	9.35	2.26	0.90	319.64
2006	11840.22	8134.42	367.08	5.44	4.41	1.17	0.48	346.67
2007	1131.60	9547.32	633.97	68.78	3.75	2.16	0.22	358.77
2008	1304.29	924.56	862.70	219.07	42.27	5.44	3.12	281.51
2009	5377.23	1783.73	264.23	253.74	66.47	21.41	1.47	242.90
2010	1921.64	5531.76	174.49	64.07	65.07	58.79	10.94	256.38
2011	2243.50	2557.09	438.70	54.45	72.01	82.30	17.72	267.58
2012	227.66	6930.92	131.06	104.35	14.60	6.47	4.07	212.96
2013	2126.40	1558.09	371.72	31.30	21.70	5.42	4.01	195.85
2014	1143.34	1955.88	136.94	26.77	1.79	0.62	0.00	85.51
2015	4889.66	2531.21	126.57	12.99	42.14	1.39	0.21	173.69
2016	7935.46	2617.19	275.96	21.31	2.30	7.19	1.66	218.41
2017	4476.15	7630.66	225.95	22.19	12.21	6.15	12.94	268.49
2018	2307.75	6932.57	570.31	62.52	6.49	0.57	0.02	270.62
2019	537.55	4498.82	401.90	112.93	7.57	0.28	0.00	206.49
2020	1851.42	487.72	74.89	53.02	67.35	3.49	0.12	82.30
2021	996.12	295.70	79.61	5.17	4.10	0.73	0.09	24.83
2022	4070.98	2091.27	211.16	7.95	1.17	0.05	0.00	75.34
2023	1568.81	857.56	191.37	8.30	1.95	0.07	0.00	67.61
2024	10323.38	3895.14	349.50	17.77	3.24	0.94	0.39	282.85
2025	1946.61	3936.30	442.78	13.41	3.05	0.14	0.00	149.00
Average 1984-2025	2196.17	2629.82	203.92	39.69	12.55	5.87	1.49	137.44

Table 4.9. Northeast Arctic haddock. Survey indices for SAM tuning (see section 4.4.6). The last age is a plus group.

Survey	Year\Age	3	4	5	6	7	8	9	10
RU-BTr-Q4	1991	62	9	3	6	18	17		
RU-BTr-Q4	1992	346	50	4	6	9	9		
RU-BTr-Q4	1993	1985	356	48	8	4	4		
RU-BTr-Q4	1994	442	1014	116	15	1	6		
RU-BTr-Q4	1995	31	123	370	40	5	4		

RU-BTr-Q4	1996	28	49	362	334	29	6		
RU-BTr-Q4	1997	32	32	10	27	10	8		
RU-BTr-Q4	1998	38	46	8	5	15	5		
RU-BTr-Q4	1999	196	39	37	8	3	14		
RU-BTr-Q4	2000	60	109	26	11	2	5		
RU-BTr-Q4	2001	334	40	65	11	4	4		
RU-BTr-Q4	2002	399	450	47	24	4	3		
RU-BTr-Q4	2003	221	299	231	34	16	3		
RU-BTr-Q4	2004	113	94	107	87	5	6		
RU-BTr-Q4	2005	240	86	48	57	24	3		
RU-BTr-Q4	2006	113	119	57	26	24	13		
RU-BTr-Q4	2007	838	73	137	38	14	15		
RU-BTr-Q4	2008	2557	1051	124	111	17	11		
RU-BTr-Q4	2009	1647	1704	631	57	32	9		
RU-BTr-Q4	2010	299	1697	1589	466	34	17		
RU-BTr-Q4	2011	47	268	1087	783	165	13		
RU-BTr-Q4	2012	209	49	160	720	480	70		
RU-BTr-Q4	2013	61	175	50	104	374	272		
RU-BTr-Q4	2014	250	46	175	56	142	416		
RU-BTr-Q4	2015	22	199	40	74	28	171		
RU-BTr-Q4	2016	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2017	71	99	9	38	6	27		
RU-BTr-Q4	2018	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2019	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2020	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2021	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2022	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2023	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2024	-1	-1	-1	-1	-1	-1		
RU-BTr-Q4	2025	-1	-1	-1	-1	-1	-1		
BS-NoRU-Q1(Aco)	1994	348.73	626.65	121.38	8.55	0.7	0.33	2.71	
BS-NoRU-Q1(Aco)	1995	41.47	121.49	395.37	47.61	2.8	0.05	0.83	
BS-NoRU-Q1(Aco)	1996	29.97	22.09	68.65	143.69	5.67	0.93	0.07	
BS-NoRU-Q1(Aco)	1997	57.27	22.22	15.47	56.13	62.77	4.68	0.19	
BS-NoRU-Q1(Aco)	1998	33.78	58.79	24.2	7.7	14.06	20.69	1.62	
BS-NoRU-Q1(Aco)	1999	83.67	21.64	22.1	6.17	1.55	3.88	2.77	
BS-NoRU-Q1(Aco)	2000	36.39	75.53	14.01	12.61	1.57	0.53	3.02	

BS-NoRU-Q1(Aco)	2001	233.45	40.2	41.38	2.2	1.61	0.15	0.71	
BS-NoRU-Q1(Aco)	2002	255.2	201.84	18.47	11.7	1.59	0.29	0.56	
BS-NoRU-Q1(Aco)	2003	203.68	184.57	136.04	12.26	6.01	0.26	0.9	
BS-NoRU-Q1(Aco)	2004	151.01	101.85	107.82	57.68	7.61	1.15	0.55	
BS-NoRU-Q1(Aco)	2005	221.33	115.67	57.43	56.71	12.69	0.38	0.33	
BS-NoRU-Q1(Aco)	2006	56.32	123.84	47.37	19.26	13.64	3.23	0.35	
BS-NoRU-Q1(Aco)	2007	209.28	46.14	80.57	28.92	10	5.05	2.79	
BS-NoRU-Q1(Aco)	2008	812.41	303.04	90.02	74.12	7.41	12.77	2.11	
BS-NoRU-Q1(Aco)	2009	883.68	629.98	266.65	38.87	14.57	1.26	1.05	
BS-NoRU-Q1(Aco)	2010	128.07	631.03	603.99	166.96	12.07	2.94	2.11	
BS-NoRU-Q1(Aco)	2011	54.16	84.23	313.02	292.21	54.91	1.71	1.46	
BS-NoRU-Q1(Aco)	2012	191.63	48.84	88.12	310.6	172.52	30.09	1.01	
BS-NoRU-Q1(Aco)	2013	67.29	146.77	35.41	53.03	223.77	102.68	14.37	
BS-NoRU-Q1(Aco)	2014	334.82	39.12	108.72	23.18	34.77	86.36	38.82	
BS-NoRU-Q1(Aco)	2015	24.35	189.4	26.63	46.13	9.22	22.45	31.99	
BS-NoRU-Q1(Aco)	2016	71.81	12.08	59.62	12.52	17.28	7.48	33.24	
BS-NoRU-Q1(Aco)	2017	81.15	65.05	4.81	34.81	6.24	7.93	17.72	
BS-NoRU-Q1(Aco)	2018	171.03	62.74	64.4	6.77	15.57	2.75	14.69	
BS-NoRU-Q1(Aco)	2019	507.61	146.22	31.73	21.88	4.72	3.46	4.19	
BS-NoRU-Q1(Aco)	2020	286.32	306.38	79.18	22.38	11.59	1.84	6.33	
BS-NoRU-Q1(Aco)	2021	50.76	130.37	181.8	19.35	5.44	0.94	1.77	
BS-NoRU-Q1(Aco)	2022	11.4	63.4	95.3	101.2	11.8	0.82	1.11	
BS-NoRU-Q1(Aco)	2023	77	9.02	51.3	53.3	38.1	2.69	0.49	
BS-NoRU-Q1(Aco)	2024	337.4	44.03	3.7	14.95	12.49	7.8	0.33	
BS-NoRU-Q1(Aco)	2025	369.45	173.1	22.81	3.68	10.1	7.51	3.65	
BS-NoRU-Q1(Aco)	2026	152.52	187.04	97.15	10.62	5.72	4.11	3.27	
BS-NoRu-Q1 (BTr)	1994	314.533	436.251	46.176	3.54	0.163	0.13	0.2	0.651
BS-NoRu-Q1 (BTr)	1995	54.857	167.104	343.38	29.623	1.441	0.025	0.043	0.404
BS-NoRu-Q1 (BTr)	1996	55.843	31.334	150.768	238.108	16.131	1.15	0	0.069
BS-NoRu-Q1 (BTr)	1997	79.632	39.855	18.255	61.566	88.411	3.277	0.082	0.043
BS-NoRu-Q1 (BTr)	1998	21.681	36.749	11.844	1.294	9.203	7.212	0.648	0.092
BS-NoRu-Q1 (BTr)	1999	56.92	15.874	9.418	2.831	0.807	1.282	0.771	0.034
BS-NoRu-Q1 (BTr)	2000	24.08	35.241	6.789	4.134	0.684	0.083	0.802	0.288
BS-NoRu-Q1 (BTr)	2001	293.996	26.252	22.997	1.634	0.752	0.058	0.06	0.329
BS-NoRu-Q1 (BTr)	2002	312.87	185.453	12.417	8.04	0.846	0.218	0.009	0.325
BS-NoRu-Q1 (BTr)	2003	352.236	174.452	72.708	5.104	1.682	0.119	0.104	0.217
BS-NoRu-Q1 (BTr)	2004	173.132	100.516	77.021	51.281	7.409	0.912	0.133	0.228

BS-NoRu-Q1 (BTr)	2005	317.889	141.058	50.664	61.191	10.082	0.249	0.08	0.009
BS-NoRu-Q1 (BTr)	2006	78.798	130.76	46.048	20.874	16.208	3.184	0.094	0.265
BS-NoRu-Q1 (BTr)	2007	443.266	81.784	84.667	26.279	5.411	2.197	1.376	0.896
BS-NoRu-Q1 (BTr)	2008	1591.031	583.606	53.079	54.732	6.794	10.248	0.23	0.167
BS-NoRu-Q1 (BTr)	2009	1230.426	751.012	368.33	25.414	12.437	0.851	0.09	0.363
BS-NoRu-Q1 (BTr)	2010	102.451	510.449	443.759	139.316	7.988	1.016	0.386	0.574
BS-NoRu-Q1 (BTr)	2011	52.883	123.634	469.482	290.036	65.236	1.416	1.121	0.184
BS-NoRu-Q1 (BTr)	2012	316.077	28.785	74.714	267.945	154.601	24.766	3.115	0.391
BS-NoRu-Q1 (BTr)	2013	57.444	143.984	22.019	33.624	191.145	69.385	6.114	0.076
BS-NoRu-Q1 (BTr)	2014	381.173	32.729	104.397	23.257	50.035	97.536	38.692	2.425
BS-NoRu-Q1 (BTr)	2015	30.615	187.035	43.601	39.44	14.668	18.735	30.744	10.2
BS-NoRu-Q1 (BTr)	2016	163.385	34.342	115.597	22.406	41.948	12.437	32.396	33.161
BS-NoRu-Q1 (BTr)	2017	134.9	105.5	7.553	55.338	9.692	15.6	2.527	23.861
BS-NoRu-Q1 (BTr)	2018	336.307	86.656	65.764	7.771	15.59	3.621	2.564	11.931
BS-NoRu-Q1 (BTr)	2019	1075.552	187.224	49.399	16.996	4.038	2.948	0.736	1.91
BS-NoRu-Q1 (BTr)	2020	424.225	586.985	99.123	22.08	6.057	2.605	1.042	2.827
BS-NoRu-Q1 (BTr)	2021	111.35	176.57	265.49	19.32	3.57	0.68	0.19	0.72
BS-NoRu-Q1 (BTr)	2022	12.226	86.54	121.699	113.566	9.099	0.617	0.113	0.44
BS-NoRu-Q1 (BTr)	2023	82.055	8.058	50.201	49.022	33.313	2.168	0.096	0.318
BS-NoRu-Q1 (BTr)	2024	346.71	40.855	3.345	15.762	12.595	7.724	0.355	0.119
BS-NoRu-Q1 (BTr)	2025	477.03	186.551	17.784	2.422	7.565	5.048	2.564	0.146
BS-NoRu-Q1 (BTr)	2026	218.35	277.672	131.819	13.537	6.559	5.106	2.815	0.588
FLT007: Eco-NoRu-Q3 (Btr)	2004	123.368	70.303	69.118	31.482	2.989	1.721	0.22	
FLT007: Eco-NoRu-Q3 (Btr)	2005	324.56	89.531	30.44	32.246	15.035	0.472	1.116	
FLT007: Eco-NoRu-Q3 (Btr)	2006	107.467	124.64	41.597	18.98	17.482	7.289	1.384	
FLT007: Eco-NoRu-Q3 (Btr)	2007	1282.94	88.498	90.369	19.227	5.881	7.102	3.209	
FLT007: Eco-NoRu-Q3 (Btr)	2008	1154.869	405.999	43.133	35.517	4.94	2.514	2.539	
FLT007: Eco-NoRu-Q3 (Btr)	2009	650.742	619.088	305.883	21.045	6.549	0.87	0.576	
FLT007: Eco-NoRu-Q3 (Btr)	2010	184.001	865.318	666.439	147.72	15.84	2.73	0.589	
FLT007: Eco-NoRu-Q3 (Btr)	2011	40.446	73.802	392.93	301.368	37.357	2.972	0.514	
FLT007: Eco-NoRu-Q3 (Btr)	2012	92.468	20.348	67.607	214.052	152.03	12.739	2.003	
FLT007: Eco-NoRu-Q3 (Btr)	2013	25.779	65.228	19.575	50.846	150.131	76.427	7.561	
FLT007: Eco-NoRu-Q3 (Btr)	2014	261.631	40.768	70.161	25.781	60.452	85.771	19.646	
FLT007: Eco-NoRu-Q3 (Btr)	2015	42.148	213.636	25.132	37.111	20.577	47.868	42.903	
FLT007: Eco-NoRu-Q3 (Btr)	2016	209.303	34.43	184.09	47.965	56.787	40.367	125.907	
FLT007: Eco-NoRu-Q3 (Btr)	2017	70.313	70.306	11.47	20.537	3.963	4.025	15.265	
FLT007: Eco-NoRu-Q3 (Btr)	2018	-1	-1	-1	-1	-1	-1	-1	

FLT007: Eco-NoRu-Q3 (Btr)	2019	896.982	160.736	38.067	15.133	5.303	5.037	11.56	
FLT007: Eco-NoRu-Q3 (Btr)	2020	204.059	341.372	58.813	4.918	1.959	0.802	1.483	
FLT007: Eco-NoRu-Q3 (Btr)	2021	129.533	345.768	330.627	32.25	5.446	0.885	1.41	
FLT007: Eco-NoRu-Q3 (Btr)	2022	-1	-1	-1	-1	-1	-1	-1	
FLT007: Eco-NoRu-Q3 (Btr)	2023	182.62	13.345	37.289	36.344	12.06	0.456	0.341	
FLT007: Eco-NoRu-Q3 (Btr)	2024	213.83	26.90	19.47	17.33	13.40	3.17	0.97	
FLT007: Eco-NoRu-Q3 (Btr)	2025	287.805	138.164	18.465	7.937	8.828	7.655	1.504	

Table 4.10 SAM model configuration used. Updated at WKDEM 2020.

#Configuration saved: Wed Feb 12 12:57:09 2020
Where a matrix is specified rows corresponds to fleets and columns to ages.
Same number indicates same parameter used
Numbers (integers) starts from zero and must be consecutive
$minAge
The minimum age class in the assessment
3
$maxAge
The maximum age class in the assessment
13
$maxAgePlusGroup
Is last age group considered a plus group for each fleet (1 yes, or 0 no).
1 1 1 1 1
$keyLogFsta
Coupling of the fishing mortality states (nomally only first row is used).
0 1 2 3 4 5 5 5 5 5
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
$corFlag
Correlation of fishing mortality across ages (0 independent, 1 compound symmetry, 2 AR(1), 3 separable AR(1).
2
$keyLogFpar
Coupling of the survey catchability parameters (nomally first row is not used, as that is covered by fishing mortality).
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
0 1 1 1 1 1 -1 -1 -1 -1 -1
2 3 3 3 3 4 4 -1 -1 -1 -1
5 6 6 6 6 7 7 7 -1 -1 -1

8 9 9 9 9 9 9 -1 -1 -1 -1
$keyQpow
Density dependent catchability power parameters (if any).
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
0 0 0 0 0 0 0 -1 -1 -1 -1
1 1 1 1 1 2 2 -1 -1 -1 -1
3 3 3 3 3 4 4 4 -1 -1 -1
5 5 5 5 5 5 5 -1 -1 -1 -1
$keyVarF
Coupling of process variance parameters for log(F)-process (nomally only first row is used)
0 1 1 1 1 1 1 1 1 1 1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
-1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1
$keyVarLogN
Coupling of process variance parameters for log(N)-process
0 1 1 1 1 1 1 1 1 1 1
$keyVarObs
Coupling of the variance parameters for the observations.
0 1 2 2 2 2 2 2 2 2 2
3 3 3 3 3 3 3 -1 -1 -1 -1
4 4 4 4 4 4 4 4 -1 -1 -1
5 5 5 5 5 5 5 5 -1 -1 -1
6 6 6 6 6 6 6 -1 -1 -1 -1
$obsCorStruct
Covariance structure for each fleet ("ID" independent, "AR" AR(1), or "US" for unstructured). | Possible values are: "ID" "AR" "US"
"ID" "AR" "AR" "AR" "AR"
$keyCorObs
Coupling of correlation parameters can only be specified if the AR(1) structure is chosen above.
NA's indicate where correlation parameters can be specified (-1 where they cannot).
#V1 V2 V3 V4 V5 V6 V7 V8 V9 V10
NA NA NA NA NA NA NA NA NA NA
0 1 1 1 2 -1 -1 -1 -1 -1
3 3 3 3 3 4 -1 -1 -1 -1
5 5 5 5 5 6 6 -1 -1 -1
7 7 7 7 7 7 7 -1 -1 -1 -1

$stockRecruitmentModelCode
Stock recruitment code (0 for plain random walk, 1 for Ricker, 2 for Beverton–Holt, and 3 piece-wise constant).
0
$noScaledYears
Number of years where catch scaling is applied.
0
$keyScaledYears
A vector of the years where catch scaling is applied.
$keyParScaledYA
A matrix specifying the couplings of scale parameters (nrow = no scaled years, ncols = no ages).
$fbarRange
lowest and higest age included in Fbar
4 7
$keyBiomassTreat
To be defined only if a biomass survey is used (0 SSB index, 1 catch index, 2 FSB index, 3 total catch, 4 total landings and 5 TSB index).
-1 -1 -1 -1 -1
$obsLikelihoodFlag
Option for observational likelihood | Possible values are: "LN" "ALN"
"LN" "LN" "LN" "LN" "LN"
$fixVarToWeight
If weight attribute is supplied for observations this option sets the treatment (0 relative weight, 1 fix variance to weight).
0
$fracMixF
The fraction of t(3) distribution used in logF increment distribution
0
$fracMixN
The fraction of t(3) distribution used in logN increment distribution
0
$fracMixObs
A vector with same length as number of fleets, where each element is the fraction of t(3) distribution used in the distribution of that fleet
0 0 0 0 0
$constRecBreaks
This option is only used in combination with stock-recruitment code 3)
$predVarObsLink
Coupling of parameters used in a mean-variance link for observations.
0 1 2 2 2 2 2 2 2 2 2

3 3 3 3 3 3 -1 -1 -1 -1 -1
4 4 4 4 4 4 4 -1 -1 -1 -1
5 5 5 5 5 5 5 5 -1 -1 -1
6 6 6 6 6 6 6 -1 -1 -1 -1

Table 4.11. Northeast Arctic haddock. SAM model. Estimated recruitment, spawning-stock biomass (SSB), and average fishing mortality (Fbar ages 4-7).

Year	R(age 3)	Low	High	SSB	Low	High	Fbar(4-7)	Low	High	TSB	Low	High
1950	108975	69200	171613	213259	190992	238122	0.791	0.671	0.934	396948	355987	442621
1951	626475	414440	946990	124916	110841	140777	0.683	0.576	0.809	425240	339487	532653
1952	84126	53968	131137	101095	88307	115735	0.702	0.588	0.839	416228	332653	520800
1953	1163158	771004	1754771	120244	103875	139192	0.533	0.441	0.643	706848	545804	915408
1954	129495	83074	201856	172738	146665	203445	0.432	0.357	0.524	806629	640047	1016567
1955	58074	36824	91585	310673	265319	363780	0.446	0.371	0.537	839161	708243	994279
1956	220402	140946	344651	366165	311932	429828	0.472	0.393	0.567	683438	587391	795189
1957	59800	37971	94179	253535	217248	295883	0.427	0.356	0.512	432670	375790	498160
1958	72625	46638	113094	181675	157717	209271	0.518	0.431	0.622	314155	276432	357025
1959	381171	251352	578038	125232	108736	144230	0.448	0.370	0.542	330254	272516	400226
1960	314624	205972	480589	112570	99276	127645	0.543	0.454	0.649	415097	346324	497526
1961	142377	93415	217003	124424	110803	139719	0.664	0.563	0.785	399923	347875	459758
1962	289382	191296	437762	124892	110886	140668	0.790	0.671	0.929	374055	322557	433775
1963	308080	205451	461975	94156	82822	107041	0.755	0.634	0.900	349778	293335	417083
1964	345532	229076	521191	84259	74030	95900	0.632	0.525	0.760	381621	316792	459718
1965	124855	81036	192368	102756	89698	117716	0.526	0.436	0.635	383328	324513	452801
1966	307137	201411	468363	145018	126243	166586	0.558	0.465	0.669	446919	382143	522676
1967	333881	218503	510183	150725	129941	174834	0.444	0.367	0.536	459783	387194	545979
1968	18438	11396	29833	167318	144889	193218	0.485	0.401	0.587	423703	359798	498957
1969	20247	12493	32815	166972	143515	194263	0.415	0.340	0.508	314691	269723	367156
1970	204516	131956	316975	154575	131168	182159	0.387	0.314	0.477	283872	239532	336418
1971	109298	70747	168855	126992	107089	150595	0.330	0.265	0.411	261782	222673	307760
1972	1061088	693218	1624175	127984	111205	147295	0.654	0.537	0.796	603662	460912	790624
1973	307820	203349	465965	125082	107688	145286	0.537	0.440	0.655	637763	513168	792609
1974	64891	42027	100194	153299	133659	175826	0.505	0.418	0.611	461411	398619	534095
1975	58650	37995	90533	194035	166235	226484	0.498	0.416	0.596	376963	327226	434260
1976	59825	38053	94055	195625	167934	227882	0.720	0.607	0.854	294691	257913	336714
1977	120585	75893	191594	118638	100026	140714	0.733	0.606	0.887	200355	171691	233804
1978	211921	139985	320822	80868	66996	97613	0.626	0.510	0.768	197921	163671	239339

1979	158205	104083	240469	62284	52415	74010	0.581	0.470	0.719	204480	170274	245557
1980	22785	14156	36673	62627	53211	73711	0.475	0.382	0.590	211882	177122	253463
1981	10708	6373	17991	72555	61373	85774	0.437	0.351	0.544	167779	141654	198721
1982	16321	9924	26842	68425	56630	82678	0.384	0.306	0.483	122370	102490	146106
1983	8129	4713	14022	58242	47871	70861	0.350	0.275	0.447	87418	73224	104362
1984	13175	8018	21648	53016	43256	64980	0.315	0.245	0.406	71427	59643	85540
1985	359863	235776	549255	48976	40761	58846	0.399	0.314	0.506	191699	141074	260491
1986	479062	315288	727907	54773	46448	64589	0.535	0.427	0.670	375116	295626	475980
1987	91041	58739	141107	77835	66526	91066	0.626	0.505	0.777	356652	298070	426746
1988	39374	24623	62961	79954	67304	94982	0.510	0.410	0.635	254090	215507	299582
1989	28106	17315	45623	84346	69533	102316	0.372	0.295	0.468	192428	161199	229707
1990	36550	23359	57187	85453	69655	104834	0.213	0.167	0.272	152597	127613	182472
1991	109392	76718	155981	99757	83823	118720	0.240	0.192	0.300	184695	157660	216366
1992	322112	228798	453484	109994	95092	127232	0.295	0.239	0.365	287369	241224	342342
1993	820866	597223	1128259	124323	109641	140971	0.318	0.260	0.389	515204	427567	620803
1994	391874	319749	480270	159634	142857	178380	0.372	0.308	0.450	640613	563159	728719
1995	99788	78491	126862	195127	174318	218420	0.302	0.255	0.359	636892	565165	717722
1996	98928	78211	125133	225984	202098	252692	0.370	0.315	0.433	553332	494930	618625
1997	119383	94679	150534	196094	174959	219783	0.447	0.379	0.528	401220	360967	445962
1998	63142	49224	80995	135279	120030	152464	0.453	0.381	0.540	266534	239332	296828
1999	146665	118330	181784	97816	86869	110142	0.463	0.385	0.557	231915	207564	259124
2000	82738	65415	104648	81102	71925	91450	0.343	0.282	0.417	212902	188842	240027
2001	358864	296770	433949	95199	85069	106534	0.370	0.308	0.444	315552	280268	355278
2002	387214	319588	469149	113400	101419	126797	0.354	0.295	0.425	431620	383246	486099
2003	336975	274115	414251	143435	128995	159493	0.428	0.362	0.505	502966	449997	562170
2004	256950	211827	311685	162252	145906	180431	0.393	0.335	0.461	490050	441211	544294
2005	356172	295410	429433	173912	156429	193348	0.408	0.348	0.478	507393	457634	562563
2006	153951	125623	188667	157402	141536	175047	0.372	0.316	0.438	436144	393507	483400
2007	510002	422077	616243	159330	143627	176750	0.387	0.328	0.457	494790	445380	549681
2008	1058248	885209	1265111	168146	150560	187786	0.319	0.268	0.381	717424	636660	808434
2009	988708	829190	1178914	189554	169966	211399	0.266	0.223	0.316	972669	861716	1097907
2010	233811	191810	285008	254839	228388	284354	0.252	0.213	0.297	1099057	974166	1239960
2011	115838	92414	145200	369752	331360	412592	0.263	0.226	0.307	1153415	1029185	1292641
2012	334439	275411	406117	488053	434311	548446	0.226	0.192	0.265	1148866	1026506	1285811
2013	117758	94290	147066	536597	475416	605651	0.152	0.127	0.180	988951	882878	1107768
2014	405397	335787	489437	533417	475661	598186	0.158	0.132	0.189	968962	873487	1074872
2015	71800	56590	91099	505545	455426	561180	0.193	0.162	0.230	859210	779119	947535

2016	206504	168193	253540	497770	449439	551299	0.265	0.225	0.313	788988	716479	868834
2017	192727	157269	236181	416370	378546	457973	0.356	0.302	0.418	691428	630948	757705
2018	355486	291128	434071	306104	277657	337465	0.413	0.352	0.485	599303	544534	659581
2019	785071	653022	943821	233900	212096	257947	0.449	0.380	0.530	656882	591047	730050
2020	417380	344884	505113	194343	175986	214614	0.478	0.405	0.565	668162	598517	745911
2021	155698	125253	193542	180887	163732	199841	0.498	0.424	0.585	600823	539761	668793
2022	45362	34679	59337	177659	158635	198965	0.430	0.365	0.508	487232	435796	544738
2023	172971	140297	213254	176883	157267	198946	0.442	0.375	0.521	418531	375557	466421
2024	438542	362274	530865	163034	143196	185620	0.432	0.360	0.518	433495	386395	486335
2025	494847	407801	600472	157942	135275	184408	0.381	0.305	0.477	494692	434048	563810
2026	286795	224019	367162	164781	134908	201270				525896	445158	621278

Table 4.12. Northeast Arctic haddock. SAM model estimated fishing mortality-at-age. SAM model.

Year Age	3	4	5	6	7	8	9	10	11	12	13
1950	0.193	0.477	0.746	0.872	1.069	0.896	0.896	0.896	0.896	0.896	0.896
1951	0.131	0.373	0.615	0.766	0.976	0.878	0.878	0.878	0.878	0.878	0.878
1952	0.125	0.379	0.627	0.783	1.02	0.926	0.926	0.926	0.926	0.926	0.926
1953	0.081	0.28	0.468	0.584	0.799	0.736	0.736	0.736	0.736	0.736	0.736
1954	0.055	0.21	0.36	0.471	0.689	0.647	0.647	0.647	0.647	0.647	0.647
1955	0.051	0.203	0.371	0.503	0.708	0.601	0.601	0.601	0.601	0.601	0.601
1956	0.056	0.213	0.393	0.55	0.731	0.622	0.622	0.622	0.622	0.622	0.622
1957	0.05	0.201	0.37	0.494	0.643	0.55	0.55	0.55	0.55	0.55	0.55
1958	0.062	0.239	0.453	0.601	0.777	0.688	0.688	0.688	0.688	0.688	0.688
1959	0.062	0.232	0.413	0.524	0.622	0.567	0.567	0.567	0.567	0.567	0.567
1960	0.095	0.319	0.539	0.636	0.677	0.617	0.617	0.617	0.617	0.617	0.617
1961	0.126	0.406	0.682	0.783	0.787	0.694	0.694	0.694	0.694	0.694	0.694
1962	0.159	0.499	0.849	0.939	0.871	0.725	0.725	0.725	0.725	0.725	0.725
1963	0.141	0.467	0.802	0.906	0.847	0.684	0.684	0.684	0.684	0.684	0.684
1964	0.1	0.361	0.635	0.767	0.764	0.646	0.646	0.646	0.646	0.646	0.646
1965	0.078	0.295	0.517	0.636	0.656	0.566	0.566	0.566	0.566	0.566	0.566
1966	0.092	0.331	0.565	0.666	0.669	0.556	0.556	0.556	0.556	0.556	0.556
1967	0.073	0.272	0.45	0.517	0.537	0.465	0.465	0.465	0.465	0.465	0.465
1968	0.086	0.303	0.494	0.556	0.587	0.512	0.512	0.512	0.512	0.512	0.512
1969	0.081	0.274	0.433	0.472	0.483	0.417	0.417	0.417	0.417	0.417	0.417
1970	0.083	0.269	0.407	0.431	0.441	0.382	0.382	0.382	0.382	0.382	0.382
1971	0.073	0.239	0.355	0.358	0.368	0.325	0.325	0.325	0.325	0.325	0.325

1972	0.211	0.509	0.757	0.694	0.654	0.545	0.545	0.545	0.545	0.545	0.545
1973	0.215	0.49	0.642	0.534	0.482	0.387	0.387	0.387	0.387	0.387	0.387
1974	0.189	0.434	0.55	0.516	0.52	0.458	0.458	0.458	0.458	0.458	0.458
1975	0.205	0.457	0.55	0.497	0.488	0.418	0.418	0.418	0.418	0.418	0.418
1976	0.316	0.643	0.787	0.725	0.725	0.637	0.637	0.637	0.637	0.637	0.637
1977	0.353	0.702	0.849	0.721	0.659	0.561	0.561	0.561	0.561	0.561	0.561
1978	0.239	0.547	0.728	0.648	0.579	0.507	0.507	0.507	0.507	0.507	0.507
1979	0.168	0.446	0.67	0.651	0.559	0.502	0.502	0.502	0.502	0.502	0.502
1980	0.103	0.323	0.529	0.564	0.484	0.458	0.458	0.458	0.458	0.458	0.458
1981	0.087	0.282	0.477	0.539	0.448	0.429	0.429	0.429	0.429	0.429	0.429
1982	0.076	0.251	0.417	0.478	0.39	0.382	0.382	0.382	0.382	0.382	0.382
1983	0.075	0.246	0.386	0.425	0.344	0.34	0.34	0.34	0.34	0.34	0.34
1984	0.066	0.226	0.347	0.376	0.312	0.294	0.294	0.294	0.294	0.294	0.294
1985	0.075	0.26	0.417	0.485	0.434	0.414	0.414	0.414	0.414	0.414	0.414
1986	0.089	0.315	0.542	0.664	0.619	0.585	0.585	0.585	0.585	0.585	0.585
1987	0.1	0.358	0.642	0.783	0.723	0.658	0.658	0.658	0.658	0.658	0.658
1988	0.073	0.279	0.513	0.654	0.594	0.54	0.54	0.54	0.54	0.54	0.54
1989	0.054	0.217	0.387	0.465	0.417	0.367	0.367	0.367	0.367	0.367	0.367
1990	0.027	0.127	0.216	0.258	0.251	0.235	0.235	0.235	0.235	0.235	0.235
1991	0.029	0.135	0.243	0.293	0.288	0.265	0.265	0.265	0.265	0.265	0.265
1992	0.031	0.146	0.292	0.367	0.375	0.345	0.345	0.345	0.345	0.345	0.345
1993	0.025	0.131	0.293	0.408	0.441	0.404	0.404	0.404	0.404	0.404	0.404
1994	0.023	0.127	0.308	0.475	0.579	0.549	0.549	0.549	0.549	0.549	0.549
1995	0.018	0.102	0.237	0.371	0.5	0.495	0.495	0.495	0.495	0.495	0.495
1996	0.024	0.126	0.291	0.444	0.616	0.625	0.625	0.625	0.625	0.625	0.625
1997	0.033	0.16	0.376	0.537	0.716	0.69	0.69	0.69	0.69	0.69	0.69
1998	0.039	0.179	0.401	0.552	0.681	0.683	0.683	0.683	0.683	0.683	0.683
1999	0.047	0.203	0.431	0.561	0.659	0.633	0.633	0.633	0.633	0.633	0.633
2000	0.033	0.159	0.325	0.414	0.474	0.446	0.446	0.446	0.446	0.446	0.446
2001	0.035	0.165	0.357	0.458	0.499	0.458	0.458	0.458	0.458	0.458	0.458
2002	0.031	0.153	0.323	0.452	0.487	0.431	0.431	0.431	0.431	0.431	0.431
2003	0.037	0.172	0.371	0.533	0.635	0.576	0.576	0.576	0.576	0.576	0.576
2004	0.036	0.161	0.334	0.488	0.589	0.557	0.557	0.557	0.557	0.557	0.557
2005	0.038	0.165	0.338	0.497	0.63	0.609	0.609	0.609	0.609	0.609	0.609
2006	0.037	0.16	0.317	0.447	0.566	0.557	0.557	0.557	0.557	0.557	0.557
2007	0.039	0.16	0.321	0.469	0.6	0.586	0.586	0.586	0.586	0.586	0.586
2008	0.026	0.116	0.235	0.388	0.54	0.538	0.538	0.538	0.538	0.538	0.538

2009	0.021	0.092	0.185	0.314	0.472	0.491	0.491	0.491	0.491	0.491	0.491
2010	0.02	0.088	0.175	0.295	0.448	0.5	0.5	0.5	0.5	0.5	0.5
2011	0.022	0.092	0.19	0.313	0.458	0.505	0.505	0.505	0.505	0.505	0.505
2012	0.021	0.085	0.164	0.271	0.383	0.415	0.415	0.415	0.415	0.415	0.415
2013	0.014	0.063	0.111	0.175	0.258	0.321	0.321	0.321	0.321	0.321	0.321
2014	0.016	0.07	0.123	0.182	0.257	0.355	0.355	0.355	0.355	0.355	0.355
2015	0.022	0.09	0.161	0.226	0.295	0.406	0.406	0.406	0.406	0.406	0.406
2016	0.029	0.118	0.226	0.317	0.401	0.52	0.52	0.52	0.52	0.52	0.52
2017	0.038	0.152	0.306	0.443	0.522	0.601	0.601	0.601	0.601	0.601	0.601
2018	0.038	0.16	0.352	0.531	0.609	0.653	0.653	0.653	0.653	0.653	0.653
2019	0.036	0.162	0.381	0.612	0.64	0.624	0.624	0.624	0.624	0.624	0.624
2020	0.038	0.169	0.404	0.646	0.694	0.64	0.64	0.64	0.64	0.64	0.64
2021	0.039	0.172	0.409	0.664	0.746	0.71	0.71	0.71	0.71	0.71	0.71
2022	0.04	0.167	0.365	0.553	0.637	0.595	0.595	0.595	0.595	0.595	0.595
2023	0.047	0.19	0.389	0.564	0.625	0.566	0.566	0.566	0.566	0.566	0.566
2024	0.048	0.194	0.394	0.542	0.597	0.526	0.526	0.526	0.526	0.526	0.526
2025	0.04	0.172	0.352	0.477	0.524	0.454	0.454	0.454	0.454	0.454	0.454

Table 4.13. Northeast Arctic haddock. SAM model. Estimated stock numbers-at-age.

Year Age	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1950	108975	99599	74061	36852	46655	16609	4895	2691	1380	1455	2053
1951	626475	55877	45195	26909	12667	12380	5392	1927	1004	443	1085
1952	84126	425585	32329	19096	8988	4317	3834	1640	736	356	507
1953	1163158	49946	209395	14419	6396	2655	1336	1057	536	254	310
1954	129495	885043	25719	91452	6989	2341	1093	550	389	200	229
1955	58074	83666	622875	14511	52016	3118	923	455	237	161	169
1956	220402	40653	55585	322756	7228	17748	1447	403	215	113	154
1957	59800	148176	27602	35816	111219	3103	6152	704	168	99	130
1958	72625	39939	91857	15460	20729	40279	1636	2508	352	84	119
1959	381171	51462	25991	39855	7324	7295	14930	728	902	147	88
1960	314624	264249	35649	15581	16991	3469	3663	6179	362	370	108
1961	142377	191313	144952	17648	6947	7990	1591	1506	2797	157	204
1962	289382	85636	92245	59624	6750	2692	3268	657	609	1160	139
1963	308080	175744	37899	26509	17578	2636	1081	1221	272	243	535
1964	345532	197308	75452	12303	7723	5831	1217	437	505	121	344

1965	124855	237593	114335	30311	4187	2802	2265	533	198	217	210
1966	307137	81988	158105	61952	12371	1710	1281	944	271	91	186
1967	333881	198912	43401	72374	24803	4870	791	603	450	132	131
1968	18438	245054	117437	21830	36079	12480	2352	410	314	233	137
1969	20247	12002	140845	54976	10667	15758	5748	1165	197	157	175
1970	204516	12535	7511	69987	25082	5892	8041	3004	644	106	186
1971	109298	133346	7082	4490	33287	12255	3346	4534	1689	371	163
1972	1061088	80107	81699	4499	3092	17508	6715	2006	2767	1024	315
1973	307820	614362	46172	23263	1690	1541	7612	2891	920	1374	608
1974	64891	167462	250292	16511	10666	877	1005	4434	1670	542	1215
1975	58650	36996	89946	139779	6799	4955	446	558	2138	811	930
1976	59825	33618	16490	44116	78895	3151	2768	245	331	1144	964
1977	120585	30577	13765	6427	17596	30314	1286	1184	102	148	807
1978	211921	54975	9685	4451	2891	7722	15054	628	562	44	429
1979	158205	116783	23270	3238	2036	1398	4087	7066	336	272	225
1980	22785	101682	58337	8326	1151	1045	713	2158	3481	174	239
1981	10708	16004	62962	26227	3461	549	557	379	1138	1716	214
1982	16321	7062	11133	31566	10516	1718	276	306	217	623	958
1983	8129	11181	4740	6820	13509	5581	980	145	177	126	803
1984	13175	4963	6660	2788	3893	8772	2871	575	79	104	517
1985	359863	8970	2843	3592	1804	2562	5335	1832	367	51	396
1986	479062	278093	5211	1568	1838	996	1467	2779	1021	204	260
1987	91041	251144	156908	2543	644	787	471	677	1202	469	208
1988	39374	70037	135597	46591	1072	230	317	205	301	505	279
1989	28106	25876	49097	70790	12171	551	94	150	99	144	362
1990	36550	20634	17138	26037	32573	5453	355	57	86	56	274
1991	109392	24721	13540	14057	20091	20086	3111	249	39	56	202
1992	322112	83243	15884	10067	10367	12504	12510	1867	164	25	155
1993	820866	221336	57233	10655	5899	6195	7565	7185	1036	100	105
1994	391874	571338	152953	31601	4700	3111	3710	4699	4257	584	114
1995	99788	223916	426415	77999	14673	2085	1413	1843	2160	2106	333
1996	98928	61480	167426	246079	32174	7175	1079	701	922	1082	1240
1997	119383	55872	38053	95886	103434	13867	2488	489	309	408	1074
1998	63142	80677	35423	18027	36960	38560	5184	977	208	129	694
1999	146665	48831	47567	17571	8918	15680	13710	1892	404	92	379
2000	82738	117757	31110	21494	6930	4250	6513	5357	799	184	225
2001	358864	69322	92990	16896	10218	3472	2550	3469	2629	429	231

2002	387214	293667	52046	47599	9198	5453	1861	1425	1900	1378	345
2003	336975	257788	192731	34536	24619	4570	3445	1203	815	1074	977
2004	256950	171382	163823	111262	16362	10687	2134	1640	604	386	1050
2005	356172	171566	94813	110058	50545	6608	5467	1134	724	303	773
2006	153951	216856	109126	52210	44938	20543	3191	2789	552	341	525
2007	510002	121128	165266	61787	26933	19035	8108	1738	1459	282	434
2008	1058248	451315	96907	103435	21896	14048	7072	3271	882	707	350
2009	988708	699320	370783	61951	40303	10248	5295	3115	1442	486	581
2010	233811	662958	589012	232333	32173	15044	4800	2715	1593	772	631
2011	115838	190419	539285	417369	122872	13943	6191	2116	1333	819	807
2012	334439	72947	136377	392253	264407	54702	6047	2545	1024	688	920
2013	117758	200113	57697	93933	273035	126674	23771	3117	1389	580	961
2014	405397	73302	146474	49621	87017	144407	61877	10829	1841	870	976
2015	71800	281444	66070	92443	40396	68286	73527	25707	5333	1002	1012
2016	206504	49731	166886	45992	61953	32968	49053	37849	12796	2552	986
2017	192727	174811	33585	109746	28026	36321	18478	21686	17864	5578	1461
2018	355486	135162	124613	24584	43446	14418	17633	8777	9153	8423	3093
2019	785071	237341	87821	62511	16204	17091	6798	7476	3610	3803	4178
2020	417380	504611	154540	44865	21988	8258	6929	3336	3134	1697	3251
2021	155698	258114	335157	65715	17734	7725	3741	2791	1563	1418	2123
2022	45362	140507	180186	158663	25668	6035	2780	1482	1078	657	1399
2023	172971	35491	105900	111212	68224	9134	2443	1153	657	501	923
2024	438542	106760	29648	62168	53594	27846	3556	1076	515	315	667
2025	494847	278704	63352	20775	34143	28195	12070	1569	492	245	469
2026	286795	328338	191294	32917	13422	17084	14200	6011	811	255	370

Table 4.14. Northeast Arctic haddock. SAM model. Natural mortality estimated age 3-6 from 0.20 + consumption from cod, ages 7-13+ natural mortality set to 0.2.

Year	3	4	5	6	7	8	9	10	11	12	13
1950	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1951	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1952	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1953	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1954	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1955	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1956	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2

1957	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1958	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1959	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1960	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1961	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1962	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1963	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1964	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1965	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1966	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1967	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1968	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1969	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1970	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1971	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1972	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1973	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1974	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1975	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1976	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1977	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1978	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1979	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1980	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1981	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1982	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1983	0.335	0.253	0.241	0.239	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1984	0.216	0.221	0.213	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1985	0.209	0.201	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1986	0.644	0.264	0.2	0.21	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1987	0.2	0.208	0.423	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1988	0.38	0.2	0.2	0.394	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1989	0.2	0.2	0.2	0.234	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1990	0.328	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1991	0.202	0.215	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1992	0.215	0.205	0.202	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1993	0.253	0.248	0.276	0.259	0.2	0.2	0.2	0.2	0.2	0.2	0.2

1994	0.29	0.213	0.293	0.226	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1995	0.384	0.34	0.315	0.291	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1996	0.721	0.32	0.249	0.279	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1997	0.507	0.266	0.256	0.281	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1998	0.231	0.293	0.27	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
1999	0.2	0.209	0.277	0.264	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2000	0.214	0.2	0.216	0.245	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2001	0.21	0.2	0.226	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2002	0.324	0.212	0.2	0.204	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2003	0.416	0.249	0.207	0.202	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2004	0.415	0.3	0.2	0.229	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2005	0.397	0.304	0.231	0.272	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2006	0.222	0.215	0.276	0.21	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2007	0.292	0.2	0.237	0.326	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2008	0.369	0.273	0.263	0.336	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2009	0.4	0.245	0.278	0.255	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2010	0.355	0.244	0.268	0.28	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2011	0.523	0.46	0.3	0.222	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2012	0.585	0.309	0.202	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2013	0.459	0.336	0.246	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2014	0.283	0.206	0.219	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2015	0.34	0.395	0.21	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2016	0.302	0.2	0.244	0.226	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2017	0.341	0.296	0.234	0.408	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2018	0.437	0.268	0.271	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2019	0.374	0.266	0.229	0.288	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2020	0.349	0.364	0.303	0.231	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2021	0.211	0.2	0.251	0.23	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2022	0.294	0.2	0.2	0.23	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2023	0.284	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2024	0.26	0.268	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2025	0.242	0.214	0.231	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Table 4.15. Northeast Arctic haddock. Summary XSA (p-shrinkage not applied, F shrinkage= 0.5). FLR Sun Jun 07 18:12:33 2026.

YEAR	RECR_a3	TOTBIO	TOTSPB	LANDINGS	YIELDSSB	SOPCOFAC	FBAR 4–7
1950	81377	242086	134506	132125	0.9823	1.5897	0.832
1951	661481	353540	100989	120077	1.189	1.2272	0.6245

YEAR	RECR_a3	TOTBIO	TOTSPB	LANDINGS	YIELDSSB	SOPCOFAC	FBAR 4–7
1952	75972	234668	57411	127660	2.2236	1.7404	0.725
1953	1259420	507595	82329	123920	1.5052	1.4279	0.5165
1954	150660	535772	117103	156788	1.3389	1.474	0.3808
1955	67774	484431	178529	202286	1.1331	1.536	0.5122
1956	206229	473692	243406	213924	0.8789	1.2623	0.4335
1957	65344	325693	186191	123583	0.6637	1.2455	0.4328
1958	85964	276341	156887	112672	0.7182	1.1252	0.519
1959	393814	362901	133174	88211	0.6624	0.9405	0.3678
1960	286609	399398	114524	154651	1.3504	1.0411	0.4848
1961	129395	390264	129842	193224	1.4881	0.9942	0.6372
1962	287850	345126	118769	187408	1.5779	1.0518	0.8012
1963	337017	309151	82565	146224	1.771	1.1458	0.8658
1964	393442	300118	63742	99158	1.5556	1.3572	0.653
1965	122843	356627	95288	118578	1.2444	1.1507	0.494
1966	290449	386074	127372	161778	1.2701	1.1621	0.5842
1967	357971	465699	154368	136397	0.8836	0.9984	0.4155
1968	23628	420350	169353	181726	1.0731	0.9976	0.504
1969	21174	341935	183975	130820	0.7111	0.882	0.3978
1970	200167	285676	156009	88257	0.5657	0.9762	0.358
1971	121032	344493	168508	78905	0.4683	0.7638	0.247
1972	1238646	614783	122856	266153	2.1664	1.0883	0.6928
1973	338278	601032	114497	322226	2.8143	1.1656	0.5375
1974	68469	601946	200413	221157	1.1035	0.8946	0.4325
1975	59560	492138	255993	175758	0.6866	0.8957	0.4275
1976	66264	307019	206652	137264	0.6642	1.12	0.5715
1977	133294	228549	141784	110158	0.7769	1.09	0.6848
1978	211289	255050	130545	95422	0.731	0.9219	0.512
1979	174001	316950	129458	103623	0.8004	0.7684	0.5525
1980	34300	342183	133116	87889	0.6602	0.7568	0.3982
1981	13257	292302	148109	77153	0.5209	0.7174	0.402
1982	17203	211539	127150	46955	0.3693	0.7224	0.3093
1983	9488	104263	71449	24600	0.3443	1.0373	0.2718
1984	13433	83502	64118	20945	0.3267	1.0547	0.2498
1985	288301	182801	62013	45052	0.7265	0.9761	0.32
1986	532059	344447	62323	100563	1.6136	1.0484	0.4388
1987	109761	333922	75055	154916	2.064	0.992	0.5958

YEAR	RECR_a3	TOTBIO	TOTSPB	LANDINGS	YIELDSSB	SOPCOFAC	FBAR 4–7
1988	54857	260048	78425	95255	1.2146	0.9955	0.499
1989	26591	212726	91989	58518	0.6361	0.9774	0.3892
1990	36868	170775	95306	27182	0.2852	1.0159	0.1562
1991	104387	195413	110527	36216	0.3277	1.0374	0.2082
1992	207719	269289	125760	59922	0.4765	0.9797	0.2838
1993	662979	442648	130455	82379	0.6315	1.0031	0.359
1994	292594	545248	151911	135186	0.8899	1.0056	0.425
1995	97981	541645	168162	142448	0.8471	1.0247	0.3828
1996	101927	473731	194897	178128	0.914	1.0175	0.4235
1997	115890	350378	171046	154359	0.9024	1.0519	0.4862
1998	58319	250554	129384	100630	0.7778	1.0113	0.4235
1999	230871	253510	97069	83195	0.8571	1.021	0.4212
2000	89343	251597	89673	68944	0.7688	1.026	0.2802
2001	365892	359154	116827	89640	0.7673	0.9903	0.2792
2002	342478	445901	136237	114798	0.8426	1.011	0.317
2003	223214	476550	159722	138926	0.8698	1.019	0.4298
2004	224655	456467	166091	158279	0.953	1.0192	0.3812
2005	345848	471764	175770	158298	0.9006	1.0029	0.493
2006	154801	413957	148888	153157	1.0287	0.9938	0.4088
2007	657857	492281	145626	161525	1.1092	0.9916	0.4288
2008	1318145	730563	150894	155604	1.0312	0.9928	0.3962
2009	1437570	1071353	174604	200061	1.1458	1.0019	0.3592
2010	520513	1246175	241215	249200	1.0331	0.9994	0.2995
2011	242859	1279636	355362	309785	0.8717	0.9978	0.3205
2012	380170	1159385	439571	315627	0.718	0.9994	0.265
2013	150036	990311	488208	193744	0.3968	0.9967	0.133
2014	375173	991466	534860	177522	0.3319	0.9968	0.1108
2015	100476	929105	546397	194756	0.3564	0.9953	0.1588
2016	251837	836028	514444	233183	0.4533	1.0006	0.2265
2017	171446	707270	426410	227588	0.5337	0.994	0.3555
2018	314347	570693	307423	191276	0.6222	0.9943	0.4315
2019	704188	592607	222829	175402	0.7872	0.9963	0.521
2020	406618	605451	176306	182468	1.035	0.9962	0.5973
2021	193188	545641	158847	204743	1.2889	0.9981	0.6033
2022	77866	463090	153957	176906	1.1491	0.998	0.5322
2023	150727	400408	158437	178898	1.1291	0.9854	0.4942

YEAR	RECR_a3	TOTBIO	TOTSPB	LANDINGS	YIELDSSB	SOPCOFAC	FBAR 4–7
2024	372200	392974	142597	139992	0.9817	0.9956	0.4775
2025	411185	434212	125169	127074	1.0152	0.9969	0.4785

Table 4.16. Northeast Arctic haddock. Input data for recruitment prediction (RCT3)- recruits as 3 year-olds. R3: recruitment estimate from SAM 2026 NT1: Norwegian Russian winter bottom trawl survey age 1 NT2: Norwegian Russian winter bottom trawl survey age. NAK1: Norwegian Russian winter acoustic survey age 1 NAK2: Norwegian Russian winter acoustic survey age 2. ECO1: Ecosystem survey age 1. ECO2: Ecosystem survey age 2. The Russian survey (RT) was discontinued in 2017 and has not been used for recruitment forecast since.

YC	recruitment	NT1	NT2	NT3	NAK1	NAK2	NAK3	EC01	ECO2
90	820866	NA	NA	NA	NA	NA	NA	NA	NA
1991	391874	NA	NA	314.53	NA	NA	348.73	NA	NA
1992	99788	NA	224.79	54.86	NA	187.96	41.47	NA	NA
1993	98928	604.2	199.52	55.84	887.82	88.59	29.97	NA	NA
1994	119383	1429.04	265.08	79.63	1198.18	94.52	57.27	NA	NA
1995	63142	300.78	90.81	21.68	132.6	26.51	33.78	NA	NA
1996	146665	1117.83	196.7	56.92	508.87	150.99	83.67	NA	NA
1997	82738	248.27	83.2	24.08	210.96	30.11	36.39	NA	NA
1998	358864	1207.98	437.22	294	653.4	404.77	233.45	NA	NA
1999	387214	832.3	446.84	312.87	1063.01	266.12	255.2	NA	NA
2000	336975	1230.98	475.31	352.24	753.01	267.9	203.68	NA	NA
2001	256950	1700.19	471.68	173.13	1315.15	362.35	151.01	NA	NA
2002	356172	3327.32	706.61	317.89	2743.74	466.54	221.33	NA	268.46
2003	153951	700.86	386.39	78.8	528.97	143.98	56.32	188.99	114.24
2004	510002	4473.16	1310.22	443.27	2276.46	624.78	209.28	603.79	929.12
2005	1058248	4944.6	1684.83	1591.03	2091.11	953.5	812.41	2270.19	1818.93
2006	988708	3731.19	2042.01	1230.43	2015.71	1753.54	883.68	988.39	1291.86
2007	233811	853.09	317.05	102.45	778.39	209.05	128.07	322.01	143.82
2008	115838	562.61	79.89	52.88	443.93	86.03	54.16	134.83	65.09
2009	334439	1634.82	353.87	316.08	1559.42	288.27	191.63	274.35	113.56
2010	117758	676.31	137.38	57.44	428.46	94.54	67.29	105.26	41.53
2011	405397	1866.96	490.28	381.17	1583.44	407.16	334.82	591.1	222.99
2012	71800	344.58	123.95	30.61	292.71	109.92	24.35	155.94	75.05
2013	206504	1281.4	342.02	163.38	1838.71	246.59	71.81	264.81	145.25
2014	192727	1133.97	561.96	134.94	1593.12	107.18	81.15	319.96	144.86
2015	355486	2299.37	770.04	336.31	1276	331.42	171.03	793.77	189.25
2016	785071	5065.43	1675.64	1075.55	3343.93	810.16	507.61	935.79	NA
2017	417380	3823.29	1125.27	424.22	2925.9	687.8	286.32	NA	585.3
2018	155698	1898.2	267.79	109.8	1544.96	260.72	50.76	379.39	57.78

YC	recruitment	NT1	NT2	NT3	NAK1	NAK2	NAK3	EC01	ECO2
2019	45362	110.62	25.12	12.2	272.94	15.69	11.4	26.82	35.88
2020	172971	406.3	110.3	82.5	431.68	70.2	77	107.62	106.65
2021	438542	1662.1	583.9	346.71	1797.1	511.1	337.4	691.82	964.83
2022	494847	1343.8	650.98	477.03	1032.7	634.03	369.45	648.48	174.85
2023	286795	2179.51	843.01	218.35	1690.2	529.17	152.52	322.44	534.22
2024	NA	4369.68	1042.53	NA	4070.49	696.46	NA	1061.23	NA
2025	NA	1612.56	NA	NA	1300.4	NA	NA	NA	NA

Table 4.17. Northeast Arctic haddock Analysis by RCT3 ver3.1 - R translation. Data for 6 surveys over 32 year classes : 1990 – 2024 Regression type = C, Tapered time weighting applied, power = 3 over 20 years, Survey weighting not applied, Final estimates shrunk towards mean, Estimates with S.E.'S greater than that of mean included, Minimum S.E. for any survey taken as 0.2, Minimum of 3 points used for regression, Forecast/Hindcast variance correction used.

yearclass: 2023									
index	**slope**	**intercept**	**se**	**rsquare**	**n**	**indices**	**prediction**	**se.pred**	**WAP.weights**
NT1	0.886	6.122	0.462	0.781	20.000	7.687	12.935	0.533	0.047
NT2	0.761	7.940	0.350	0.861	20.000	6.738	13.069	0.409	0.080
NT3	0.670	8.937	0.106	0.985	20.000	5.391	12.549	0.121	0.333
NAK1	1.221	3.831	0.601	0.677	20.000	7.433	12.904	0.693	0.028
NAK2	0.776	8.180	0.363	0.852	20.000	6.273	13.051	0.424	0.074
NAK3	0.731	8.876	0.151	0.971	20.000	5.034	12.559	0.172	0.333
EC01	0.871	7.381	0.411	0.830	19.000	5.779	12.414	0.473	0.059
ECO2	0.929	7.623	0.562	0.694	19.000	6.283	13.456	0.691	0.028
yearclass: 2024									
index	**slope**	**intercept**	**se**	**rsquare**	**n**	**indices**	**prediction**	**se.pred**	**WAP.weights**
NT1	0.871	6.207	0.460	0.769	20.000	8.383	13.505	0.555	0.151
NT2	0.746	7.989	0.362	0.843	20.000	6.950	13.174	0.426	0.255
NT3	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAK1	1.210	3.868	0.586	0.672	20.000	8.312	13.929	0.733	0.086
NAK2	0.758	8.242	0.373	0.835	20.000	6.547	13.207	0.440	0.240
NAK3	NA	NA	NA	NA	NA	NA	NA	NA	NA
EC01	0.864	7.435	0.396	0.829	19.000	6.968	13.455	0.486	0.196
ECO2	NA	NA	NA	NA	NA	NA	NA	NA	NA
yearclass: 2025									
index	**slope**	**intercept**	**se**	**rsquare**	**n**	**indices**	**prediction**	**se.pred**	**WAP.weights**
NT1	0.864	6.261	0.472	0.763	19.000	7.386	12.640	0.546	0.480
NT2	NA	NA	NA	NA	NA	NA	NA	NA	NA
NT3	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAK1	1.217	3.820	0.600	0.666	19.000	7.171	12.544	0.692	0.299

NAK2	NA	NA	NA	NA	NA	NA	NA	NA	NA
NAK3	NA	NA	NA	NA	NA	NA	NA	NA	NA
EC01	NA	NA	NA	NA	NA	NA	NA	NA	NA
ECO2	NA	NA	NA	NA	NA	NA	NA	NA	NA
Year-class	**WAP**	**logWAP**	**int.se**						
2023	318932	12.67	0.09						
2024	594395	13.30	0.22						
2025	284429	12.56	0.38						

Table 4.18. Northeast Arctic haddock. Prediction with management option table: Input data (based on SAM estimates and forecast estimates according to stock annex).

2026									
	Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
	3	286795	0.262	0.023	0	0	0.218	0.041	0.631
	4	328338	0.227	0.079	0	0	0.467	0.169	0.873
	5	191294	0.21	0.244	0	0	0.852	0.345	1.205
	6	32917	0.2	0.436	0	0	1.136	0.481	1.392
	7	13422	0.2	0.764	0	0	1.769	0.53	1.836
	8	17084	0.2	0.844	0	0	1.952	0.47	1.989
	9	14200	0.2	0.907	0	0	2.235	0.47	2.228
	10	6011	0.2	0.953	0	0	2.649	0.47	2.559
	11	811	0.2	1	0	0	3.072	0.47	3.005
	12	255	0.2	1	0	0	3.664	0.47	3.406
	13	370	0.2	1	0	0	4.015	0.47	3.852
2027									
	Age	**N**	**M**	**Mat**	**PF**	**PM**	**SWt**	**Sel**	**CWt**
	3	594395	0.262	0.029	0	0	0.271	0.041	0.691
	4	0	0.227	0.065	0	0	0.413	0.169	0.815
	5	0	0.21	0.195	0	0	0.742	0.345	1.105
	6	0	0.2	0.471	0	0	1.204	0.481	1.454
	7	0	0.2	0.666	0	0	1.495	0.53	1.674
	8	0	0.2	0.89	0	0	2.186	0.47	2.085
	9	0	0.2	0.923	0	0	2.354	0.47	2.239
	10	0	0.2	0.952	0	0	2.623	0.47	2.52
	11	0	0.2	1	0	0	3.028	0.47	2.777
	12	0	0.2	1	0	0	3.26	0.47	3.166
	13	0	0.2	1	0	0	3.981	0.47	3.777
2028									

	Age	N	M	Mat	PF	PM	SWt	Sel	CWt
	3	284429	0.262	0.027	0	0	0.279	0.041	0.7
	4	0	0.227	0.082	0	0	0.475	0.169	0.882
	5	0	0.21	0.162	0	0	0.661	0.345	1.031
	6	0	0.2	0.395	0	0	1.057	0.481	1.32
	7	0	0.2	0.701	0	0	1.586	0.53	1.728
	8	0	0.2	0.827	0	0	1.879	0.47	1.948
	9	0	0.2	0.949	0	0	2.604	0.47	2.327
	10	0	0.2	0.96	0	0	2.756	0.47	2.528
	11	0	0.2	1	0	0	3.015	0.47	2.744
	12	0	0.2	1	0	0	3.23	0.47	3.013
	13	0	0.2	1	0	0	3.584	0.47	3.578

Table 4.19. Northeast Arctic haddock. Prediction with management option table for 2025-2027.

2026						
Biomass	**SSB**	**FMult**	**FBar**	**Landings**		
525894	164780	0.9369	0.3572	153293		
202 7					**202 8**	
Biomass	**SSB**	**FMult**	**FBar**	**Landings**	**Biomass**	**SSB**
643062	186998	0	0	0	835652	299789
		0.1	0.0381	22606	815269	288072
		0.2	0.0763	44415	795667	276862
		0.3	0.1144	65459	776814	266136
		0.4	0.1525	85771	758677	255872
		0.5	0.1906	105378	741226	246050
		0.6	0.2288	124311	724434	236651
		0.7	0.2669	142595	708272	227655
		0.8	0.3050	160256	692714	219044
		0.9	0.3431	177320	677735	210802
		1	0.3813	193810	663311	202912
		1.1	0.4194	209750	649419	195358
		1.2	0.4575	225160	636036	188126
		1.3	0.4956	240062	623143	181201
		1.4	0.5338	254476	610718	174570
		1.5	0.5719	268421	598742	168220
		1.6	0.6100	281916	587198	162137
		1.7	0.6481	294977	576066	156312
		1.8	0.6863	307622	565331	150732

		1.9	0.7244	319868	554976	145386
		2	0.7625	331728	544986	140264

Table 4.20. Northeast Arctic haddock. Prediction single option table for 2026-2028 based on HCR. MFDP R version data from file fhcr_fmgmt.xls. Fbar age range: 4-7. Input units are thousands and kg - output in tonnes.

Year:	2026	**F multiplier:**	0.9369	**Fbar:**	0.3572	
age	**CatchN**	**CatchYield**	**F**	**SSB (Jan)**	**StockBiomass (Jan)**	**StockN (Jan)**
3	9516	6005	0.0384	1438	62521	286795
4	43144	37665	0.1583	12113	153334	328338
5	47926	57751	0.3232	39768	162982	191294
6	10905	15179	0.4507	16304	37394	32917
7	4801	8814	0.4966	18140	23744	13422
8	5556	11050	0.4404	28146	33348	17084
9	4618	10289	0.4404	28785	31737	14200
10	1955	5002	0.4404	15175	15923	6011
11	264	793	0.4404	2491	2491	811
12	83	282	0.4404	934	934	255
13	120	463	0.4404	1486	1486	370
TOTAL	128887	153293		164780	525894	891497
Year:	2027	**F multiplier:**	0.918	**Fbar:**	0.35	
age	**CatchN**	**CatchYield**	**F**	**SSB (Jan)**	**StockBiomass (Jan)**	**StockN (Jan)**
3	19332	13358	0.0376	4671	161081	594395
4	27385	22318	0.1551	5701	87711	212375
5	54989	60763	0.3167	32315	165719	223342
6	36579	53185	0.4416	63645	135128	112232
7	6045	10119	0.4866	17098	25673	17173
8	2140	4461	0.4315	13012	14620	6688
9	2881	6450	0.4315	19566	21198	9005
10	2394	6034	0.4315	18690	19633	7485
11	1014	2815	0.4315	9594	9594	3168
12	137	433	0.4315	1394	1394	427
13	105	398	0.4315	1312	1312	329
TOTAL	153000	180336		186998	643062	1186620
Year:	2028	**F multiplier**:	0.918	**Fbar**:	0.35	
age	**CatchN**	**CatchYield**	**F**	**SSB (Jan)**	**StockBiomass (Jan)**	**StockN (Jan)**
3	9251	6475	0.0376	2143	79356	284429
4	56800	50097	0.1551	17157	209236	440497
5	35682	36788	0.3167	15519	95794	144923

6	42986	56742	0.4416	55067	139409	131892
7	20798	35940	0.4866	65691	93711	59086
8	2765	5386	0.4315	13431	16240	8643
9	1138	2648	0.4315	8789	9262	3557
10	1532	3873	0.4315	12670	13198	4789
11	1273	3494	0.4315	12001	12001	3981
12	539	1624	0.4315	5443	5443	1685
13	129	461	0.4315	1443	1443	403
TOTAL	172893	203528		209354	675094	1083885

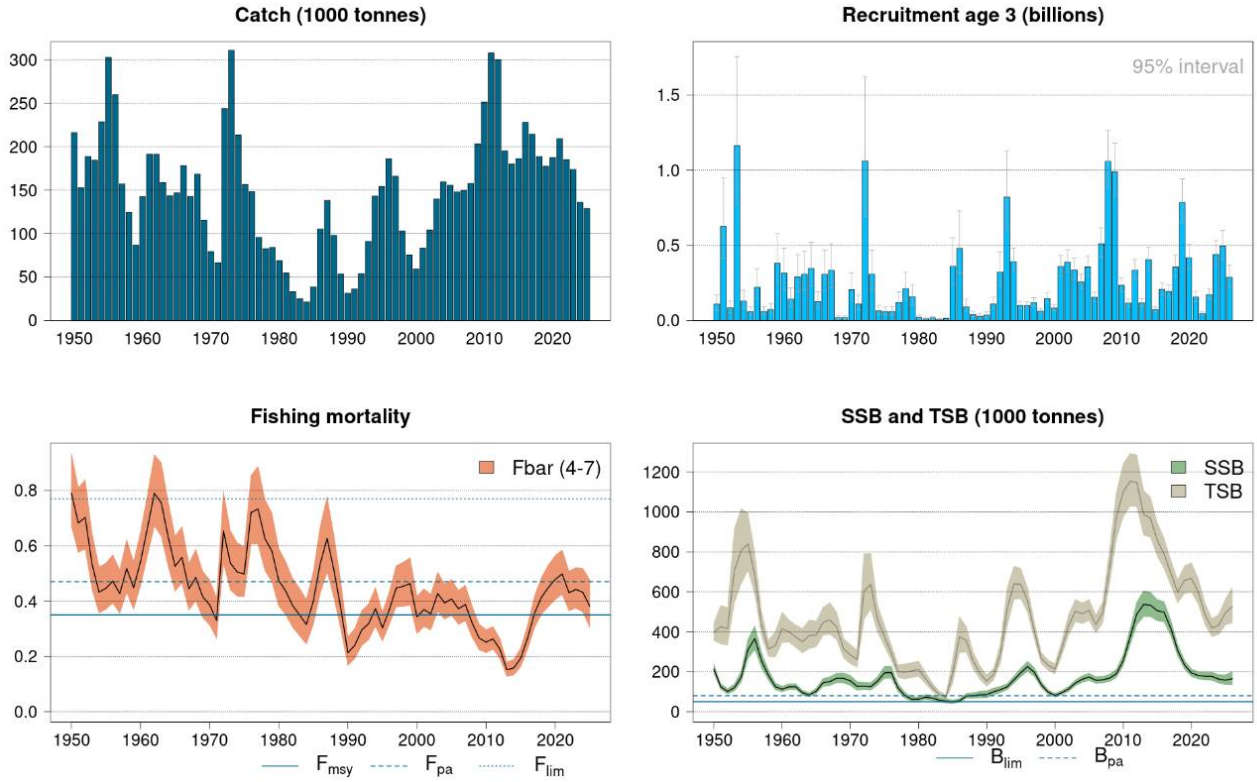

Figure 4.1. Northeast Arctic haddock landings (top left 1950-2025), recruitment (top right 1950-2026), fishing mortality (bottom left 1950-2025), and total stock biomass for ages 3+ (TSB) and spawning-stock biomass (SSB) (bottom right 1950–2026). The reference points in the SSB and TSB plot refers to the spawning stock biomass. Fishing mortality and total and spawning stock biomass are given with point wise 95% confidence intervals (shaded areas), recruitment is given with upper 95% confidence interval (bar).

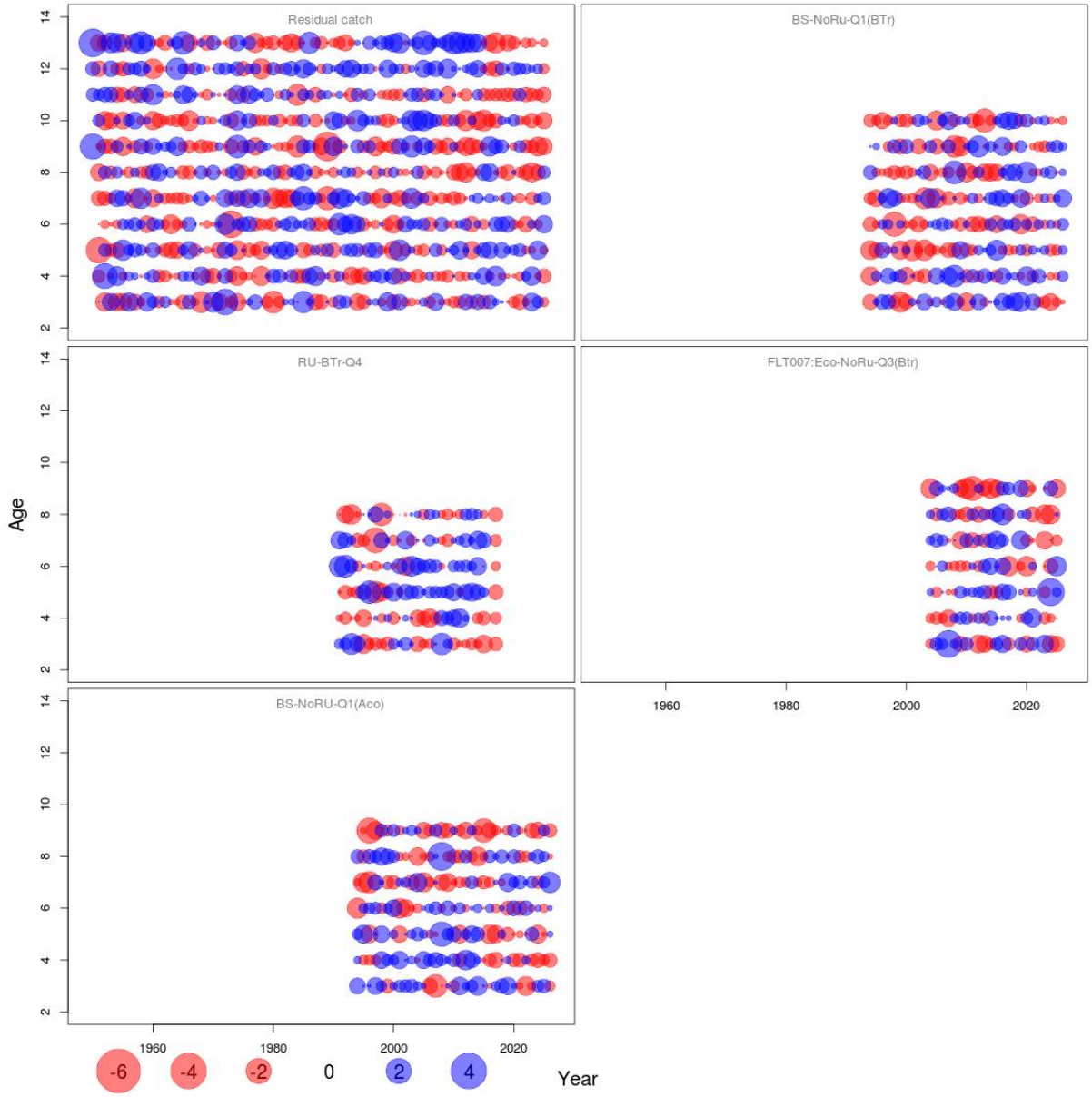

Figure 4.2. Northeast Arctic haddock; one step ahead residuals for the final SAM run 2026. Blue circles indicate positive residuals (observations larger than predicted) and red circles indicate negative residuals.

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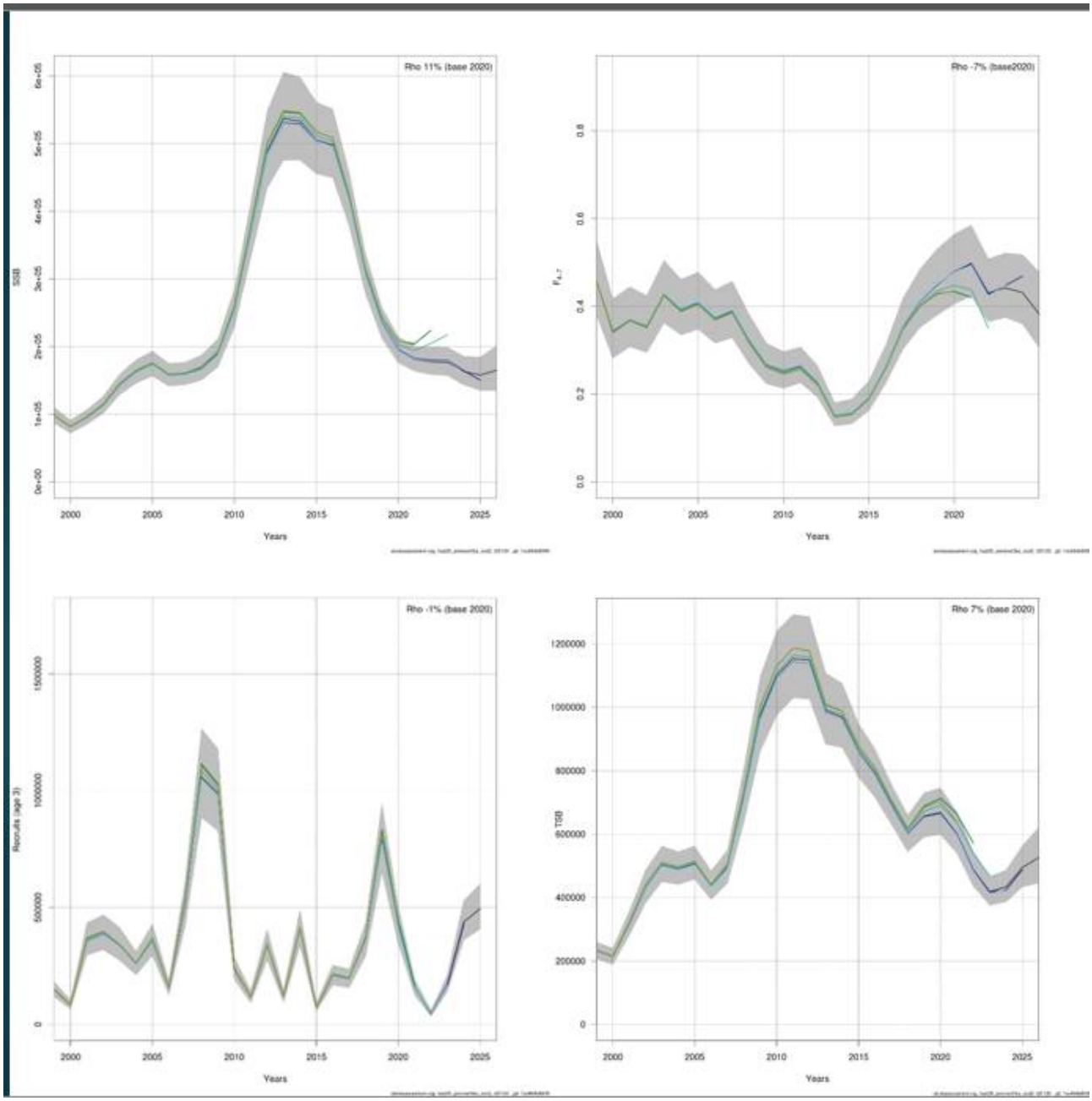

Figure 4.3 Northeast Arctic haddock. 5 year retrospective plots of top: SSB, Fbar4-7, R3, bottom: recruitment and TSB for years 1950–2026 (Fbar: 1950-2025), estimates from SAM with 95% confidence interval.

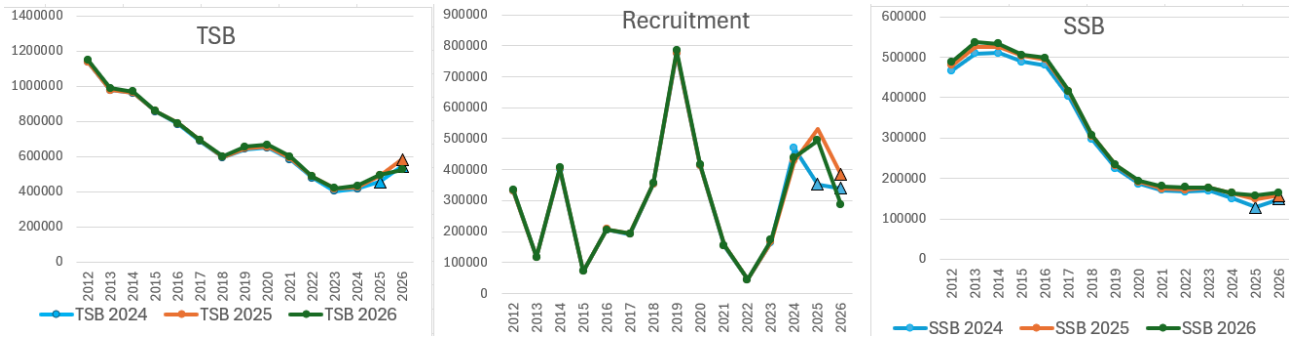

Figure 4.4. Results of assessment of NEA haddock. TSB, recruits and SSB from AFWG 2024 (blue), JRN-AFWG 2025 (orange) and this year's (2026) assessment (green) from 2012 and onwards. The points shown as tringles are forecasts.

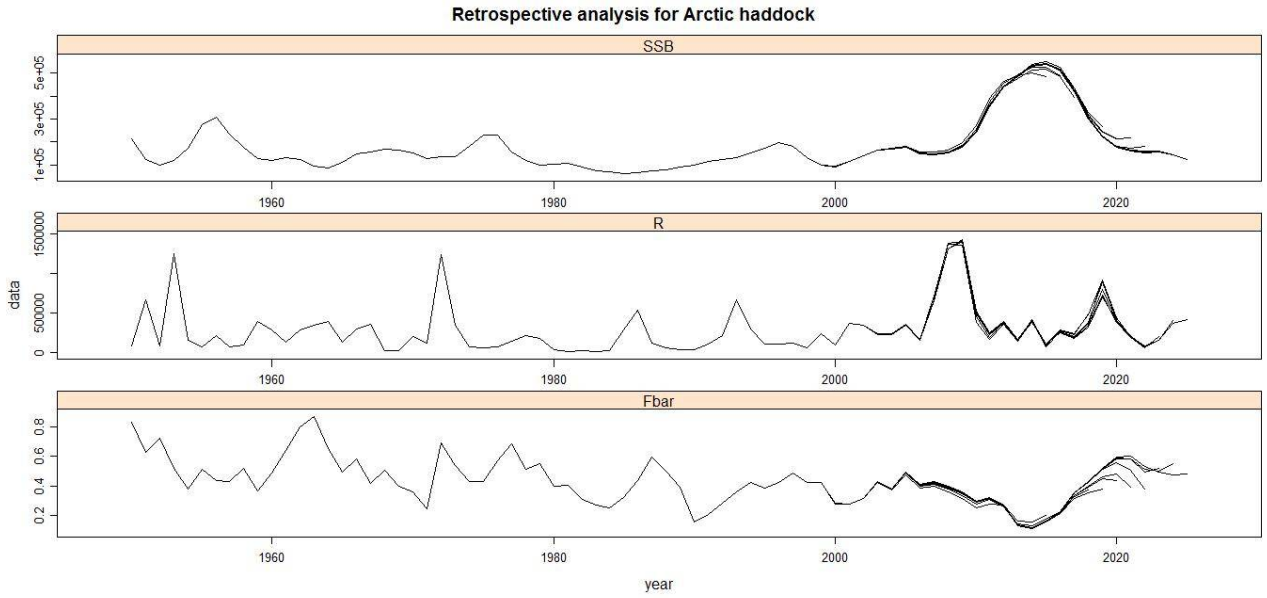

Figure 4.5.a. Retrospective plots of SSB (top), recruitment(middle) and fishing mortality (bottom) for assessment years 1950-2025 from the XSA model without P shrinkage, F shrinkage = 0.5

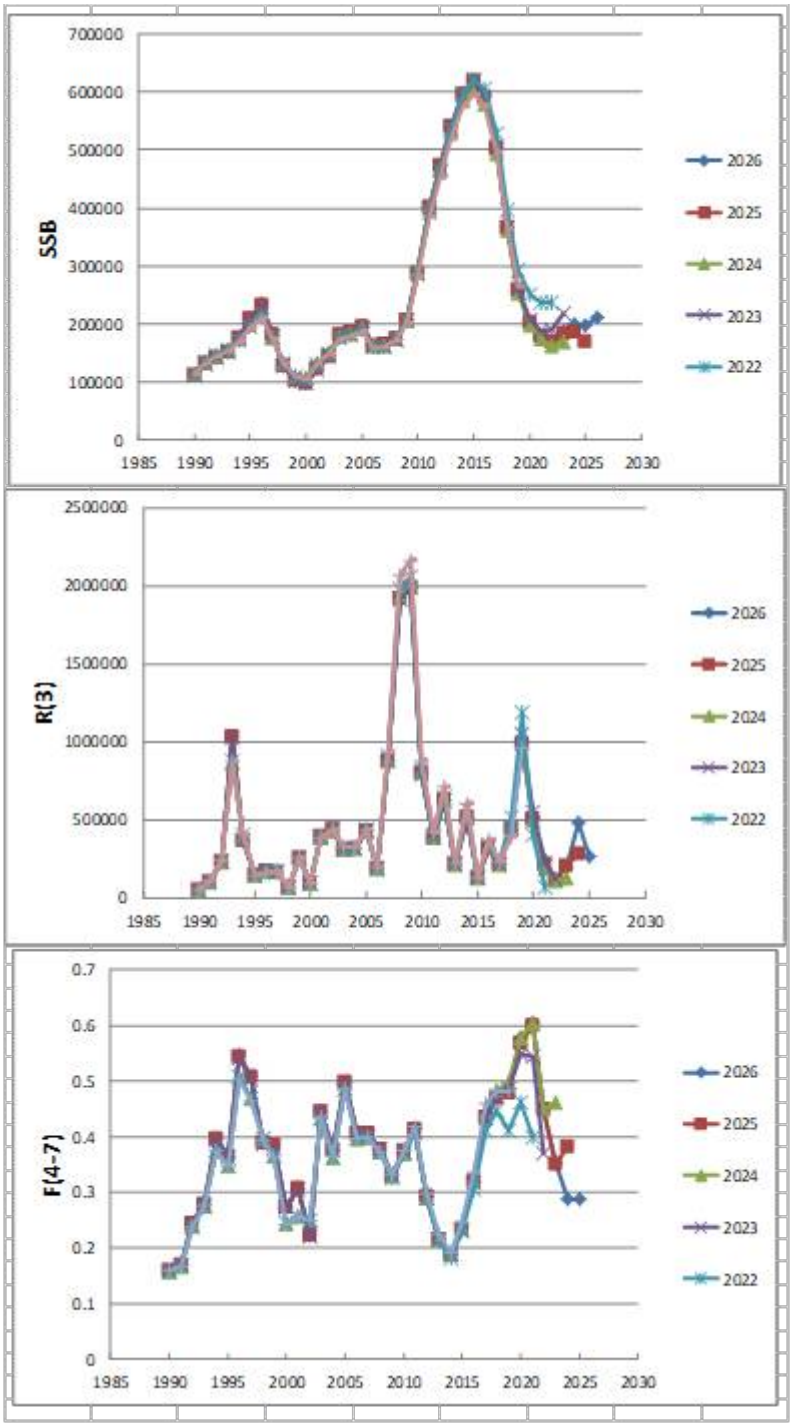

Figure 4.5.b. Retrospective plots of SSB (top), recruitment (middle) and fishing mortality for assessment years 1990-2025 from the TISVPA model.

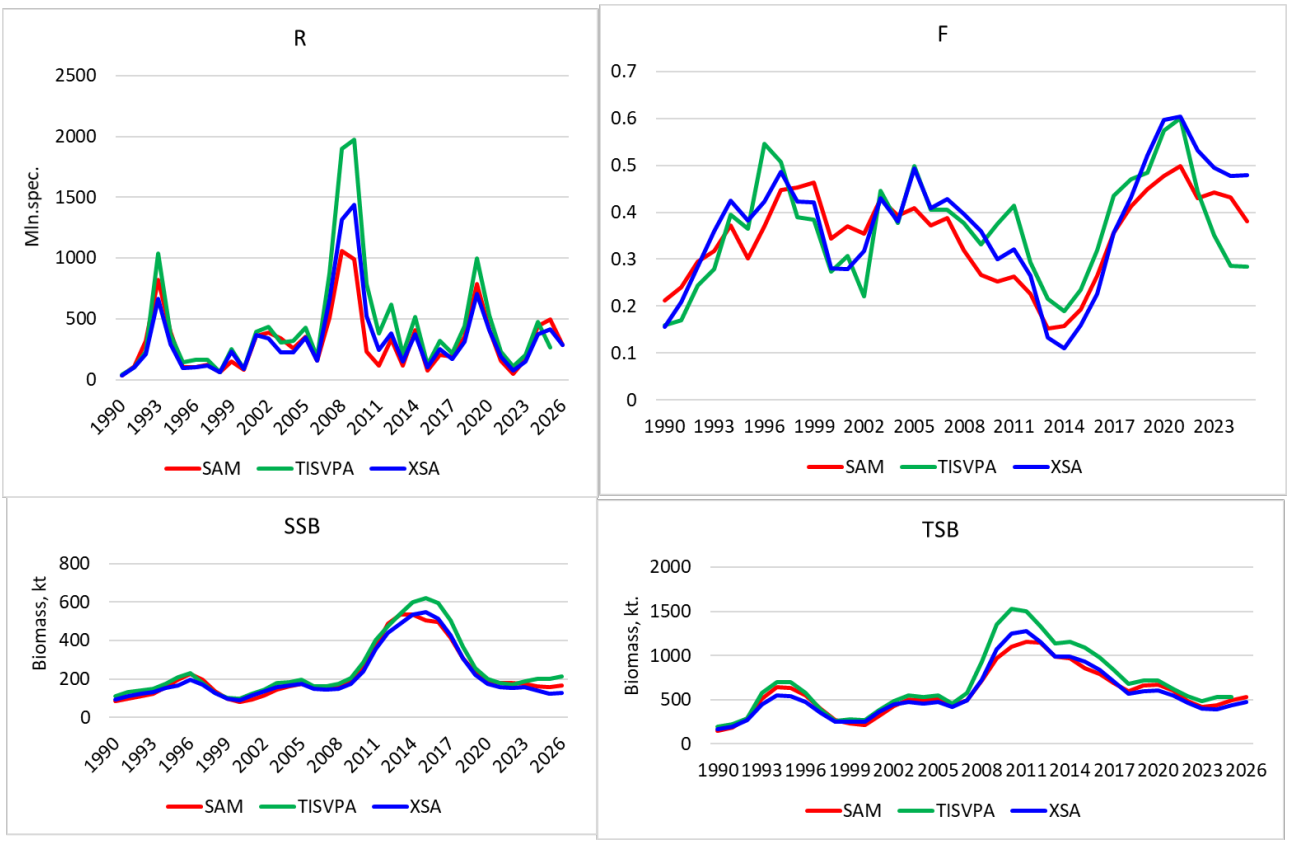

Figure 4.6. Comparison of results of assessment of NEA haddock. Recruits, biomass, spawning biomass and F in 1990–2026 by different models: median SAM estimates, XSA with settings mentioned in section 4.9 and TISVPA with settings established in WKDEM 2020.

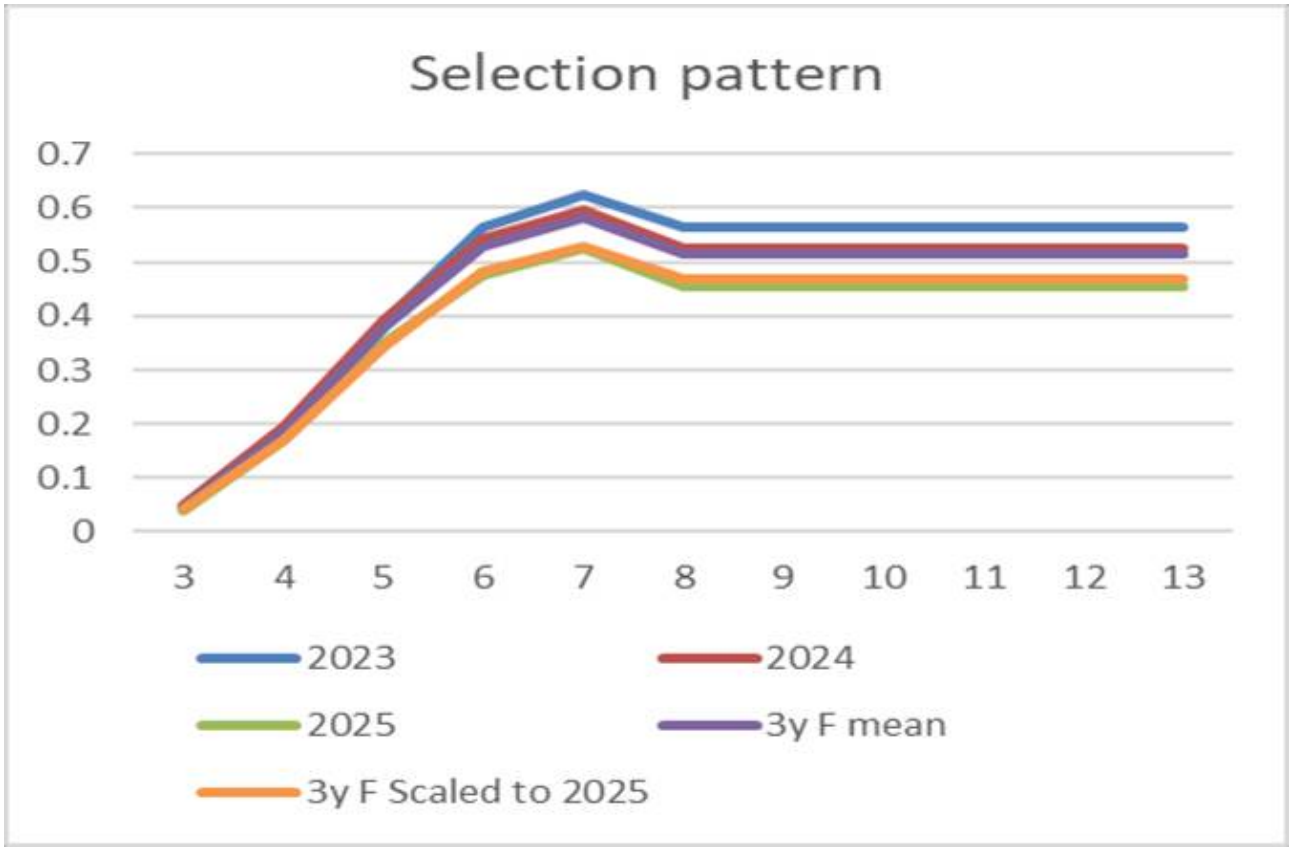

Figure 4.7 Standard selection pattern model (red) used for short-term forecasts at the current meeting.

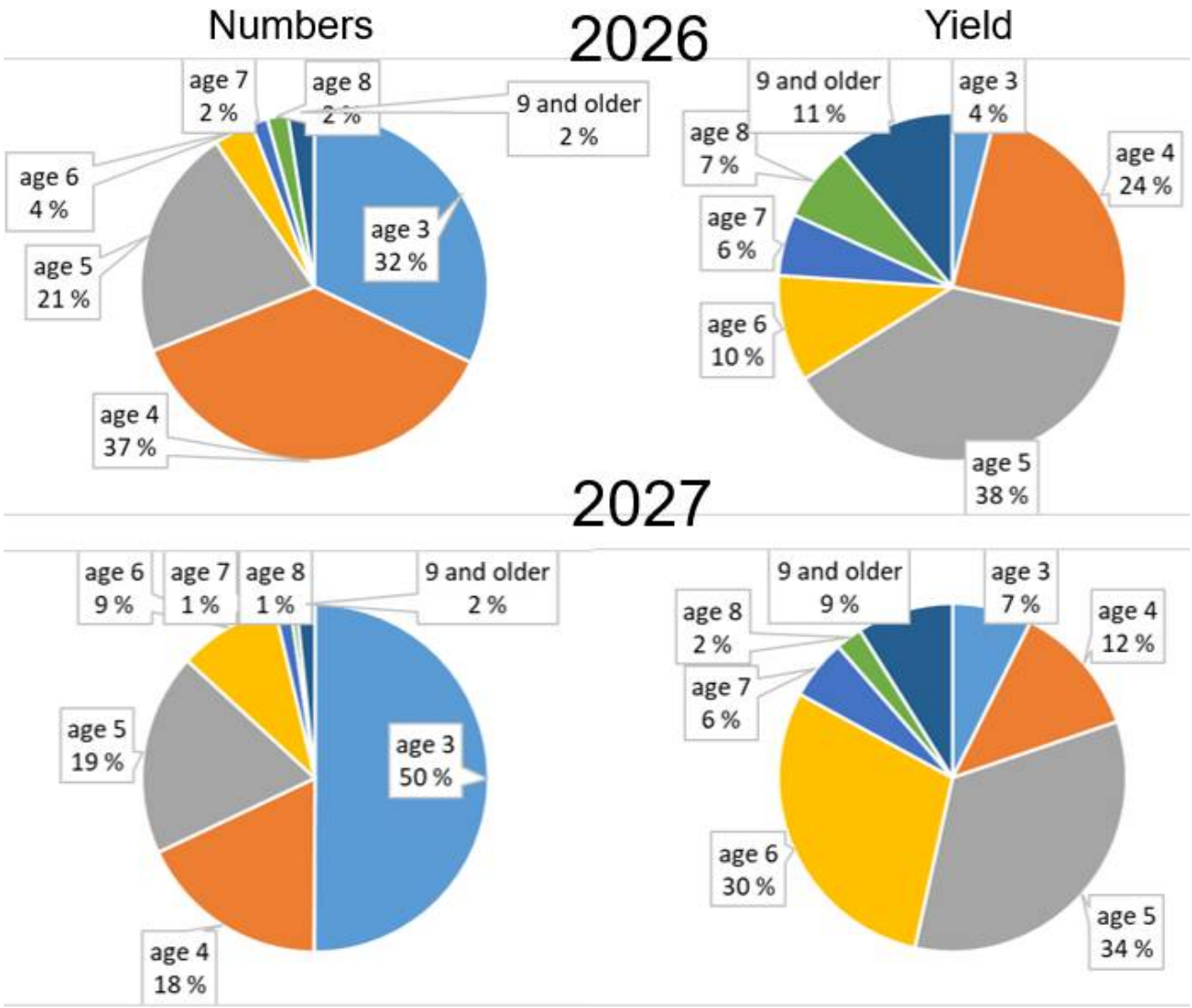

Figure 4.8 Top left: proportion of the stock (number of individuals) by age in 2026, output from SAM (Table 4.13). Top right: proportion of yield in biomass by age forecasted for 2026, using TAC constraint for 2026, taken from Table 4.20. Bottom left: proportion of the stock (number of individuals) by age in 2027, taken from Table 4.20. Bottom right: proportion of yield in biomass by age forecasted for 2027 applying Fbar=0.35, taken from Table 4.20.

6. Beaked redfish in subareas 1 and 2 (Northeast Arctic)

6.1 Status of the fisheries

6.1.1 Development of the fishery

A description of the historical development of the fishery in subareas 1 and 2 is found in the ICES stock annex (ICES 2018c) for this stock. An international pelagic fishery for Beaked redfish *S. mentella* in the Norwegian Sea outside EEZs has developed since 2004 (Figure 6.1). This pelagic fishery, which is further described in the stock annex, is managed by the Northeast Atlantic Fisheries Commission (NEAFC). Since 2014 the directed demersal and pelagic fisheries are reopened in the Norwegian Economic Zone, the Fisheries Protection Zone around Svalbard (Spitsbergen) and, for pelagic fisheries only, in the Fishing Zone around Jan Mayen. The spatial regulation for this fishery is illustrated in Figures 6.2 and 6.3. In 2025, most of the catches of S. mentella from Norwegian fisheries were taken in the Norwegian Exclusive Economic Zone. In contrast, most of the catches from Russian fisheries were taken in the Fisheries Protection Zone around Svalbard (Spitsbergen). Figure 6.2 shows the distribution of catch among national fishing fleets for 2018 to 2025 and the location of Norwegian *S. mentella* catches in the Norwegian EEZ in 2023 as well as bycatch in other areas. The 44 th Session of the Joint Norwegian-Russian Fisheries Commission decided to split the total TAC among countries as follows: Norway: 72%, Russia: 18%, Third countries: 10% (as bycatch in the fishery protection zone at Svalbard (Spitsbergen): 4.1%, and international waters of the Norwegian Sea (NEAFC-area): 5.9%). This split was reconducted at the 56th session of the commission in 2025.

6.1.2 Bycatch in other fisheries

During 2003–2013, all catches of *S. mentella* , except the pelagic fishery in the Norwegian Sea outside EEZ, were taken as bycatches in other fisheries. Some of the pelagic catches are taken as bycatches in the blue whiting and herring fisheries. From 2014 onwards most of the catch is taken as targeted catch and no longer as bycatch, following the opening of a targeted fishery in the Norwegian EEZ, Svalbard (Spitsbergen) Fisheries Protection Zone and around Jan Mayen. When fishing for other species it has since 2013 been allowed to have up to 20% redfish (both species *S. mentella* and *S. norvegicus* together) in round weight as bycatch outside 12 nautical miles and only 10% bycatch inside 12 nautical miles to better protect *S. norvegicus* .

6.1.3 Landings prior to 2026 (Tables 6.1-6.7)

Nominal catches of *S. mentella* by country for subareas 1 and 2 combined are presented in Table 6.1, while they are presented separately for Subarea 1 and divisions 2.a and 2.b in Tables 6.2–6.4. The pelagic catch of *S. mentella* in the Norwegian Sea outside EEZs reported to NEAFC and/or ICES amounted to 7 739 t in 2018, 6060 t in 2019, 5469 t in 2020, 2 872 t in 2021, 2 680t in 2022, 5t in 2023, 1693 t in 2024 and 3229 t in 2025, as shown by country in Table 6.5. Nominal catches for both redfish species combined (i.e. *S. mentella* and *S. norvegicus*) by country are presented in Table 6.6. The sources of information used are catches reported to ICES, NEAFC, Norwegian and Russian authorities (foreign vessels fishing in the Norwegian and Russian economic zones) or direct reporting to the JRN-AFWG. Where catches are reported as *Sebastes* sp., they are split into *S. norvegicus* and *S. mentella* by AFWG experts based on available correlation between official catches of these two species in the considered areas. All tables have been updated for 2025, and new figures presented for 2025. Total international landings in 1952–2025 are also shown in Figure 6.1. In 2014, ICES advised that the annual catch in 2015, 2016, and 2017 should be set at no more than 30 000 t and in 2017, ICES advised that the annual catch in 2018 should not exceed 32 658 t. Following the ICES benchmark (WKREDFISH, ICES 2018a) and the subsequent evaluation of a management plan for the stock (WKREBMSE, ICES 2018b) ICES advised an annual catch of no more than 53 757 t for 2019 and 55 860 t in 2020,

corresponding to a fishing mortality of F = 0.06, which is consistent with recommended management plan. This was continued in 2020, when ICES advised an annual catch of no more than 66 158 t in 2021 and 67 210 t in 2022, still corresponding to F = 0.06. For 2023-2025, JRN-AFWG advised TACs using status quo F. According to this, an annual catch of no more than 66 779t in 2023 and 70 164t in 2024, corresponding to F = 0.097. Finally, JRN-AFWG advised an annual catch of no more than 67 191 t in 2025 and 69 177 t in 2026, corresponding to F = 0.077. Because of the novelty of the situation, related with reopening fisheries after 10 years of its ban, the total landings of *S. mentella* in subareas 1 and 2 in 2014, demersal and pelagic catches, amounted to only 18 426 t, then increased from 34 754 t in 2016 to 63 479 t in 2021. The catches have been > 60 000 t since 2021. The catch was 66 220 t in 2025, of which only 3229 t were reported from the pelagic fishery in international waters of the Norwegian Sea. The total landings in 2017 and 2018 were respectively 783 t and 5 388 t above the TAC advised by ICES, but were 8 117 t, 2 229 t, 2 679 t, 5 016 t, 6 313 t below the advised TAC in the years 2019-2023, respectively. The catch was 6 313 t, 3180 t and 971 t below the TAC advised by the JRN-AFWG in the years 2023-2025, respectively. Norway caught the major share of the demersal catches, but Russian demersal catches increased substantially after 2017, particularly in ICES Division 2.b. Subarea 4 (North Sea) is outside the traditional areas handled by this Working Group, and the Beaked redfish catches are therefore not included in the assessment. The total redfish landings (golden and beaked redfish combined) from Subarea 4 were up to 2003 between 1000–3000 t per year. Since 2005 the annual landings from this area have varied between 76 and 341 t (Table 6.7).

6.1.4 Expected landings in 2026

JRN-AFWG has advised on the basis of precautionary considerations that the annual catch should be set at no more than 69 177 t in 2026. The 56th session of the Joint Norwegian-Russian Fisheries Commission decided to follow this advice. In 2026, Norwegian fishing vessels can catch and land up to 49 807 t of redfish in the Norwegian economic zone (NEZ) in a limited area north of 65°20'N (see map in Figure 6.3), in international waters and the fisheries zone around Jan Mayen. Only vessels with cod and saithe trawl permits can participate in the directed fishery for redfish. Each vessel which has the right to participate is assigned a maximum quota, which can be adjusted during the year, per how much of the national quota is exploited. The fishery may be stopped if the total quota is reached. This quota must also cover catches of redfish (both species) in other fisheries. Targeted fishery for redfish with bottom trawls is prohibited in the period from 1 March until 10 May. Investigations were conducted in 2015–2016 to assess whether the protection of females during the main time of larvae release should be improved by extending the period of prohibited fishing until later in May, and to see if the area south of Bear Island (Area 20 in Figure 6.3) can be opened for directed fishing, either with or without sorting grid, and permissions were granted to a small number of vessels of the Norwegian reference fleet for an earlier onset of fishing to gain further data. The hitherto conclusion is that males dominated the catches (more than 70%) in the main fishing areas south and southwest of Bear Island during the investigations from late April until the directed fishery started on 10 May, and that the area south of Bear Island should stay closed during January-February due to smaller *S. mentella* inhabiting this area at the beginning of the year. Since 2015, Russia has had access to the NEZ when fishing their quota share. The *S. mentella* TAC for 2026 is 69 177 tonnes. According to the agreed split of the TAC, 49 807 t goes to Norway, 12 452 t to Russia and the remaining 6 918 t of the TAC are divided between third countries in the NEZ and Svalbard (Spitsbergen) Zone and the NEAFC areas. However, some transfer of quotas was made afterwards. 2 000 t of the Norwegian TAC was transferred from Norway to Russia, and 2 100 t of the Norwegian TAC was set aside to cover bycatch in NEZ (1100 t for Russia and 1 000 t for other countries), giving final TACs of 45 707 t for Norway, 15 552 for Russian and 7 918 t for third countries. The bycatch quantum set aside for Russia in NEZ is part of an allocation of 2200 t of redfish bycatch (both S. mentella and S. norvegicus) in NEZ.

Catch in the NEAFC areas in 2025 amounted to 3 229 t while the catch in the national economic zones of Norway and Russia as well as the fisheries protection zone around Svalbard was 62 991 t. The total catch in 2025 was 971 t lower than the agreed TAC.

6.2 Data used in the assessment

Analytical assessment was conducted for this stock following recommendation from the benchmark assessment working group (WKREDFISH, ICES 2018a). Input datasets were updated with the most recently available data. The analytical assessment, based on a statistical catch-at-age model (SCAA), covers the period 1992–2025. The input data consists of the following tables:

- Total catch in tonnes (Table 6.1)
- Catch in tonnes in the pelagic fishery Norwegian Sea outside EEZs (Table 6.5)
- Total catch numbers-at-age 6–19+ (Table 6.8)
- Catch numbers-at-age 7–19+ in the pelagic fishery (Table 6.9)
- Weight-at-age 2–19+ in the population (Table 6.12)
- Maturity-at-age 2–19+ in the population (Table 6.14)
- Russian autumn survey numbers-at-age 0–11 (Table 6.15)
- Ecosystem survey numbers-at-age 2–15 (Table 6.17)
- Winter survey numbers-at-age 2–15 (Table 6.18b)
- Deep pelagic ecosystem survey proportions-at-age (Table 6.19)

There was no direct observation of catch numbers-at-age for the pelagic fishery in the Norwegian Sea outside EEZs in 2012–2023. Instead, numbers-at-age were estimated based on catch-at-age from previous or following year, and weight-at-age and fleet selectivities (section 6.2.2 in AFWG report 2013). In 2013, 2016, 2019 and 2022, observations from the scientific survey in the Norwegian Sea were used to derive numbers-at-age in the pelagic fishery. This was considered appropriate given that the survey operates in the area of the fishery, with a commercial pelagic trawl and at the time of the start of the fishery.

6.2.1 Length- composition from the fishery (Figure 6.4)

Comparison of length distributions of the Norwegian and Russian catches of *S. mentella* in 2022–2025 are shown in Figure 6.4. In 2022 and 2023, the length distributions from Russian and Norwegian fleets were almost identical, with maximum catches around 38 cm length. In 2024, length of beaked redfish in Norwegian catches was slightly larger than in Russian catches, whereas in 2025, the length of beaked redfish in the Russian catches were slightly larger than in Norwegian catches. This may be due to differences in the fishing areas. The Russian fleet largely operated in area 2b, and the Norwegian fleet in area 2a.

6.2.2 Catch-at-age (Tables 6.8–6.11, Figure 6.5)

For JRN-AFWG 2022, catch-at-age in the Norwegian fishery was estimated using StoX-Reca for 2014 and 2020. For 2015, 2016 and 2018, running StoX-Reca failed and catch-at-age for the Norwegian Fishery was estimated using the older Biomass program in SAS (Table 6.8). Not enough age readings were available to estimate catch-at-age in 2017, 2019 and 2021. For the pelagic fisheries 2017, 2018, 2020 and 2021 (Table 6.9)

proportions-at-age in the catch were derived from proportions at-age in earlier years, weight-at-age and fleet selectivity (section 6.2.2 in AFWG report 2013). This procedure for estimating catch-at-age for recent years in which age data are not available is somewhat problematic. This is because the last year of observation has a large effect on the estimated catch-at-age for several years. At the assessment working group in 2017 and at the benchmark assessment in January 2018, the last year of observations for the catch-at-age was 2014 and the values for the years 2015 and 2016 were extrapolated. Once available, the data for 2015 (demersal) and 2016 (pelagic) were substantially different from these earlier extrapolations. In the 2022 assessment the catch-at-age observations in 2018, had a large effect on the years around it, producing a very large proportion of the 19+ class in the catch and a correspondingly high F 19+ . As the age structure in 2018 was based on less than 1000 aged fish it was decided to use a time-averaged age- length-key (ALK) to convert the length distribution in 2017-2019 and in 2021 to an age distribution. The time- averaged ALK is based on the Norwegian age-length data back to 2009, excluding the years 2017, 2019 and 2021 and on commercial catches with demersal gears. The conversion still produced a fraction of the 19+-group of >60% but F 19+ was lower than in the standard method. Several other options were considered. Firstly, extrapolation as in the standard method but extrapolating also the 19+-group and then rescaling to sum up to 100%, rather than calculating the 19+ as the difference between other ages and 100%. Secondly, calculating the fraction of each age-class as an average of the same cohort's fraction in the year before and after. Thirdly, as an average of the fraction of the same age-class in the last 3 years with data or last 3 calendar years. Finally, using a combined Russian-Norwegian ALK for individual years. Whilst some of these options produced lower fishing mortalities for the 19+-group, the change in observed selectivity for the demersal catches since 2017 remained largely the same. Therefore, the option of a common ALK across years was chosen as the option with the most sensible underlying reasoning. Age composition of the Russian and Norwegian catches in 2021 was calculated using the age–length key, based on Russian age readings. The joint age–length key for the last three years (2019–2021) was applied. In general, the age distribution in the Norwegian fishery was shifted towards older fish compared to the Russian fishery. In the Russian catches fish at age 15–16 dominated, while in the Norwegian catches 16–17 years old made up the majority of the catches. (Figure 6.5). The proportion (by numbers) of individuals at age 18 and older in the Norwegian catches was almost twice as large as in the Russian ones.

For JRN-AFWG 2024, StoX-Reca again failed in producing catch-at-age data for Norwegian catch in 2022 (Howell et al., 2024). In addition, the older Biomass program could not be run. A simplified method was therefore used. Catch-at-length was calculated (by gear "bottom trawl" and "pelagic trawl", and by stratum "Norwegian statistical area 12/20" and "other areas") through a length-weight relationship and length distributions from the Norwegian reference fleet. An age-length-key was used to convert catch-at-length to catch-at-age. Ages were not available for 2025, and proportions-at-age in the catch were derived from proportions at-age in earlier years, similar to earlier years. For JRN-AFWG 2026, catch-at-age data were calculated using the same approach as for JRN-AFWG 2024.

Catch-at-age for the pelagic fleet in 2022 was derived from proportion-at-age in the scientific survey in the Norwegian Sea. Catch-at-age for the 2023-2025 pelagic catches were extrapolated like earlier years. Age–length-keys for *S. mentella* are uncertain because of the slow growth rate of individuals and therefore these data should be used with caution. Given that age is difficult to derive from length it is important that age readings are available for the most recent years, at the time of the working group.

6.2.3 Weight-at-age (Tables 6.12, 6.13, Figures 6.6, 6.7)

In earlier assessment, weight-at-age in the stock was set equal to the weight-at-age in the catch. This turned out to be problematic because of important fluctuations in reported weight-at-age in the catch that cannot be explained biologically (i.e. these are noisy data). In 2015, it was advised to either use a fixed weight-at-age for

the 19+ group, or use a modelled weight-at-age based on catch and survey records (Planque, 2015). The second option was chosen. Weight-at-age in the population was modelled for each year using mixed-effect models of a von Bertalanffy growth function (in weight). In 2018 an attempt was made to model weight-at-age for each cohort (rather than each year of observation). This showed that the growth function is nearly invariant between cohorts. Therefore, it was decided to use a fixed (i.e. common to all years) weight-at-age as input to the Statistical Catch-at-age model. The observed and modelled weight-at-age are presented in Table 6.12 as well as Figures 6.6 and 6.7 (not updated after 2019).

6.2.4 Maturity-at-age (Table 6.14, Figure 6.8)

The proportion maturity-at-age was estimated for individual years using a mixed-effect statistical model (Table 6.14, Figure 6.8). Since JRN-AFWG 2024 maturity-at-age used in the statistical catch-at-age model are identical for every year, based on average values from the previous years.

6.2.5 Natural mortality (Figures 6.9, 6.10)

In previous years, natural mortality for *S. mentella* was set to 0.05 for all ages and all years. This was based on life-history correlates presented in Hoenig (1983). Thirty-nine alternative mortality estimates were explored during the 2018 benchmark workshop, based on the review work by Kenchington (2014) and several additional recent papers (Then *et al* , 2014; Hamel, 2014; Charnov *et al* , 2013). Overall, the mode of these natural mortality estimates is 0.058 which departs only slightly from the original estimate of 0.050 (Figure 6.9). WKREDFISH (ICES, 2018a) decided to continue using 0.050 as the value of M in the assessment model. These estimates were updated for a peer-reviewed paper submitted in 2022 (Höffle and Planque, 2023) with 44 estimators resulting in a mode of the distribution of 0.07. Figure 6.10 shows cod's predation on juvenile (5–14 cm) redfish during 1984–2020. This time-series confirms the presence of redfish juveniles and may be used as an indicator of redfish abundance. A clear difference is seen between the abundance/consumption ratio in the 1980s and at present. A change in survey trawl catchability (smaller meshes) from 1993 onwards (Jakobsen *et al* , 1997) and/or a change in the cod's prey preference may cause this difference. As long as the trawl survey time-series has not been corrected for the change in catchability, the abundance index of juvenile redfish less than 15 cm during the 1980s might have been considerably higher, if this change in catchability had been corrected for. The decrease in the abundance of young redfish in the surveys during the 1990s is consistent with the decline in the consumption of redfish by cod. It is important that the estimation of the consumption of redfish by cod is being continued.

6.2.6 Scientific surveys

Following a dedicated review, ICES AFWG approved the use of the new SToX versions of winter and ecosystem surveys for use in the *S. mentella* assessment (Höffle and Tranang 2020, Tranang et al. 2020). The group recommended that the data be monitored annually to identify if a significant portion of the mentella stock moves east of the strata system. The group further recommended that work continues to investigate redfish-specific strata systems for the winter survey. The results from the following research vessel survey series were evaluated by the Working Group:

6.2.7 Surveys in the Barents Sea and Svalbard (Spitsbergen) area (Tables 1.1, 1.2, 6.15–6.18, Figures 6.11, 6.12)

Russian bottom-trawl survey in the Svalbard (Spitsbergen) and Barents Sea areas in October-December for 1978–2015 in fishing depths of 100–900 m (Table 6.15, Figure 6.11). ICES acronym: RU-BTr-Q4. Russian-Norwegian Barents Sea 'Ecosystem survey' (bottom-trawl survey, August-September) from 1986–2025 in fishing depths of 100–500 m (Figures 6.11–6.12). Data disaggregated by age for the periods 1996–2009 and 2011-2025 (Tables 6.16b-6.17). ICES acronym: Since 2003 part of Eco-NoRu-Q3 (BTr), survey code: A5216.

Winter Barents Sea seabed-trawl survey (February) from 1986–2023 (jointly with Russia since 2000, except 2006 and 2007) in fishing depths of 100–500 m (Figures 6.11–6.12). Data disaggregated by age for the period 1992–2011, 2013, 2018, 2020 and 2023 (Table 6.18b). ICES acronym: BS-NoRu-Q1 (BTr), survey code: A6996.

The Norwegian survey initially designed for redfish and Greenland halibut is now part of the ecosystem survey and covers the Norwegian Economic Zone (NEZ) and Svalbard (Spitsbergen) Fisheries Protection Zone incl. north and east of Spitsbergen during August 1996–2012 from less than 100 m to 800 m depth. This survey includes survey no. 2 above, and has been a joint survey with Russia since 2003, and since then called the Ecosystem survey. ICES acronym: Eco-NoRu-Q3 (Btr), survey code: A5216.

6.2.8 Pelagic survey in the Norwegian Sea (Table 6.19, Figures 6.13, 6.14)

The international deep pelagic ecosystem survey in the Norwegian Sea (WGIDEEPS, ICES 2016, survey code: A3357) monitors deep pelagic ecosystems, focusing on beaked redfish (*S. mentella*). The latest survey was conducted in the open Norwegian Sea from 22 July until 12 August 2022, following similar surveys in 2008, 2009, 2013, 2016 and 2019. The spatial coverage of the 2022 survey and the catch rates of beaked redfish in the 2019 survey are presented in Figure 6.13. The survey is scheduled every third to fourth year, and the next survey will be conducted in August 2026. Estimated numbers-at- age from this survey were presented at the benchmark assessment in 2018 and used in the SCAA model. Data for 2016 was updated in 2019, using additional age readings and numbers-at-age for the 2019 survey were presented during AFWG 2020, used in the assessment and updated for AFWG 2021. The details of the data preparation, using StoX, are available from WD7 of AFWG 2018 (Planque *et al.* , 2018). The data used as input to the analytical assessment consists of proportions-at-age from age 2 to 75 years (Figure 6.14).

A slope survey, “Egga-sør survey” was carried out by IMR from 29 February to 23 March 2024, following similar surveys in 2009, 2012, 2014, 2016, 2018, 2020, 2022, 2024 and 2026. The spatial coverage of the 2024 survey and the distribution of beaked redfish registered by acoustic is presented in Figure 6.17. Egga-Sør and Egga-Nord surveys operate on a biennial basis. The length and age distributions of beaked redfish from these surveys show consistent ageing in the population and gradual incoming of new cohorts after the recruitment failure period. These surveys are considered as candidates for data input to the analytical assessment of *S. mentella* (see also Planque, 2016).

6.3 Assessment

The group performed the analytical assessment using the statistical catch-at-age (SCAA) model reviewed at the benchmark in January 2018 (WKREDFISH, ICES 2018a). The model was configured as the benchmark baseline model which includes 53 parameters to be estimated and the model converged correctly.

6.3.1 Results of the assessment (Tables 6.20, 6.21, Figures 6.18–6.20)

6.3.2 Stock trends

The temporal patterns in recruitment-at-age 2 (Figures 6.18 and 6.19) imply recruitment failure for the year classes 1996 to 2003 and indicate a return to high levels of recruitment. The estimates of year-class strength for recent years are uncertain due to limited age data from the winter and ecosystem surveys. Modelled spawning-stock biomass (SSB) increased from 1992 to 2007 (Table 6.19). In the late 2000s the total-stock biomass (TSB) consisted of a larger proportion of mature fish than in the 1990s. This is reversing as individuals from new successful year classes, but still immature, are growing. TSB has increased from about 1.0 to slightly above 1.5 million tonnes in the last 25 years (Table 6.21, Figure 6.19 and Figure 6.20). The concurrent decline in SSB from 2007 to 2014 can be attributed to the weak year classes (1996–2003) entering the mature stock. This trend has

levelled off, and SSB has increased every year after 2017. SSB at the start of 2026 is estimated at 987 261 t.

6.3.3 Fishing mortality (Tables 6.20a,b–6.21, Figure 6.21)

The patterns of fleet selectivity-at-age indicate that most of the fish captured by the demersal fleet as well as the pelagic fleet in 2025 are of age 15 and older (Tables 6.20a,b and Figure 6.21). Model results at the benchmark workshop did show a gradual shift in the demersal selectivity towards older ages, a shift that was not observed after the 2015 catch-at-age data were incorporated in the model. This shift towards older ages is now again visible in the data from 2017 onwards, similar to what was observed in 2014. In 2025, F 19+ is estimated at 0.065(Table 6.21), with 0.061 for the demersal and 0.0029 for the pelagic fleets (Table 6.20a), respectively.

6.3.4 Survey selectivity patterns (Figure 6.22)

Winter and ecosystem surveys selectivity at age are very similar and show reduced selectivity for age 8 years and older, which is consistent with the known geographical distribution of different life stages of *S. mentella* (Figure 6.22). Conversely, the Russian survey shows a reduced selectivity for age 7 years and younger. This is believed to result from gear selectivity.

6.3.5 Residual patterns (Figures 6.23-6.27)

Residual patterns in catch and survey indices are presented in Figures 6.23-6.27. There is generally no visible trend in the residuals for the Russian groundfish survey neither by age nor by year. Trends in residuals are visible in recent years for winter and ecosystem surveys and will need to be investigated further. Alternative methods for the estimation of the survey selectivity patterns will be investigated in the benchmark assessment planned for 2026 and could resolve the issue. Residual patterns for the demersal fleet indicate a similar fit of the model compared to AFWG 2018, when a time varying selectivity-at-age for this fleet was introduced.

6.3.6 Retrospective patterns (Figures 6.28 and 6.29)

The historical and analytical retrospective patterns are presented in Figures 6.28 and 6.29. All model parameters were estimated in each individual run. Retrospective runs were performed for terminal years from 2018 through 2024, with all model parameters re-estimated in each run by sequentially removing one year of data. The figures and retro data confirm that the retrospective pattern remains stable with the addition of new years. The current assessment shows that SSB values for earlier years are generally higher than those from previous retrospectives. The upward revision is modest for recent years (typically 2–7%), and larger for the earliest years in the time series (up to ~26%). Estimates of F remain consistent across retro runs, with only minor deviations in the most recent years. The pattern for F (ages 19+) is stable up to 2018, after which small differences appear. Recruitment estimates are variable, but the overall pattern is consistent across retrospectives, with no major deviations in the most recent runs. The addition of new data since the last benchmark confirms the stability of the model and the consistency of the assessment results.

6.3.7 Projections

FMSY at age 19+ is approximated using F0.1 and estimated at 0.084 (section 1.4 of the WKREBMSE report, ICES 2018b).

If the fishing mortality is maintained (*Status quo F*), this is expected to lead to a catch of 66 475 t in 2026, which is approximately 2 700 t less than the advised TAC for 2026. This would lead to a SSB of 1 001 840 t in early 2027, catches of 67 090 t in 2027 and a SSB of 1 021 893 t in 2028. Zero catch in 2027 would lead to an SSB of 1 081 170 t t in 2028. These projections assume that the selectivity patterns of the demersal and pelagic fleets are identical with those estimated for 2023. It is also assumed that the ratio of fishing mortality between these two fleets remains unchanged.

6.3.8 Additional considerations

Historical fluctuations in the recruitment-at-age 2 (Figures 6.18 and 6.21) are consistent with the 0-group survey index (Figure 6.16), although the 0-group survey index is not used as an input to the SCAA. The population age structure derived from the model outputs for the old individuals (beyond 19+, Figure 6.22) is consistent with the age structure reported from the slope surveys although these are not yet used as input to the model. Recent recruitment levels estimated with SCAA are highly uncertain since they rely on only a few years of observations and since the age readings from winter survey were not available for most of the recent years. The use of the autoregressive model for recruitment (random effects in the SCAA) which was introduced in 2018 allows for a projection of the recruitment in recent years, despite the current lack of age data.

6.3.9 Assessment summary (Table 6.21, Figure 6.21)

The history of the stock as described by the SCAA model for the period 1992–2025 is summarized in Table 6.21 and Figure 6.21. The key elements are as follows:

- upward trend in Total-stock biomass from 1992 to 2006 followed by stabilization until 2011 and a new upward trend until the present,
- upward trend in spawning-stock biomass from 1992 to 2007 followed by stabilization (or slight decline) until 2014 and subsequent increase,
- recruitment failure for year classes 1996–2003 (2y old fish in 1998–2005),
- good (although uncertain) recruitment for year classes born after 2005. Age data for recruits (at age 2y) after 2014 is limited.
- Annual fishing mortality for the 19+ group throughout the assessment period varied between 0.003 and 0.083.

6.4 Comments to the assessment

Currently, the survey series used in the SCAA do not appropriately cover the geographical distribution of the adult population. Data from the pelagic survey in the Norwegian Sea has been reviewed in the last benchmark and is now included in the assessment model. Priority should be given to including additional data from the slope surveys that include older age groups, in analytical assessments in future (Planque 2016). The SCAA model relies on the availability of reliable age data in surveys and in the catch, and it requires a continuous effort to keep these data at an appropriate level.

A benchmark is planned for 2027.

6.5 Biological reference points

The proposed reference points estimated during the workshop on the management plan for *S. mentella* in (ICES 2018b) were:

Reference point	Value
B_{lim}	227 000 t
B_{pa}	315 000 t
$F_{MSY19+} = F_{0.1}$	0.084

These were revised from those set during the benchmark in the same year (ICES 2018a) which were Bpa = 450 kt, B = 324 kt and FMSY19+ = F0.1 = 0.08.

6.6 Management advice

The present report updates the assessment and advises that when the status quo approach is applied, catches in 2027 should be no more than 67 090 tonnes. This would correspond to a fishing mortality of F19+ = 0.065, whilst fishing pressure across the fishable age-classes would remain nearly constant.

6.7 Future development of the assessment

A benchmark will be conducted in 2027. The following issues are expected to be addressed during the benchmark: - Direct use of length information (as in GADGET) - The inclusion of e.g., data from slope surveys in the analytical assessment, preferably by means of a survey index derived from a spatio-temporal generalized linear mixed-effects model, as recently implemented in a new stock assessment for Golden redfish (*S. norvegicus*) in subareas 1 and 2 (ICES 2026, Vihtakari et al., 2026).

6.8 References

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6.9 Tables and figures

Table 6.1. S. mentella in subareas 1 and 2. Nominal catch (t) by countries in Subarea 1, divisions 2.a and 2.b combined.

Year	Faroe Islands	France	Germany	Latvia	Lithuania	Norway	Portugal	Russia	Spain	UK[2]	Others	Total
1993	13	50	35	-	-	5 182	963	6 260	5	293	13	**12 814**
1994	4	74	18	-	-	6 511	895	5 021	30	136	32	**12 721**
1995	3	16	176	-	-	2 646	927	6 346	67	97	6	**10 284**
1996	4	75	119	-	-	6 053	467	925	328	99	5	**8 075**
1997	4	37	81	-	-	4 657	474	2 972	272	78	23	**8 598**
1998	20	73	100	-	-	9 733	125	3 646	177	134	36	**14 044**
1999	73	26	202	-	-	7 884	65	2 731	29	140	59	**11 209**
2000	50	12	62	-	-	6 021	115	3 519	87	130	80	**10 076**
2001	74	16	198	-	-	13 937	179	3 775	90	120	29	**18 418**
2002	75	58	99	-	-	2 151	242	3 904	190	188	86	**6 993**
2003	64	22	32	-	-	1 210	44	952	47	124	25	**2 520**
2004	588	13	10	-	-	1 375	235	2 879	257	76	60	**5 493**
2005	1 147	46	33	-	-	1 759	140	5 023	163	95	59	**8 465**
2006	3 808	215	2 483	341	845	4 710	1 804	11 413	710	1 027	5 905	**33 261**
2007	2 197	234	520	349	785	3 209	1 483	5 660	2 181	202	3 398	**20 218**
2008	1 849	187	16	267	117	2 220	713	7 117	463	83	64	**13 096**
2009	1 343	15	42	-	-	2 677	806	3 843	177	80	1 263	**10 246**
2010	979	175	21	243	457	2 064	293	6 414	1 184	79	14	**11 923**
2011	984	175	835	536	565	2 471	613	5 037	1 678	55	13	**12 962**
2012	259	-	517	447	449	2 115	1 038	4 101	1 780	-	354	**11 060**
2013	697	-	80	280	262	1 750	1 078	3 677	1 459	-	106	**9 389**
2014	743	215	446	215	167	13 149	505	1 704	1 162	-	121	**18 427**
2015	657	49	242	537	192	19 433	678	1 142	2 529	52	59	**25 570**
2016	502	134	493	1 243	1 065	18 190	1 066	8 419	3 213	122	306	**34 753**
2017	443	45	763	562	790	17 077	1 060	6 593	2 838	436	175	**30 782**
2018	425	67	2 473	1 020	1 010	18 593	699	10 497	2 457	63	741	**38 045**

Year	Faroe Islands	France	Germany	Latvia	Lithuania	Norway	Portugal	Russia	Spain	UK	Others	Total
2019	156	370	1 599	-	653	23 844	1 422	13 444	2 222	590	1 340	**45 640**
2020	149	163	1 807	-	1 081	32 949	889	13 874	744	437	1 563	**53 656**
2021	290	218	1 166	-	1 379	43 794	381	14 887	615	655	94	**63 479**
2022	235	221	1 758	-	990	40 715	464	16 717	278	114	702	**62 194**
2023	154	128	626	-	-	44 542	358	13 976	295	152	154	**60 385**
2024[1]	2 037	131	481	1	-	47 220	466	16 235	104	75	234	**66 984**
2025[1]	1 865	87	1 895	-	-	46 292	387	15 494	140	51	9	**66 220**
1 - Provisional figures.												
2 - UK(E&W) + UK(Scot.)												

Table 6.2. S. mentella in subareas 1 and 2. Nominal catch (t) by countries in Subarea 1.

Year	Faroe Islands	France	Germany	Greenland	Norway	Russia	Spain	Others	Total
1993	2	-	-	-	16	588	-	-	**606**
1994	2	-	2	-	36	308	-	-	**348**
1995	2	-	-	-	20	203	-	-	**225**
1996	-	-	-	-	5	101	-	-	**106**
1997	-	-	-	3	12	174	-	1	**190**
1998	20	-	-	-	26	378	-	-	**424**
1999	69	-	-	-	69	489	-	-	**627**
2000	-	-	-	-	47	406	-	48	**501**
2001	-	-	-	-	8	296	-	3	**307**
2002	-	-	-	-	4	587	-	-	**591**
2003	-	-	-	-	6	292	-	-	**298**
2004	-	-	-	-	2	355	-	-	**357**
2005	-	-	-	-	3	327	-	-	**330**
2006	2	-	-	-	12	460	-	2	**476**
2007	-	-	-	-	11	210	-	28	**249**
2008	-	-	-	-	5	155	-	2	**162**
2009	-	-	-	-	3	80	-	8	**91**
2010	-	-	-	-	20	10	-	-	**30**
2011	-	-	-	-	48	13	-	-	**61**
2012	-	-	-	-	34	17	-	-	**51**
2013	-	-	-	-	64	27	-	-	**91**
2014	-	-	-	-	159	63	-	-	**222**
2015	-	-	-	18	138	125	-	1	**282**
2016	-	-	-	-	225	229	342	1	**797**

Year	Faroe Islands	France	Germany	Greenland	Norway	Russia	Spain	Others	Total
2017	-	-	-	12	207	196	-	3	**418**
2018	-	-	19	26	255	376	-	3	**679**
2019	83	4	-	13	369	206	19	22	**716**
2020	35	12	6	21	335	118	1	12	**540**
2021	87	31	-	14	195	367	1	4	**699**
2022	91	2	3	20	509	88	1	-	**714**
2023	56	8	31	17	997	145	69	5	**1 328**
2024[1]	125	4	34	5	1 436	327	6	11	**1 948**
2025[1]	59	7	15	-	491	39	13	3	**627**

1 - Provisional figures.

Table 6.3. S. mentella in subareas 1 and 2. Nominal catch (t) by countries in Division 2.a (including landings from the pelagic trawl fishery in the international waters)

Year	Faroe Islands	France	Germany	Latvia	Lithuania	Norway	Portugal	Russia	Spain	UK[2]	Others	Total
1993	11	15	35	-	-	5 029	648	5 328	-	2	1	**11 069**
1994	2	33	16	-	-	6 119	687	4 692	8	4	3	**11 564**
1995	1	16	176	-	-	2 251	715	5 916	65	43	4	**9 187**
1996	-	75	119	-	-	5 895	429	677	5	61	3	**7 264**
1997	-	37	77	-	-	4 422	410	2 341	9	55	14	**7 365**
1998	-	73	58	-	-	9 186	118	2 626	55	106	20	**12 242**
1999	-	16	160	-	-	7 358	56	1 340	14	120	53	**9 117**
2000	50	11	35	-	-	5 892	98	2 167	18	103	29	**8 403**
2001	63	12	161	-	-	13 636	105	2 716	18	95	21	**16 827**
2002	37	54	59	-	-	1 937	124	2 615	8	157	63	**5 054**
2003	58	18	17	-	-	1 014	17	448	8	102	18	**1 700**
2004	555	8	4	-	-	987	86	2 081	7	18	18	**3 764**
2005	1 101	36	17	-	-	1 083	71	3 307	20	15	44	**5 694**
2006	3 793	199	2 475	845	-	4 010	1 731	10 110	589	958	5 864	**30 574**
2007	2 157	226	519	785	349	3 043	1 395	5 061	2 159	120	3 387	**19 201**
2008	1 821	179	9	117	267	1 952	666	6 442	430	62	56	**12 001**
2009	1 316	7	23	-	-	2 208	764	3 305	137	62	1 252	**9 074**
2010	961	175	13	457	243	1 705	246	5 903	1 183	55	14	**10 955**
2011	932	175	697	561	536	1 682	599	4 326	1 656	19	2	**11 185**
2012	259	-	469	449	447	1 500	1 038	3 478	1 770	-	343	**9 753**
2013	675	-	24	262	280	871	1 055	3 293	1 435	-	90	**7 985**
2014	728	209	411	167	215	4 089	505	1 334	1 159	-	117	**8 934**
2015	657	49	236	192	537	11 410	678	480	2 508	47	34	**16 828**

Year	Faroe Islands	France	Germany	Latvia	Lithuania	Norway	Portugal	Russia	Spain	UK	Others	Total
2016	495	107	493	1 065	1 243	8 887	1 052	3 949	2 862	71	268	**20 492**
2017	425	38	763	790	562	7 348	1 059	3 922	2 813	429	141	**18 290**
2018	400	47	2 440	1 010	876	14 057	699	4 721	2 435	62	704	**27 451**
2019	73	363	1 599	652	-	17 741	1 421	7 366	2 184	569	768	**32 736**
2020	112	146	1 797	1 081	-	22 854	880	6 085	737	403	1 532	**35 627**
2021	151	182	1 128	1 379	-	35 798	377	6 008	535	552	76	**46 186**
2022	112	187	1 693	990	-	28 666	441	7 793	92	11	679	**40 664**
2023	73	37	518	-	-	38 527	329	2 089	213	62	103	**41 951**
2024[1]	1 905	71	402	-	-	39 005	460	4 357	50	9	221	**46 480**
2025[1]	1 744	54	1 853	-	-	42 334	384	7 203	95	-	3	**53 670**
1 - Provisional figures.												
2 - UK(E&W) + UK(Scot.)												

Table 6.4. S. mentella in subareas 1 and 2. Nominal catch (t) by countries in Division 2.b.

Year	Faroe Islands	France	Germany	Greenland	Norway	Portugal	Russia	Spain	UK[2]	Others	Total
1993	-	35	-	-	137	315	344	57	291	12	**1 191**
1994	-	41	-	-	356	208	21	22	132	29	**809**
1995	-	-	-	-	375	212	227	2	54	2	**872**
1996	4	-	-	-	153	38	147	323	38	2	**705**
1997	4	-	3	1	223	64	457	263	22	5	**1 042**
1998	-	-	42	-	521	7	642	122	29	16	**1 379**
1999	4	10	42	-	457	9	902	15	20	6	**1 465**
2000	-	1	27	-	82	17	946	69	27	3	**1 172**
2001	11	4	37	-	293	74	763	72	25	5	**1 284**
2002	38	4	40	-	210	118	702	182	31	23	**1 348**
2003	6	4	15	-	190	27	212	39	22	7	**522**
2004	33	5	6	-	386	149	443	250	58	42	**1 372**
2005	46	10	17	1	673	69	1 389	143	80	14	**2 442**
2006	13	16	8	11	688	73	843	121	67	30	**1 870**
2007	40	8	1	-	155	88	389	22	62	3	**768**
2008	28	8	7	1	263	47	520	33	19	6	**932**
2009	27	8	19	-	466	42	458	41	17	7	**1 085**
2010	18	-	8	-	339	47	501	1	24	-	**938**
2011	52	-	139	-	741	14	698	23	36	15	**1 718**
2012	-	-	48	-	581	-	606	10	-	11	**1 256**
2013	22	-	56	-	815	23	357	23	-	16	**1 312**

Year	Faroe Islands	France	Germany	Greenland	Norway	Portugal	Russia	Spain	UK	Others	Total
2014	15	6	34	-	8 901	-	307	3	-	4	**9 270**
2015	-	-	6	5	7 885	-	536	21	5	1	**8 459**
2016	7	27	-	14	9 078	14	4 241	9	50	24	**13 464**
2017	18	7	1	10	9 522	1	2 476	25	7	9	**12 076**
2018	25	20	14	6	4 281	-	5 400	22	1	147	**9 916**
2019	-	4	-	543	5 734	-	5 873	19	17	-	**12 190**
2020	2	5	4	4	9 760	-	7 671	6	34	-	**17 486**
2021	52	6	38	1	7 801	-	8 512	79	103	3	**16 595**
2022	32	32	62	3	11 540	23	8 836	185	104	-	**20 817**
2023	25	83	78	-	5 018	24	11 742	12	89	33	**17 104**
2024[1]	7	56	45	-	6 779	3	11 551	48	66	1	**18 556**
2025[1]	62	26	27	-	3 467	-	8 252	32	51	6	**11 923**
1 - Provisional figures.											
2 - UK(E&W) + UK(Scot.)											

Table 6.5. S. mentella in subareas 1 and 2. Nominal catch (t) by countries of the pelagic fishery in international waters of the Norwegian Sea (see text for further details).

Year	Faroe Islands	Germany	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	Others	Total
2002	-	9	-	-	-	-	-	-	-	-	**9**
2003	-	40	-	-	-	-	-	-	-	-	**40**
2004	500	2	-	-	-	-	-	1 510	-	-	**2 012**
2005	1 083	20	-	-	-	-	-	3 299	-	-	**4 402**
2006	3 766	2 475	341	845	2 862	2 447	1 697	9 390	575	4 372	**28 770**
2007	1 968	497	349	785	1 813	1 079	1 377	3 645	2 155	2 489	**16 157**
2008	1 797	-	267	117	330	-	641	4 901	390	-	**8 443**
2009	1 253	-	-	-	-	337	701	1 975	135	889	**5 290**
2010	912	-	243	457	450	-	244	5 103	820	-	**8 229**
2011	740	693	536	561	342	-	595	3 621	1 648	175	**8 911**
2012	259	469	447	449	-	311	1 038	2 714	1 768	31	**7 486**
2013	675	-	280	262	1	68	1 078	2 720	1 435	8	**6 527**
2014	697	409	215	167	-	100	505	795	1 146	-	**4 034**
2015	606	231	537	192	-	-	678	-	2 508	-	**4 752**
2016	393	493	1 243	1 065	9	-	821	512	2 862	-	**7 398**
2017	296	761	562	790	-	14	791	1 014	2 624	-	**6 852**
2018	400	2 192	876	1 010	-	116	372	-	2 399	374	**7 739**
2019	-	1 157	-	652	1	364	1 096	117	1 908	765	**6 060**
2020	-	1 380	-	1 081	-	-	480	25	737	1 766	**5 469**

Year	Faroe Islands	Germany	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	Others	Total
2021	-	514	-	1 379	-	-	84	498	280	117	**2 872**
2022	-	938	-	990	-	-	88	-	-	664	**2 680**
2023	-	-	-	-	-	-	-	-	-	5	**5**
2024[1]	1 682	-	-	-	-	-	-	-	-	11	**1 693**
2025[1]	1 488	1 099	-	-	-	-	-	639	-	3	**3 229**
1 - Provisional figures.											

Table 6.6. REDFISH in subareas 1 and 2. Nominal catch (t) by countries in Subarea 1, divisions 2.a and 2.b combined for both S. mentella and S. norvegicus.

Year	Faroe Islands	France	Germany[2]	Latvia	Lithuania	Norway	Portugal	Russia[3]	Spain	UK[4]	Others	Total
1984	-	2 970	7 457	-	-	18 650	1 806	69 689	25	716	-	**101 313**
1985	-	3 326	6 566	-	-	20 456	2 056	59 943	38	167	-	**92 552**
1986	-	2 719	6 136	-	-	24 529	2 864	38 509	-	227	29	**75 013**
1987	200	1 674	7 150	-	-	19 539	2 350	13 411	50	289	450	**45 113**
1988	-	3 349	2 355	-	-	24 662	500	9 139	26	470	973	**41 474**
1989	338	1 907	4 245	-	-	25 295	340	14 344	5	272	-	**46 746**
1990	386	1 821	6 741	-	-	34 090	830	18 904	-	333	37	**63 142**
1991	639	791	981	-	-	49 464	166	15 354	1	349	23	**67 768**
1992	58	1 301	530	-	-	23 451	977	4 335	16	484	623	**31 775**
1993	152	921	685	-	-	18 319	1 040	7 573	13	735	27	**29 465**
1994	26	771	1 026	-	-	21 466	985	6 220	34	272	41	**30 841**
1995	30	748	693	-	-	16 162	936	6 985	67	265	14	**25 900**
1996	42	746	618	-	-	21 654	522	1 641	409	426	39	**26 097**
1997	7	1 011	538	-	-	18 839	535	4 556	308	264	51	**26 109**
1998	98	567	231	-	-	26 273	131	5 278	228	305	88	**33 199**
1999	108	61	430	-	-	24 634	68	4 422	36	309	127	**30 195**
2000	67	25	222	-	-	19 052	131	4 631	87	203	118	**24 536**
2001	111	46	436	-	-	23 071	186	4 738	91	239	47	**28 965**
2002	135	89	141	-	-	10 712	276	4 736	193	234	120	**16 636**
2003	173	30	154	-	-	8 063	50	1 431	47	258	154	**10 360**
2004	607	17	78	-	-	7 608	240	3 601	260	145	143	**12 699**
2005	1 194	56	105	-	-	7 844	196	5 637	171	147	151	**15 501**
2006	3 919	223	2 518	341	845	11 015	1 873	12 126	719	1 066	6 004	**40 649**
2007	2 343	249	587	349	785	8 993	1 708	6 550	2 186	257	3 583	**27 590**
2008	2 123	250	46	267	117	7 436	785	7 866	467	168	170	**19 695**
2009	1 413	16	100	-	-	8 128	836	4 541	177	111	1 411	**16 733**
2010	1 150	226	52	243	457	8 058	321	6 979	1 187	123	109	**18 905**

Year	Faroe Islands	France	Germany	Latvia	Lithuania	Norway	Portugal	Russia	Spain	UK	Others	Total
2011	1 008	228	844	536	565	7 152	638	5 956	1 684	68	135	**18 814**
2012	346	182	588	447	449	6 362	1 055	4 782	1 780	100	486	**16 577**
2013	780	353	81	280	262	5 586	1 114	4 474	1 459	493	180	**15 062**
2014	810	434	452	215	167	16 589	510	2 510	1 162	211	192	**23 252**
2015	733	102	266	537	192	22 210	678	1 806	2 531	109	323	**29 487**
2016	685	164	497	1 243	1 065	22 322	1 066	9 283	3 213	198	481	**40 217**
2017	566	62	782	562	790	20 644	1 150	7 890	2 882	596	330	**36 254**
2018	571	104	2 539	1 020	1 010	23 554	766	12 331	2 469	100	922	**45 386**
2019	392	395	1 692	-	656	29 795	1 495	15 373	2 287	615	1 499	**54 199**
2020	315	164	1 895	-	1 081	39 452	969	16 489	750	456	1 724	**63 295**
2021	613	224	1 242	-	1 379	51 497	441	16 624	623	751	280	**73 674**
2022	546	241	1 818	-	990	48 268	537	19 257	282	122	1 083	**73 144**
2023	345	164	744	-	-	52 212	459	16 248	325	168	488	**71 153**
2024[1]	2 227	150	550	1	-	54 849	496	18 304	116	79	592	**77 364**
2025[1]	2 280	162	1 918	-	-	54 910	387	17 563	151	54	230	**77 655**
1 - Provisional figures.												
2 - Includes former GDR prior to 1991.												
3 - USSR prior to 1991.												
4 - UK(E&W) + UK(Scot.)												

Table 6.7. REDFISH in Subarea 4 (North Sea). Nominal catch (t) by countries as officially reported to ICES.

Year	Denmark	Faroe Islands	France	Germany	Ireland	Netherlands	Norway	Portugal	UK[2]	Others	Total
1998	27	12	570	370	4	21	1 113	-	749	2	**2 868**
1999	52	1	-	58	39	16	862	-	532	3	**1 563**
2000	41	-	224	19	28	19	443	-	618	5	**1 397**
2001	96	-	272	13	19	-	421	-	538	4	**1 363**
2002	40	2	98	11	7	-	241	-	524	2	**925**
2003	71	2	26	2	-	-	474	-	463	1	**1 039**
2004	42	3	26	1	-	-	287	-	214	-	**573**
2005	34	-	10	1	-	-	84	-	28	2	**159**
2006	49	1	12	3	-	-	163	33	79	1	**341**
2007	27	-	8	1	-	-	116	-	77	1	**230**
2008	3	-	8	1	-	-	77	-	54	1	**144**
2009	4	1	38	-	-	-	119	-	86	-	**248**
2010	5	-	3	-	-	-	62	-	150	-	**220**
2011	9	-	90	1	-	-	66	-	71	-	**237**

Year	Denmark	Faroe Islands	France	Germany	Ireland	Netherlands	Norway	Portugal	UK	Others	Total
2012	10	-	19	-	-	-	71	-	87	-	**187**
2013	7	-	40	-	-	-	54	-	176	-	**277**
2014	-	-	32	1	-	-	146	-	93	-	**272**
2015	1	-	14	1	-	-	157	-	61	-	**234**
2016	3	-	11	-	-	-	180	-	22	-	**216**
2017	3	-	10	-	-	-	168	-	38	-	**219**
2018	10	-	4	-	-	-	71	-	29	-	**114**
2019	7	-	10	-	-	-	62	-	10	-	**89**
2020	9	-	4	-	-	-	54	-	28	-	**95**
2020	9	-	4	-	-	-	54	-	28	-	**95**
2021	4	-	11	-	-	-	30	-	123	-	**168**
2022	3	3	11	-	-	-	40	-	24	-	**85**
2023	1	-	5	-	-	-	57	-	51	-	**114**
2024[1]	6	1	4	-	-	-	44	-	-	-	**55**
2025[1]	2	1	2	-	-	-	76	-	10	-	**91**
1 - Provisional figures.											
2 - UK(E&W) + UK(Scot.)											

Table 6.8. S. mentella in subareas 1 and 2. Catch numbers-at-age 6 to 18 and 19+ (in thousands) and total landings (in tonnes). For the periods 2014–2015, 2017-2018, 2020-2021 and 2023, age data are missing from the pelagic fishery. For the years 2017, 2019, 2021 and 2025, age data are missing from the demersal fishery fisheries. The numbers-at-age have been estimated following the method outlined in section 6.2.2.

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+	Tot No.	Tot Land.
1992	1 873	2 498	1 898	1 622	1 780	1 531	2 108	2 288	2 258	2 506	2 137	1 512	677	9 258	33 946	15 590
1993	159	159	174	512	2 094	3 139	2 631	2 308	2 987	1 875	1 514	1 053	527	6 022	25 154	12 814
1994	738	730	722	992	2 561	2 734	3 060	1 535	2 253	2 182	3 336	1 284	734	3 257	26 118	12 721
1995	662	941	1 279	719	740	1 230	2 013	4 297	3 300	2 162	1 454	757	794	2 404	22 752	10 284
1996	223	634	1 699	1 554	1 236	1 078	1 146	1 413	1 865	880	621	498	700	2 247	15 794	8 075
1997	125	533	1 287	1 247	1 297	1 244	876	1 416	1 784	1 217	537	1 177	342	3 568	16 650	8 598
1998	37	882	2 904	4 236	3 995	2 741	1 877	1 373	1 277	1 595	1 117	784	786	6 241	29 845	14 044
1999	9	83	441	1 511	2 250	3 262	1 867	1 454	1 447	1 557	1 418	1 317	658	3 919	21 193	11 209
2000	1	24	390	1 235	2 460	2 149	1 816	1 205	1 001	993	932	505	596	5 705	19 012	10 076

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+	Tot No.	Tot Land.
2001	117	372	542	976	925	1 712	2 651	2 660	1 911	1 773	1 220	714	814	16 234	32 621	18 418
2002	2	40	252	572	709	532	1 382	1 893	1 617	855	629	163	237	4 082	12 965	6 993
2003	6	37	103	93	132	220	384	391	434	466	513	199	231	1 193	4 402	2 520
2004	7	16	70	96	278	429	611	433	1 063	813	830	841	607	3 076	9 170	5 493
2005	2	20	57	155	244	262	295	754	783	1 896	817	1 087	1 023	6 065	13 460	8 465
2006	-	4	3	38	64	121	423	1 461	1 356	2 835	4 271	3 487	3 969	32 084	50 116	33 261
2007	-	1	3	22	33	86	235	631	2 194	2 825	3 657	4 359	3 540	15 824	33 410	20 218
2008	-	-	1	10	46	100	197	469	612	1 502	1 384	894	1 886	11 906	19 007	13 096
2009	-	1	16	22	42	39	254	258	577	364	824	692	1 856	11 704	16 649	10 246
2010	10	4	6	19	34	55	61	262	278	413	606	717	742	15 646	18 853	11 923
2011	4	4	4	25	55	114	11	103	288	398	419	495	585	15 173	17 678	12 962
2012	4	24	29	24	26	66	69	78	80	305	401	388	442	13 992	15 928	11 060
2013	-	3	19	101	90	44	41	42	9	177	146	185	317	12 826	14 000	9 389
2014	14	27	338	95	114	92	147	54	108	68	248	287	193	23 101	24 886	18 427
2015	43	41	134	565	843	1 355	1 245	717	385	945	289	595	871	29 441	37 469	25 570
2016	40	-	977	667	3 350	2 579	2 983	1 995	1 964	1 269	1 342	1 256	1 108	36 719	56 249	34 753
2017	36	187	403	461	1 042	1 431	1 226	1 370	1 222	1 648	1 462	1 272	1 786	32 989	46 535	30 782
2018	50	319	611	822	1 363	2 481	2 663	2 825	2 816	2 872	2 623	1 804	2 353	41 030	64 632	38 045
2019	129	447	809	1 257	2 122	2 225	2 024	2 238	2 394	3 141	2 814	1 982	2 511	45 497	69 590	45 640
2020	5	14	616	239	2 368	1 948	2 085	3 541	2 861	2 882	3 974	3 454	3 136	53 208	80 331	53 656
2021	79	470	1 007	1 325	2 294	3 165	2 878	3 137	3 417	4 492	4 266	3 007	3 752	62 816	96 105	63 479
2022	458	551	851	1 149	1 559	1 858	4 977	6 523	7 809	7 310	8 654	4 738	4 988	48 296	99 721	62 194
2023	429	490	871	1 821	1 945	3 830	6 326	6 797	5 962	9 430	7 763	4 708	4 897	44 027	99 296	60 385

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+	Tot No.	Tot Land.
2024	607	614	1 296	2 925	4 143	6 649	9 755	10 352	10 323	8 808	8 300	5 909	4 194	42 397	116 272	66 984
2025	1 971	1 371	965	1 514	2 966	4 000	6 357	9 291	9 828	9 863	8 577	7 997	5 685	42 500	112 885	66 220

Table 6.9. Pelagic S. mentella in the Norwegian Sea (outside the EEZ). Catch numbers-at-age (thousands).

Year/Age	7	8	9	10	11	12	13	14	15	16	17	18	19+	Tot No.	Tot Land.
2006	-	-	-	-	23	93	1 083	323	1 563	3 628	2 514	3 756	29 704	42 687	28 770
2007	-	-	9	18	25	154	444	1 642	2 302	3 021	3 394	3 156	12 684	26 849	16 157
2008	-	-	-	2	-	157	92	214	272	555	723	909	8 775	11 699	8 443
2009	-	-	-	-	-	61	32	65	117	200	269	659	7 296	8 699	5 290
2010	-	-	-	-	-	-	155	74	135	224	356	458	12 497	13 899	8 229
2011	-	-	-	-	-	-	-	194	84	140	216	327	11 040	12 001	8 911
2012[1]	-	-	-	-	-	-	-	-	227	90	139	206	10 087	10 749	7 486
2013[2]	-	-	78	27	28	-	-	-	94	28	104	168	9 473	10 000	6 527
2014[3]	-	-	-	74	24	25	-	-	-	58	16	57	4 920	5 174	4 034
2015[3]	-	-	-	-	170	54	51	-	-	-	84	22	6 343	6 724	4 752
2016[3]	-	-	154	307	271	276	134	90	107	239	445	229	10 499	12 751	7 398
2017[3]	-	-	-	238	462	390	370	165	100	109	226	402	8 349	10 811	6 852
2018[3]	-	-	-	-	691	1 281	1 008	874	352	195	198	393	12 659	17 651	7 739
2019	25	5	200	400	220	242	197	279	183	155	135	161	6 696	8 898	6 060
2020[3]	-	44	8	345	672	353	362	270	345	206	163	136	5 496	8 400	5 469
2021[3]	-	-	45	8	339	631	309	290	195	228	127	96	2 380	4 648	2 872
2022	-	-	7	14	12	48	165	135	114	194	155	84	2 931	3 859	2 680
2023[3]	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5
2024[3]	-	-	-	-	14	25	20	66	189	128	92	140	1 746	2 420	1 693
2025[3]	-	-	-	-	-	45	76	55	164	428	270	185	3 366	4 589	3 229

1 - No age data in 2012, catch numbers-at-age are estimated from proportions at age in 2011 and in 2013.

2 - No age data from the catches in 2013. Age readings from the research survey conducted in September 2013 are used to derive catch numbers-at-age.

3 - No age data in 2014 – 2018, 2020-2021 and 2023, catch numbers-at-age are estimated from previous year according to protocol described in section 6.2.2.

Table 6.10. S. mentella in subareas 1 and 2. Total catch numbers-at-length (thousands).

Year/Length	18–20	20–22	22–24	24–26	26–28	28–30	30–32	32–34	34–36	36–38	38–40	40–42	42–44	44–46	46–48	48–50	50–52
2011	0	12	0	0	1	8	249	2 544	6 481	6 528	3 620	829	95	18	1	0	0
2012	0	0	23	19	26	28	41	287	1 898	5 030	5 385	1 911	451	197	43	23	0

Year/Length	18–20	20–22	22–24	24–26	26–28	28–30	30–32	32–34	34–36	36–38	38–40	40–42	42–44	44–46	46–48	48–50	50–52
2013	0	0	4	32	154	137	90	69	1 382	4 214	4 480	1 633	497	197	0	0	0
2014	0	5	0	25	29	235	660	697	3 358	7 667	8 544	3 808	787	34	0	0	0
2015-2025	Data not available at the time of the working group																

Table 6.11. S. mentella in subareas 1 and 2. Catch numbers-at-length (thousands) in the pelagic fishery.

Year/Length	18–20	20–22	22–24	24–26	26–28	28–30	30–32	32–34	34–36	36–38	38–40	40–42	42–44	44–46	46–48	48–50	50–52
2011	0	0	0	0	1	8	244	2 562	5 887	4 425	1 537	287	13	0	1	0	0
2012	0	0	0	0	0	0	106	2 014	5 092	3 681	952	48	0	0	0	0	0
2013	0	0	0	0	0	0	75	1 352	4 791	2 967	730	87	6	0	0	0	0
2014	0	0	0	0	0	3	14	349	2 408	2 454	827	80	6	1	0	0	0
2015-2025	Data not available at the time of the working group																

Table 6.12. S. mentella in subareas 1 and 2. Observed mean weights-at-age (kg) from Norwegian data (catches and surveys combined). The bottom row gives the fixed weights-at-age used in the statistical catch-at-age model.

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
1992	0.167	0.164	0.211	0.241	0.309	0.324	0.378	0.366	0.428	0.454	0.487	0.529	0.571	0.805
1993	0.141	0.181	0.217	0.254	0.306	0.357	0.349	0.400	0.450	0.436	0.460	0.499	0.462	0.846
1994	0.174	0.188	0.235	0.298	0.361	0.396	0.415	0.480	0.492	0.562	0.642	0.636	0.720	0.846
1995	0.158	0.185	0.226	0.261	0.324	0.360	0.432	0.468	0.496	0.519	0.566	0.573	0.621	0.758
1996	0.175	0.189	0.224	0.272	0.323	0.337	0.377	0.518	0.536	0.603	0.690	0.800	0.683	0.958
1997	0.152	0.191	0.228	0.280	0.324	0.367	0.435	0.492	0.521	0.615	0.601	0.611	0.671	0.911
1998	0.120	0.148	0.192	0.261	0.326	0.373	0.427	0.496	0.537	0.566	0.587	0.625	0.658	0.809
1999	0.133	0.170	0.226	0.286	0.343	0.382	0.441	0.483	0.537	0.565	0.620	0.644	0.672	0.757
2000	0.109	0.144	0.199	0.276	0.332	0.392	0.437	0.490	0.540	0.585	0.631	0.650	0.671	0.872
2001	0.115	0.137	0.183	0.262	0.310	0.356	0.400	0.434	0.484	0.534	0.581	0.615	0.624	0.819
2002	0.114	0.139	0.182	0.253	0.329	0.372	0.392	0.434	0.476	0.520	0.545	0.587	0.601	0.833
2003	0.109	0.124	0.196	0.245	0.312	0.371	0.422	0.434	0.477	0.516	0.551	0.591	0.623	0.817
2004	0.104	0.129	0.180	0.264	0.308	0.376	0.413	0.444	0.478	0.521	0.579	0.614	0.688	0.835
2005	0.104	0.136	0.196	0.263	0.322	0.370	0.408	0.451	0.478	0.523	0.550	0.551	0.640	0.797
2006	0.107	0.143	0.200	0.266	0.314	0.374	0.419	0.462	0.489	0.527	0.570	0.602	0.590	0.796
2007	0.115	0.131	0.180	0.252	0.305	0.364	0.409	0.449	0.485	0.513	0.523	0.554	0.569	0.737
2008	0.000	0.158	0.177	0.242	0.304	0.402	0.465	0.486	0.511	0.546	0.600	0.596	0.635	0.803
2009	0.129	0.179	0.206	0.249	0.326	0.394	0.510	0.550	0.542	0.583	0.609	0.594	0.595	0.809

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
2010	0.129	0.128	0.175	0.263	0.375	0.447	0.501	0.541	0.582	0.602	0.593	0.608	0.592	0.706
2011	0.136	0.156	0.183	0.261	0.316	0.435	0.512	0.604	0.655	0.609	0.671	0.647	0.677	0.795
2012	0.135	0.178	0.225	0.246	0.249	0.356	0.474	0.582	0.530	0.626	0.654	0.730	0.699	0.833
2013	0.129	0.145	0.189	0.230	0.270	0.282	0.345	0.384	0.534	0.559	0.634	0.627	0.661	0.720
2014	0.193	0.172	0.221	0.167	0.192	0.239	0.333	0.277	0.364	0.516	0.713	0.780	0.797	0.882
2015	0.167	0.168	0.232	0.294	0.346	0.383	0.457	0.436	0.474	0.538	0.665	0.690	0.724	0.824
2016	0.110	0.000	0.331	0.356	0.401	0.392	0.434	0.486	0.543	0.579	0.740	0.591	0.598	0.776
2017	0.154	0.196	0.254	0.270	0.306	0.413	0.425	0.458	0.533	0.472	0.562	0.650	0.692	0.796
2018	0.000	0.233	0.135	0.371	0.323	0.280	0.379	0.452	0.524	0.633	0.483	0.589	0.457	0.821
2019	0.118	0.380	0.341	0.470	0.538	0.523	0.539	0.565	0.572	0.620	0.656	0.601	0.633	0.744
Modelled	0.141	0.188	0.237	0.286	0.334	0.381	0.424	0.465	0.503	0.537	0.569	0.597	0.623	0.755

Table 6.13. Pelagic S. mentella in the Norwegian Sea (outside the EEZ). Catch weights-at-age (kg).

Year/Age	11	12	13	14	15	16	17	18	19+
2006	0.44	0.44	0.52	0.44	0.49	0.55	0.53	0.56	0.61
2007	0.39	0.43	0.41	0.48	0.50	0.52	0.55	0.57	0.64
2008	0.36	0.47	0.56	0.50	0.56	0.54	0.56	0.55	0.64
2009	0.38	0.44	0.45	0.48	0.54	0.59	0.64	0.58	0.69
2010	-	-	0.62	0.56	0.54	0.59	0.59	0.56	0.61
2011	-	0.48	0.54	0.54	0.64	0.59	0.54	0.59	0.59
2012	No data								
2013[1]	0.31	-	-	-	0.56	0.62	0.60	0.62	0.68
2014-2025	No data								
1 - As observed in the research survey in the Norwegian Sea in September 2013.									

Table 6.14. S. mentella in subareas 1 and 2. Proportion mature-at-age 6–19+ derived from Norwegian commercial and survey data. The proportions were derived from samples with at least 5 individuals. a50 w1 and w2 are the annual coefficients for modelled maturity ogives using a double half sigmoid of the form 0.5 ((1+tanh(age- a50)/w1)) for age < a50 and 0.5 (1+tanh((age- a50)/w2) for age > a50. a50 equals the age at 50% maturity. Since JRN-AFWG 2024 maturity-at-age used in the statistical catch-at-age model are identical for every year and given at the bottom row of the table.

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
1992	0.00	0.01	0.02	0.04	0.07	0.14	0.26	0.42	0.53	0.59	0.65	0.70	0.75	1
1993	0.01	0.02	0.04	0.08	0.15	0.28	0.44	0.55	0.61	0.67	0.72	0.77	0.82	1
1994	0.02	0.04	0.08	0.15	0.28	0.44	0.59	0.72	0.81	0.88	0.93	0.96	0.98	1
1995	0.03	0.07	0.13	0.24	0.39	0.57	0.71	0.83	0.90	0.95	0.97	0.98	0.99	1
1996	0.01	0.01	0.02	0.05	0.10	0.19	0.33	0.50	0.59	0.66	0.73	0.79	0.84	1
1997	0.02	0.04	0.08	0.16	0.29	0.46	0.55	0.61	0.66	0.71	0.76	0.80	0.84	1
1998	0.02	0.04	0.08	0.15	0.26	0.43	0.56	0.65	0.73	0.80	0.85	0.90	0.93	1
1999	0.03	0.05	0.10	0.20	0.34	0.51	0.57	0.64	0.70	0.75	0.80	0.84	0.87	1

Year/Age	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
2000	0.03	0.06	0.11	0.21	0.36	0.52	0.63	0.73	0.81	0.87	0.91	0.94	0.96	1
2001	0.01	0.02	0.04	0.09	0.17	0.30	0.47	0.56	0.62	0.68	0.74	0.79	0.83	1
2002	0.02	0.05	0.10	0.19	0.33	0.50	0.54	0.59	0.63	0.67	0.70	0.74	0.77	1
2003	0.03	0.06	0.12	0.21	0.36	0.51	0.57	0.63	0.69	0.73	0.78	0.82	0.85	1
2004	0.03	0.06	0.12	0.22	0.37	0.51	0.55	0.59	0.63	0.67	0.70	0.73	0.76	1
2005	0.02	0.05	0.09	0.18	0.31	0.49	0.55	0.61	0.66	0.71	0.75	0.79	0.83	1
2006	0.01	0.02	0.03	0.07	0.13	0.24	0.39	0.53	0.59	0.64	0.70	0.75	0.79	1
2007	0.02	0.04	0.09	0.17	0.30	0.47	0.64	0.77	0.87	0.93	0.96	0.98	0.99	1
2008[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2009	0.02	0.04	0.09	0.17	0.30	0.47	0.60	0.71	0.80	0.87	0.92	0.95	0.97	1
2010	0.02	0.04	0.08	0.16	0.28	0.45	0.54	0.60	0.66	0.71	0.76	0.80	0.83	1
2011[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2012	0.02	0.05	0.10	0.19	0.32	0.50	0.59	0.68	0.75	0.81	0.86	0.90	0.93	1
2013	0.00	0.01	0.02	0.04	0.08	0.15	0.28	0.45	0.62	0.77	0.87	0.93	0.97	1
2014	0.00	0.00	0.01	0.02	0.03	0.06	0.12	0.23	0.38	0.53	0.61	0.68	0.74	1
2015	0.01	0.02	0.05	0.09	0.17	0.31	0.48	0.54	0.58	0.63	0.67	0.71	0.74	1
2016	0.03	0.06	0.12	0.22	0.38	0.52	0.56	0.61	0.66	0.70	0.74	0.77	0.81	1
2017[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2018[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2019[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2020[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2021[1]	0.02	0.04	0.08	0.15	0.27	0.43	0.55	0.62	0.68	0.74	0.79	0.83	0.87	1
2022[1]	0.02	0.05	0.09	0.17	0.30	0.46	0.80	0.96	0.99	1.00	1.00	1.00	1.00	1
2023[1]	0.02	0.04	0.08	0.14	0.22	0.30	0.45	0.56	0.63	0.69	0.73	0.76	0.79	1
Model input	0.02	0.04	0.08	0.14	0.24	0.37	0.49	0.58	0.66	0.73	0.77	0.81	0.85	1

1 - Model parameter estimates were unrealistic and replaced by average parameter values.

Table 6.15. S. mentella. Average catch (numbers of specimens) per hour trawling of different ages of S. mentella in the Russian groundfish survey in the Barents Sea and Svalbard areas (1976–1983 published in Annales Biologiques). The survey was not conducted in 2016, took place in 2017 with insufficient coverage, and was terminated after that year.

Yearclass	0	1	2	3	4	5	6	7	8	9	10	11
1974	-	-	4.8	-	4.9	22.8	4.8	4.8	-	-	-	3.0
1975	-	7.4	-	1.7	6.4	2.4	3.5	5.0	-	-	4.0	-
1976	7.0	-	8.1	1.2	2.5	6.8	4.9	5.0	1.0	13.0	-	-
1977	-	0.2	0.2	0.2	0.9	5.1	3.7	1.0	19.0	2.0	-	-
1978	0.8	0.0	0.9	1.0	5.0	3.8	2.0	20.0	6.0	-	-	-
1979	-	1.9	1.4	3.6	2.3	9.0	11.0	16.0	1.0	-	-	0.1

Yearclass	0	1	2	3	4	5	6	7	8	9	10	11
1980	0.3	0.4	2.0	2.5	16.0	6.0	11.0	25.0	2.0	-	1.5	2.0
1981	-	2.2	3.9	20.0	6.0	12.0	47.0	18.0	6.3	1.6	0.5	1.0
1982	19.8	13.2	13.0	15.0	34.0	44.0	39.0	32.6	4.3	3.1	4.9	+
1983	12.5	3.0	5.0	6.0	31.0	34.0	32.3	13.3	4.0	4.2	0.6	1.1
1984	-	10.0	2.0	-	5.0	18.3	19.0	2.2	2.4	0.2	1.7	2.4
1985	107.0	7.0	-	1.0	5.2	16.2	1.7	1.7	0.6	2.8	3.8	0.3
1986	2.0	-	1.0	1.8	8.4	3.6	2.1	1.2	5.6	8.2	0.9	0.7
1987	-	3.0	37.9	1.3	8.0	4.1	2.0	10.6	9.6	1.4	2.0	1.3
1988	4.0	58.1	4.3	13.3	25.8	3.9	8.6	11.2	2.8	4.2	3.0	4.7
1989	8.7	9.0	17.0	23.4	4.6	5.4	4.0	6.6	6.6	4.1	7.7	5.3
1990	2.5	6.3	6.1	1.0	4.3	1.7	11.5	6.5	5.5	6.7	7.4	3.6
1991	0.3	1.0	0.5	1.5	1.2	11.3	3.9	3.3	4.6	5.8	2.7	1.9
1992	0.6	+	0.2	0.1	4.3	1.3	2.0	2.3	4.9	2.3	1.0	4.1
1993[1]	-	+	1.5	1.8	1.0	1.2	3.0	4.2	2.6	2.0	3.2	2.1
1994	0.3	3.5	1.7	1.7	0.9	3.6	5.2	4.3	3.1	3.3	1.8	1.2
1995	2.8	1.0	1.1	0.4	2.2	2.6	3.5	3.4	2.9	1.2	1.0	8.5
1996[2]	+	0.1	0.1	0.4	0.7	1.1	1.0	1.4	1.0	0.8	3.7	0.6
1997	-	-	+	0.4	0.5	0.3	0.9	0.6	1.0	1.1	0.5	0.4
1998	-	0.1	0.2	0.3	0.2	1.1	0.5	0.7	1.0	3.4	0.4	0.7
1999	0.1	-	0.1	+	0.1	0.3	0.5	0.8	0.5	3.2	0.4	0.6
2000	-	0.6	0.1	0.5	0.3	0.3	0.6	0.4	0.1	0.1	0.7	0.3
2001	-	0.1	0.4	-	0.1	0.2	0.2	0.3	0.2	0.8	0.1	1.0
2002[3]	0.1	0.5	0.1	-	-	0.1	0.5	0.4	1.5	3.5	1.0	1.1
2003	-	-	0.1	-	0.3	1.0	0.5	4.8	2.1	3.7	1.3	1.9
2004	-	0.2	0.3	0.5	1.5	0.9	4.4	3.7	7.5	4.1	3.1	3.3
2005	-	-	1.4	1.9	1.4	2.3	3.9	7.2	6.1	5.8	3.1	-
2006[4]	0.1	1.8	1.2	1.1	0.8	2.1	4.1	3.0	6.1	5.9	-	-
2007	2.5	0.4	0.1	1.2	1.7	2.4	3.6	4.3	7.4	-	-	-
2008	0.1	0.1	1.6	1.8	4.1	2.9	5.8	5.5	-	-	-	-
2009	1.6	1.9	1.1	4.4	4.8	2.9	4.8	-	-	-	-	-
2010	7.5	0.7	1.2	1.5	1.9	1.6	-	-	-	-	-	-
2011	0.1	0.3	0.6	1.6	1.6	-	-	-	-	-	-	-
2012	0.2	0.7	0.5	0.3	-	-	-	-	-	-	-	-
2013	0.1	0.1	0.4	-	-	-	-	-	-	-	-	-
2014	3.6	1.0	-	-	-	-	-	-	-	-	-	-
2015	6.6	-	-	-	-	-	-	-	-	-	-	-

Yearclass	0	1	2	3	4	5	6	7	8	9	10	11
1 - Not complete area coverage of Division 2.b.												
2 - Area surveyed restricted to Subarea 1 and Division 2.a only.												
3 - Area surveyed restricted to Subarea 1 and Division 2.b only.												
4 - Area surveyed restricted to divisions 2.a and 2.b onl												

Table 6.16a. S. mentella1 in Division 2.b. Abundance indices (by length) from the bottom-trawl survey in the Svalbard area (Division 2.b) in summer/fall (numbers in millions).

Year/Length	5.0–9.9	10.0–14.9	15.0–19.9	20.0–24.9	25.0–29.9	30.0–34.9	35.0–39.9	40.0–44.9	>45	Total
1986[2]	6	101	192	17	10	5	2	4	0	**337**
1987[2]	20	14	140	19	6	2	1	2	0	**204**
1988[2]	33	23	82	77	7	3	2	2	0	**229**
1989	556	225	24	72	17	2	2	8	4	**910**
1990	184	820	59	65	111	23	15	7	3	**1 287**
1991	1 533	1 426	563	55	138	38	30	7	1	**3 791**
1992	149	446	268	43	22	15	4	7	4	**958**
1993	9	320	272	89	16	13	3	1	0	**723**
1994	4	284	613	242	10	9	2	2	1	**1 167**
1995	32	33	417	349	77	18	5	1	0	**933**
1996	56	69	139	310	97	8	4	1	0	**685**
1997	3	44	13	65	57	9	4	0	0	**195**
1998	0	37	35	28	132	73	45	2	0	**352**
1999	3	3	124	62	260	169	42	1	0	**664**
2000	0	10	30	59	126	143	21	1	0	**391**
2001	1	5	3	32	57	227	50	3	0	**378**
2002	1	4	6	21	62	266	47	4	0	**410**
2003	1	5	7	10	49	243	45	1	-	**361**
2004	0	2	8	7	14	81	52	2	0	**166**
2005	22	1	4	4	10	68	46	1	0	**156**
2006	84	6	5	7	43	198	107	3	0	**453**
2007	73	39	1	4	9	91	102	3	0	**322**
2008	125	46	22	3	8	24	78	3	-	**309**
2009	9	122	88	14	3	27	219	5	-	**487**
2010	96	18	44	37	2	20	91	7	-	**315**
2011	126	91	81	48	10	7	67	5	1	**436**
2012	28	74	68	81	47	8	94	10	-	**410**
2013	33	43	127	106	67	19	85	13	-	**493**
2014[3]	3	10	59	49	38	24	66	20	0	**269**

Year/Length	5.0–9.9	10.0–14.9	15.0–19.9	20.0–24.9	25.0–29.9	30.0–34.9	35.0–39.9	40.0–44.9	>45	Total
2015	89	8	29	159	116	66	69	25	-	**561**
2016	244	33	44	205	138	139	142	48	0	**993**
2017	41	38	8	20	59	76	57	17	0	**316**
2018	66	62	55	35	100	65	80	26	-	**489**
2019	3	27	89	32	59	83	74	26	1	**394**
2020	107	8	58	40	40	115	98	17	-	**483**
2021	498	136	15	39	16	58	88	18	-	**868**
2022	15	102	6	23	27	51	109	24	0	**357**
2023	5	65	90	20	68	42	87	23	0	**400**
2024	5	79	642	102	76	52	83	16	0	**1 055**
2025	83	5	60	142	36	79	98	28	0	**531**
1 Includes some unidentified Sebastes specimens mostly less than 15 cm.										
2 Old trawl equipment (bobbins gear and 80 m sweep length).										
3 Poor survey coverage in 2014.										

Table 6.16b. S. mentella1 in Division 2.b. Norwegian bottom-trawl survey indices (by age) in the Svalbard area (Division 2.b) in summer/fall 1992–2025 (numbers in millions).

Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	283	419	484	131	58	45	14	8	5	2	7	2	1	3	**1 462**
1993	2	527	117	202	142	8	23	6	13	1	7	1	1	0	**1 050**
1994	7	280	290	202	235	42	94	1	1	3	4	1	1	0	**1 161**
1995	4	50	365	237	132	61	19	17	11	0	1	3	0	0	**900**
1996	13	32	10	36	103	135	78	16	50	28	32	8	21	2	**564**
1997	8	43	6	7	38	18	29	19	6	2	0	2	1	1	**180**
1998	0	25	27	13	10	12	61	52	41	15	0	5	13	0	**274**
1999	3	16	108	25	28	39	106	59	54	26	35	14	18	12	**543**
2000	4	6	5	13	30	21	28	44	66	48	21	19	9	6	**320**
2001	1	4	2	0	12	15	18	36	28	46	45	80	53	14	**354**
2002	3	2	4	1	5	22	34	23	90	35	54	65	17	22	**377**
2003	0	3	4	3	5	4	27	26	26	28	13	132	50	21	**342**
2004	1	1	4	4	2	4	2	10	4	15	18	18	19	15	**117**
2005	18	1	1	3	1	3	3	8	5	5	14	8	29	21	**120**
2006	35	1	3	3	2	6	5	36	3	19	46	68	8	19	**254**
2007	23	24	1	0	2	1	4	4	5	3	3	8	28	17	**123**
2008	8	25	19	11	2	2	2	4	3	3	3	3	7	8	**100**
2009	11	74	54	30	25	30	8	1	1	1	4	19	10	8	**276**
2010	No age reading														

Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
2011	119	43	58	42	12	47	35	4	1	0	2	0	0	1	**364**
2012	27	52	31	23	32	50	27	33	17	9	0	1	0	-	**302**
2013	30	4	30	37	7	102	75	44	41	8	8	3	3	3	**395**
2014[2]	0	3	2	6	23	41	12	23	5	30	13	11	3	1	**173**
2015	72	5	11	58	34	60	35	102	34	23	13	3	6	3	**459**
2016	102	13	11	88	34	102	66	31	13	80	37	2	12	30	**621**
2017	38	28	10	15	15	20	39	16	28	8	6	19	1	23	**266**
2018	44	52	14	23	88	14	4	20	27	18	16	9	14	1	**344**
2019	25	50	56	4	17	44	13	17	13	1	3	16	23	0	**282**
2020	43	9	23	27	30	13	17	20	39	7	13	17	11	8	**277**
2021	393	68	24	29	7	26	12	22	5	9	8	16	15	5	**639**
2022	12	55	35	5	6	10	7	19	12	6	5	16	5	16	**209**
2023	24	88	33	20	29	13	21	18	4	5	4	6	22	25	**312**
2024	64	15	324	263	143	2	24	54	25	10	3	31	16	3	**977**
2025	6	8	44	65	43	20	60	31	26	24	10	39	6	5	**387**
1 Includes some unidentified Sebastes specimens mostly less than 15 cm.															
2 Poor survey coverage in 2014.															

Table 6.17. S. mentella1 in subareas 1 and 2. Abundance indices (by age) from the Ecosystem survey in August-September covering the Norwegian Economic Zone (NEZ) and Svalbard incl. the area north and east of Spitsbergen and the continental slope down to 1000 m (numbers in millions and total biomass in thousand tonnes).

Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	Total	Tot B[3]
1996	146	113	22	54	166	182	109	43	65	41	38	20	29	11	17	**1 056**	171
1997	63	131	12	23	74	56	77	83	18	14	1	2	2	1	9	**566**	73
1998	0	79	86	40	26	23	85	100	54	24	11	7	15	1	25	**576**	105
1999	5	23	117	48	42	77	129	73	58	65	50	14	18	12	25	**756**	155
2000	6	23	14	20	53	68	84	78	100	72	71	37	17	21	27	**691**	178
2001	5	7	11	1	20	26	37	52	44	62	50	86	54	16	32	**503**	162
2002	9	7	7	4	9	28	47	64	103	50	76	72	25	37	35	**573**	181
2003	3	7	8	3	8	8	42	62	55	38	61	137	98	37	28	**595**	257
2004	8	16	11	8	4	8	7	16	11	54	27	23	27	28	65	**313**	91
2005	32	5	5	5	4	6	7	13	6	6	17	29	34	31	49	**249**	101
2006	125	5	7	7	4	8	7	38	4	23	50	69	15	37	160	**559**	199
2007	264	147	13	4	10	3	7	9	12	5	4	9	56	19	221	**783**	199
2008	56	209	137	31	7	3	3	6	6	3	3	6	8	10	108	**596**	84
2009	116	186	237	82	105	48	17	3	6	3	5	22	11	9	324	**1 174**	260
2010	No age reading																

Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	Total	Tot B
2011	387	320	206	61	57	75	51	13	3	2	3	1	0	3	100	**1 282**	120
2012	335	239	365	169	127	78	60	41	20	12	4	1	2	3	145	**1 601**	184
2013	286	173	174	181	149	178	115	95	88	15	12	9	3	3	137	**1 618**	271
2014[2]	2	21	35	81	55	96	99	62	36	55	42	18	19	3	166	**790**	239
2015	414	81	55	99	54	115	49	135	77	27	20	6	6	3	121	**1 262**	207
2016	715	136	56	133	93	129	88	61	19	92	39	13	28	31	235	**1 868**	not updated
2017	540	251	211	210	36	46	61	63	35	34	40	38	11	34	77	**1 687**	213
2018	162	234	153	64	124	34	29	25	86	64	31	35	24	1	129	**1 195**	not updated
2019	85	109	114	89	38	69	28	24	22	129	33	20	40	3	189	**992**	211
2020	157	42	46	70	51	33	49	44	62	15	30	37	29	22	231	**918**	not updated
2021	957	209	108	64	25	42	28	35	21	22	10	23	23	14	154	**1 735**	not updated
2022	55	187	220	64	16	17	35	55	16	13	24	26	10	20	237	**995**	not updated
2023	197	333	152	44	44	39	37	23	11	20	10	22	42	35	161	**1 170**	not updated
2024	132	88	492	347	162	27	55	79	36	47	11	57	21	22	84	**1 660**	not updated
2025	40	39	75	105	88	57	71	60	48	36	61	62	14	7	130	**893**	not updated
1 Includes some unidentified Sebastes specimens mostly less than 15 cm.																	
2 Poor survey coverage in 2014.																	
3 Calculated using modelled weight-at-age.																	

Table 6.18a. S. mentella1. Abundance indices (by length) from the bottom-trawl survey in the Barents Sea in winter (numbers in millions). The area coverage was extended from 1993 onwards and from 2014 and onwards. Numbers from 1994 onwards were recalculated while numbers for 1986–1993 are as in previous reports.

Year/Length	5.0–9.9	10.0–14.9	15.0–19.9	20.0–24.9	25.0–29.9	30.0–34.9	35.0–39.9	40.0–44.9	>45	Total
1986	81	152	205	88	169	130	88	24	14	**950**
1987	72	25	227	56	35	11	5	1	0	**433**
1988	587	25	133	182	40	50	48	4	0	**1 068**
1989	623	55	28	177	58	9	8	2	0	**961**
1990	324	305	36	56	80	13	13	2	0	**828**
1991	395	449	86	39	96	35	24	3	0	**1 127**
1992	139	367	227	35	55	34	8	2	1	**867**
1993	31	593	320	116	24	25	6	1	0	**1 117**
1994	5	191	345	366	55	69	23	3	0	**1 057**
1995	301	83	516	345	75	50	22	2	0	**1 394**
1996	211	103	197	342	136	42	18	0	0	**1 049**
1997[2]	59	130	27	273	254	63	37	4	0	**847**
1998[2]	0	85	62	101	200	40	12	1	0	**501**
1999	0	6	68	36	172	73	21	3	0	**379**

Year/Length	5.0–9.9	10.0–14.9	15.0–19.9	20.0–24.9	25.0–29.9	30.0–34.9	35.0–39.9	40.0–44.9	>45	Total
2000	7	12	39	77	143	96	27	6	1	**408**
2001	9	21	7	55	79	75	9	0	0	**255**
2002	15	6	17	36	95	116	24	1	0	**310**
2003	4	4	10	12	76	221	51	6	0	**384**
2004	0	1	8	17	32	85	31	1	0	**175**
2005	0	5	8	10	27	153	86	2	0	**291**
2006[3]	98	1	8	13	23	103	81	1	1	**329**
2007[2]	372	121	1	5	12	132	139	6	0	**788**
2008	857	359	26	3	10	105	166	5	0	**1 531**
2009	95	323	135	5	9	67	163	5	0	**802**
2010	652	276	217	64	7	72	190	6	0	**1 484**
2011	501	237	219	152	13	44	156	6	0	**1 328**
2012[2]	127	279	86	124	47	13	154	17	0	**847**
2013	249	225	243	157	142	35	194	26	0	**1 271**
2014	109	182	261	119	127	53	117	14	0	**982**
2015	185	114	222	312	303	220	172	19	0	**1 547**
2016	670	108	150	336	215	167	125	13	0	**1 784**
2017[2]	646	197	70	212	294	319	236	11	0	**1 985**
2018	239	328	85	110	195	277	223	23	1	**1 481**
2019	52	304	276	92	157	256	213	18	0	**1 368**
2020[2]	206	122	207	93	120	236	213	24	0	**1 221**
2021[2]	995	129	143	130	84	201	182	22	0	**1 886**
2022	637	1 035	53	112	76	92	163	20	0	**2 188**
2023	51	1 104	369	105	152	132	196	31	1	**2 141**
2024	34	199	689	69	205	134	156	27	0	**1 513**
2025	51	78	555	333	123	141	197	27	1	**1 506**
2026	287	18	138	579	149	197	216	27	1	**1 613**

1 Includes some unidentified Sebastes specimens mostly less than 15 cm.

2 Indices not raised to represent uncovered parts of the Russian EEZ.

3 Not complete coverage in southeast due to restrictions, strata 7 area set to default and strata 13 as in 2005.

Table 6.18b. S. mentella1 in subareas 1 and 2. Norwegian bottom-trawl indices (by age) from the annual Barents Sea survey in February 1992–2025 (numbers in millions). The area coverage was extended from 1993 onwards and from 2014 and onwards. Numbers recalculated.

Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1992	351	252	132	56	14	11	3	9	18	16	12	11	2	5	**892**
1993	38	473	192	242	62	45	19	22	13	11	10	4	2	3	**1 136**

Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1994	5	96	315	160	342	269	97	55	4	28	13	14	26	5	**1 430**
1995	312	66	178	255	329	223	73	21	7	13	20	9	10	9	**1 525**
1996	205	124	136	236	199	189	144	71	24	27	13	6	10	4	**1 388**
1997[2]	66	158	33	58	112	95	125	103	38	46	26	24	7	7	**898**
1998[2]	0	74	48	26	10	53	109	110	37	18	6	6	3	3	**503**
1999	0	0	35	41	29	28	52	62	53	32	14	5	6	1	**358**
2000	19	0	5	31	36	22	29	72	77	50	24	14	10	3	**392**
2001	0	19	9	2	6	26	37	31	42	18	21	29	5	2	**247**
2002	18	4	11	6	1	10	45	60	28	17	37	20	40	14	**311**
2003	0	3	2	3	5	5	15	39	27	23	58	39	68	36	**323**
2004	0	0	5	2	5	11	11	13	15	13	14	23	24	14	**150**
2005	0	3	3	2	6	5	6	15	21	9	18	30	41	60	**219**
2006[3]	77	25	5	3	6	6	11	12	6	15	15	10	43	29	**263**
2007[2]	285	73	3	0	2	1	3	7	9	5	7	21	43	71	**530**
2008	746	190	103	13	0	1	4	7	2	5	3	24	23	33	**1 154**
2009	109	112	96	89	66	32	20	13	4	5	21	0	24	7	**598**
2010	162	265	179	172	92	71	26	21	2	9	4	7	11	17	**1 038**
2011	377	233	135	130	107	70	40	22	2	5	1	1	1	23	**1 147**
2012[2]	No age reading														
2013	0	178	252	144	143	122	117	13	31	12	4	24	38	12	**1 090**
2014-2017	No age reading														
2018	195	270	126	39	25	38	44	53	48	56	61	62	87	50	**1 154**
2019	No age reading														
2020[2]	17	123	108	111	22	44	92	129	64	80	64	7	0	5	**866**
2021-2026	No age reading														

1 Includes some unidentified Sebastes specimens mostly less than 15 cm.

2 Indices not raised to represent uncovered parts of the Russian EEZ.

3 Not complete coverage in southeast due to restrictions, strata 7 area set to default and strata 13 as in 2005.

Table 6.19. Comparison of results on S. mentella from the Norwegian Sea pelagic surveys in 2008, 2009, 2013, 2016, 2019 and 2022. Acoustic results for the 2019 and 2022 survey were not available.

V1	2008	2009	2013	2016	2019	2022
mean length (cm) All/M/F[1]	37.0/36.4/37.5	36.6/36.0/37.1	37.5/37.0/38.1	37.7/37.0/38.3	37.6/37.2/38.0	37.4/37.2/38.5
mean length (cm) S/DSL/D[2]	37.2/36.8/39.1	37.2/36.5/38.3	37.1/37.4/38.9	38.1/37.6/38.4	37.4/37.6/37.7	-
mean weight (g) All/M/F	619/585/648	625/609/666	659/625/706	656/619/694	683/644/724	687/673/743
Mean age (y) All/M/F	25 / 25 / 25	25 / 25 / 24	28 / 29 / 28	27 / 27 / 26	- / - / -	30/31/31
Sex ratio (M/F)	45% / 55%	45% / 55%	59% / 41%	50% / 50%	51% / 49%	53%/47%

V1	2008	2009	2013	2016	2019	2022
Occurrence	96%	100%	95%	80%	99%	89%
Catch rates	3.80 t/NM^2	3.94 t/NM^2	3.47 t/NM^2	1.01 t/NM^2	3.40 t/NM^2	-
mean sA	33 m^2/NM^2	34 m^2/NM^2	19 m^2/NM^2	5.2 m^2/NM^2	-	-
Total Area	53 720 NM^2	69 520 NM^2	69 520 NM^2	67 150 NM^2	73 364 NM^2	-
Abundance (Acoustics)[3]	395 000 t	532 000 t	297 000 t	136 000 t	-	-
Abundance (Trawl)[4]	406 000 t	548 000 t	482 000 t	116 000 t	499 000 t	-
1 - M = males only, F = females only.						
2 - S = shallower than DSL, DSL = deep scattering layer, D = deeper than DSL.						
3 - The abundance derived from hydroacoustics is calculated assuming a Length-dependent target strength equation of TS=20log(L)-68.0. In 2016 the TS equation used was TS=20log(L)-69.6 following recommendation from ICES-WKTAR (2010).						
4 - Trawls: Gloria 2048 in 2008 and 2009 Gloria 2560 HO helix in 2013 and Gloria 1024 in 2016. Trawl catchability for redfish set to 0.5 for all trawls based on results from Bethke et al. (2010).						

Table 6.20a. S. mentella in subareas 1 and 2. Population matrix with numbers-at-age (in thousands) for each year and separable fishing mortality coefficients for the demersal and pelagic fleet by year (Fy) and selectivity at age for the pelagic fleet (Sa). Numbers are estimated from the statistical catch-at-age model.

Dem Fy	Pel Fy	Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.041	0.000	1992	449 985	435 071	384 480	242 743	146 272	100 583	100 564	105 545	134 785	89 757	96 445	74 084	73 014	63 665	45 504	29 535	19 260	212 208
0.031	0.000	1993	307 973	428 130	413 940	365 807	229 103	137 760	94 496	94 216	98 589	125 515	83 331	89 285	68 407	67 266	58 543	41 778	27 083	211 439
0.027	0.000	1994	223 397	293 015	407 336	393 836	347 956	217 844	130 875	89 592	88 967	92 508	116 961	77 256	82 545	63 162	62 076	54 014	38 542	220 038
0.020	0.000	1995	209 499	212 548	278 784	387 553	374 413	330 494	206 534	123 675	84 257	83 218	86 142	108 600	71 622	76 467	58 491	57 476	50 007	239 386
0.014	0.000	1996	161 246	199 324	202 225	265 244	368 476	355 706	313 505	195 403	116 578	79 109	77 889	80 468	101 341	66 800	71 302	54 533	53 584	269 791
0.014	0.000	1997	115 657	153 415	189 643	192 403	252 294	350 328	337 813	297 051	184 515	109 726	74 313	73 101	75 494	95 064	62 659	66 881	51 152	303 323
0.019	0.000	1998	59 663	110 039	145 964	180 432	183 026	239 915	332 821	320 226	280 595	173 716	103 111	69 779	68 622	70 862	89 228	58 812	62 775	332 712
0.014	0.000	1999	48 428	56 765	104 695	138 874	171 655	174 069	227 861	314 660	300 632	262 400	162 275	96 297	65 164	64 083	66 175	83 326	54 922	369 327
0.011	0.000	2000	37 643	46 076	54 008	99 610	132 128	163 307	165 552	216 376	297 367	282 642	246 244	152 225	90 327	61 123	60 109	62 072	78 159	397 942
0.020	0.000	2001	32 874	35 815	43 838	51 385	94 772	125 709	155 355	157 313	204 555	279 952	265 899	231 639	143 196	84 969	57 498	56 544	58 390	447 861
0.007	0.000	2002	42 664	31 277	34 075	41 709	48 871	90 084	119 330	147 067	148 283	191 946	261 872	248 326	216 179	133 601	79 267	53 637	52 746	472 246
0.003	0.000	2003	51 719	40 591	29 758	32 420	39 682	46 494	85 679	113 396	139 469	140 305	181 415	247 418	234 598	204 224	126 211	74 883	50 670	495 954
0.005	0.000	2004	71 766	49 207	38 620	28 313	30 842	37 747	44 218	81 461	107 768	132 486	133 229	172 217	234 836	222 648	193 812	119 774	71 063	518 732

Dem Fy	Pel Fy	Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.008	0.000	2005	122 429	68 280	46 817	36 744	26 934	29 337	35 896	42 028	77 366	102 246	125 572	126 183	163 037	222 266	210 708	183 408	113 342	558 110
0.005	0.039	2006	227 760	116 483	64 964	44 544	34 957	25 622	27 900	34 119	39 905	73 338	96 752	118 668	119 157	153 907	209 787	198 865	173 095	633 685
0.004	0.021	2007	335 343	216 698	110 826	61 809	42 380	33 258	24 362	26 515	32 397	37 834	69 376	91 271	111 594	111 648	143 606	194 859	183 885	736 844
0.005	0.010	2008	352 561	319 056	206 173	105 443	58 807	40 321	31 632	23 165	25 201	30 764	35 876	65 658	86 201	105 168	104 973	134 682	182 301	855 529
0.005	0.006	2009	338 723	335 438	303 560	196 160	100 322	55 951	38 357	30 087	22 026	23 938	29 164	33 948	62 061	81 401	99 207	98 908	126 755	973 545
0.004	0.009	2010	429 216	322 272	319 147	288 817	186 632	95 448	53 227	36 483	28 603	20 913	22 685	27 596	32 096	58 640	76 866	93 618	93 275	1 035 626
0.005	0.010	2011	475 638	408 370	306 620	303 646	274 787	177 563	90 795	50 622	34 683	27 170	19 839	21 489	26 108	30 334	55 363	72 494	88 203	1 060 325
0.005	0.008	2012	394 137	452 537	388 536	291 728	288 898	261 438	168 910	86 358	48 132	32 953	25 780	18 792	20 323	24 663	28 621	52 174	68 239	1 077 323
0.004	0.007	2013	232 876	374 994	430 558	369 666	277 557	274 860	248 700	160 658	82 115	45 741	31 286	24 440	17 788	19 212	23 286	26 995	49 164	1 076 427
0.016	0.006	2014	270 130	221 565	356 781	409 647	351 710	264 073	261 480	236 573	152 800	78 077	43 471	29 709	23 182	16 848	18 170	21 996	25 472	1 059 248
0.025	0.006	2015	254 420	257 011	210 804	339 453	389 739	334 608	251 198	248 692	224 941	145 216	74 139	41 221	28 112	21 873	15 846	17 038	20 575	1 009 765
0.030	0.013	2016	268 473	242 064	244 528	200 566	322 954	370 774	318 255	238 828	236 240	213 279	137 200	69 672	38 512	26 145	20 284	14 669	15 755	950 374
0.028	0.012	2017	286 689	255 434	230 307	232 652	190 807	307 200	352 511	302 322	226 456	223 196	200 321	127 946	64 567	35 534	24 051	18 618	13 440	880 673
0.035	0.017	2018	280 767	272 765	243 028	219 122	221 327	181 499	292 099	335 006	287 028	214 627	210 923	188 487	119 727	60 072	32 892	22 175	17 116	816 774
0.053	0.008	2019	307 214	267 130	259 517	231 225	208 427	210 482	172 504	277 407	317 737	271 647	202 448	198 013	175 894	110 997	55 343	30 141	20 234	753 645
0.066	0.008	2020	452 081	292 293	254 156	246 913	219 882	198 135	199 954	163 713	262 855	300 332	255 830	189 693	184 337	162 537	101 802	50 419	27 310	693 094
0.078	0.005	2021	722 781	430 124	278 097	241 812	234 912	209 184	188 453	190 123	155 559	249 411	284 141	240 674	176 741	169 489	147 416	91 361	44 949	636 998
0.072	0.002	2022	630 737	687 677	409 234	264 591	229 936	223 284	198 682	178 782	180 020	146 841	234 328	265 154	222 592	161 752	153 441	132 160	81 270	597 473
0.063	0.000	2023	467 043	600 103	654 278	389 358	251 506	218 429	211 888	188 226	168 927	169 414	137 396	217 590	243 993	202 890	146 149	137 650	117 930	600 070
0.063	0.001	2024	365 437	444 360	570 957	622 501	370 146	238 934	207 260	200 630	177 599	158 516	157 758	126 763	198 880	221 251	182 921	131 272	123 359	641 750

Dem Fy	Pel Fy	Year/Age	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
0.062	0.003	2025	317 063	347 688	422 778	543 227	591 807	351 604	226 586	195 923	188 583	165 472	146 053	143 760	114 535	178 716	198 201	163 587	117 289	682 844

Table 6.20b. S. mentella in subareas 1 and 2. Fisheries selectivity at age for the pelagic fleet by age (Sa). Numbers are estimated from the statistical catch-at-age model.

Year	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
-	0	0	0	0	0	0.014	0.022	0.035	0.056	0.086	0.132	0.196	0.282	0.387	0.503	0.62	0.724	1

Table 6.20c. S. mentella in subareas 1 and 2. Fisheries selectivity at age for the demersal fleet by age (Sa). Numbers are estimated from the statistical catch-at-age model.

Year	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
1992	0	0	0	0.196	0.248	0.308	0.376	0.449	0.524	0.598	0.668	0.731	0.786	0.832	0.870	0.900	0.924	1
1993	0	0	0	0.008	0.020	0.048	0.113	0.244	0.449	0.674	0.839	0.929	0.971	0.988	0.995	0.998	0.999	1
1994	0	0	0	0.029	0.062	0.129	0.248	0.425	0.622	0.786	0.892	0.948	0.976	0.989	0.995	0.998	0.999	1
1995	0	0	0	0.034	0.072	0.147	0.276	0.458	0.651	0.805	0.902	0.953	0.978	0.990	0.995	0.998	0.999	1
1996	0	0	0	0.019	0.050	0.128	0.290	0.530	0.758	0.897	0.960	0.985	0.995	0.998	0.999	1.000	1.000	1
1997	0	0	0	0.013	0.039	0.109	0.271	0.531	0.775	0.913	0.970	0.990	0.997	0.999	1.000	1.000	1.000	1
1998	0	0	0	0.004	0.021	0.095	0.339	0.716	0.925	0.984	0.997	0.999	1.000	1.000	1.000	1.000	1.000	1
1999	0	0	0	0.001	0.005	0.027	0.136	0.474	0.838	0.967	0.994	0.999	1.000	1.000	1.000	1.000	1.000	1
2000	0	0	0	0.000	0.001	0.012	0.111	0.563	0.930	0.993	0.999	1.000	1.000	1.000	1.000	1.000	1.000	1
2001	0	0	0	0.019	0.048	0.116	0.255	0.472	0.701	0.860	0.941	0.977	0.991	0.997	0.999	0.999	1.000	1
2002	0	0	0	0.003	0.012	0.049	0.172	0.458	0.775	0.933	0.983	0.996	0.999	1.000	1.000	1.000	1.000	1
2003	0	0	0	0.042	0.083	0.155	0.272	0.433	0.609	0.761	0.866	0.930	0.964	0.982	0.991	0.996	0.998	1
2004	0	0	0	0.021	0.044	0.092	0.183	0.329	0.518	0.702	0.838	0.919	0.961	0.982	0.992	0.996	0.998	1
2005	0	0	0	0.009	0.022	0.053	0.121	0.253	0.454	0.671	0.834	0.925	0.968	0.987	0.995	0.998	0.999	1
2006	0	0	0	0.003	0.009	0.023	0.058	0.138	0.293	0.518	0.736	0.879	0.950	0.980	0.992	0.997	0.999	1
2007	0	0	0	0.001	0.004	0.010	0.029	0.078	0.193	0.405	0.660	0.847	0.940	0.978	0.992	0.997	0.999	1
2008	0	0	0	0.000	0.001	0.003	0.013	0.060	0.232	0.588	0.871	0.970	0.993	0.999	1.000	1.000	1.000	1
2009	0	0	0	0.001	0.002	0.008	0.031	0.110	0.323	0.650	0.878	0.965	0.991	0.998	0.999	1.000	1.000	1
2010	0	0	0	0.002	0.006	0.016	0.043	0.111	0.256	0.488	0.725	0.880	0.953	0.982	0.994	0.998	0.999	1
2011	0	0	0	0.001	0.002	0.007	0.022	0.067	0.182	0.410	0.684	0.871	0.955	0.985	0.995	0.998	0.999	1
2012	0	0	0	0.002	0.005	0.011	0.027	0.065	0.147	0.298	0.512	0.722	0.865	0.941	0.975	0.990	0.996	1
2013	0	0	0	0.001	0.003	0.006	0.013	0.028	0.059	0.122	0.234	0.401	0.596	0.764	0.877	0.940	0.972	1
2014	0	0	0	0.002	0.004	0.007	0.014	0.026	0.050	0.091	0.162	0.271	0.417	0.580	0.727	0.836	0.908	1
2015	0	0	0	0.002	0.004	0.010	0.023	0.055	0.124	0.257	0.459	0.675	0.836	0.926	0.968	0.987	0.995	1
2016	0	0	0	0.003	0.007	0.018	0.043	0.098	0.210	0.394	0.613	0.794	0.904	0.958	0.982	0.993	0.997	1
2017	0	0	0	0.004	0.008	0.016	0.031	0.059	0.112	0.201	0.333	0.499	0.665	0.798	0.887	0.940	0.969	1
2018	0	0	0	0.007	0.013	0.023	0.042	0.073	0.125	0.206	0.320	0.461	0.608	0.738	0.836	0.903	0.944	1

Year	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19+
2019	0	0	0	0.010	0.016	0.027	0.044	0.072	0.116	0.180	0.270	0.383	0.511	0.637	0.747	0.832	0.893	1
2020	0	0	0	0.001	0.001	0.003	0.007	0.016	0.035	0.076	0.156	0.295	0.487	0.683	0.830	0.917	0.962	1
2021	0	0	0	0.007	0.012	0.021	0.036	0.059	0.097	0.155	0.239	0.349	0.478	0.610	0.728	0.820	0.886	1
2022	0	0	0	0.013	0.021	0.036	0.058	0.095	0.150	0.229	0.333	0.457	0.586	0.704	0.800	0.871	0.919	1
2023	0	0	0	0.013	0.024	0.043	0.077	0.133	0.220	0.343	0.491	0.640	0.766	0.858	0.918	0.954	0.974	1
2024	0	0	0	0.012	0.026	0.052	0.103	0.193	0.333	0.510	0.685	0.819	0.905	0.952	0.976	0.989	0.994	1
2025	0	0	0	0.017	0.032	0.059	0.109	0.190	0.312	0.467	0.628	0.765	0.863	0.924	0.959	0.978	0.989	1

Table 6.21. S. mentella in subareas 1 and 2. Stock summary estimated by the statistical catch-at-age model. Stock biomass is for age 2+.

Year	R age 2 (millions)	R age 6 (thousands)	TSB (t)	SSB (t)	F 12-18	F 19
1992	450	146	576 432	325 555	0.033	0.041
1993	308	229	623 944	344 178	0.030	0.031
1994	223	348	684 237	367 067	0.027	0.027
1995	209	374	751 923	393 609	0.020	0.020
1996	161	368	820 771	426 576	0.014	0.014
1997	116	252	888 027	466 640	0.013	0.014
1998	60	183	950 439	512 771	0.019	0.019
1999	48	172	1 001 122	565 230	0.014	0.014
2000	38	132	1 044 783	623 215	0.011	0.011
2001	33	95	1 081 402	688 394	0.019	0.020
2002	43	49	1 097 817	740 597	0.007	0.007
2003	52	40	1 116 053	795 006	0.002	0.003
2004	72	31	1 130 539	845 795	0.005	0.005
2005	122	27	1 137 844	889 803	0.008	0.008
2006	228	35	1 141 554	928 864	0.020	0.043
2007	335	42	1 122 157	943 461	0.012	0.025
2008	353	59	1 117 215	959 766	0.009	0.015
2009	339	100	1 124 463	971 885	0.008	0.011
2010	429	187	1 137 306	968 017	0.008	0.013
2011	476	275	1 153 356	952 454	0.008	0.014
2012	394	289	1 175 835	934 886	0.007	0.013
2013	233	278	1 210 078	918 307	0.006	0.011
2014	270	352	1 254 970	906 631	0.011	0.022
2015	254	390	1 293 213	892 458	0.023	0.031
2016	268	323	1 321 371	883 084	0.032	0.043
2017	287	191	1 343 174	876 877	0.026	0.041

Year	R age 2 (millions)	R age 6 (thousands)	TSB (t)	SSB (t)	F 12-18	F 19
2018	281	221	1 369 900	885 689	0.031	0.052
2019	307	208	1 390 610	898 883	0.035	0.061
2020	452	220	1 406 874	914 342	0.044	0.073
2021	723	235	1 418 616	926 340	0.048	0.083
2022	631	230	1 426 728	934 034	0.049	0.074
2023	467	252	1 449 059	947 948	0.050	0.063
2024	365	370	1 494 664	967 323	0.057	0.064
2025	317	592	1 536 941	978 795	0.055	0.065

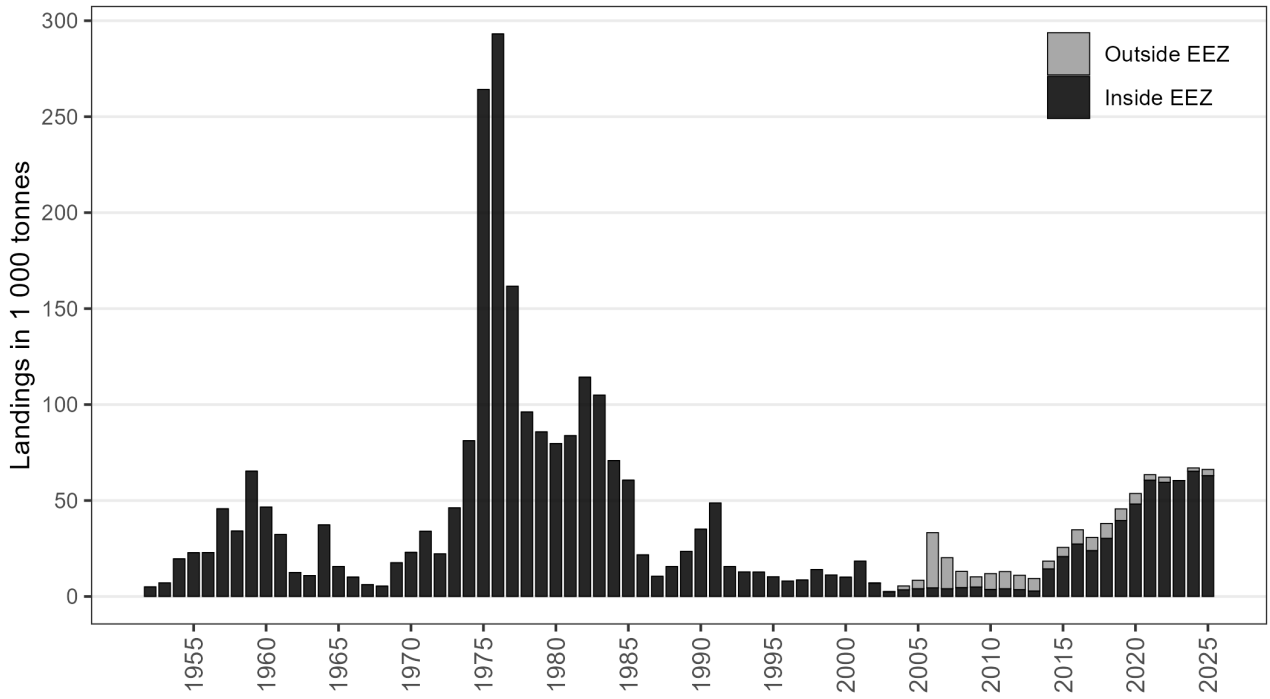

Figure 6.1. S. mentella in subareas 1 and 2. Time series of landings (t) by country, 1952–2025.

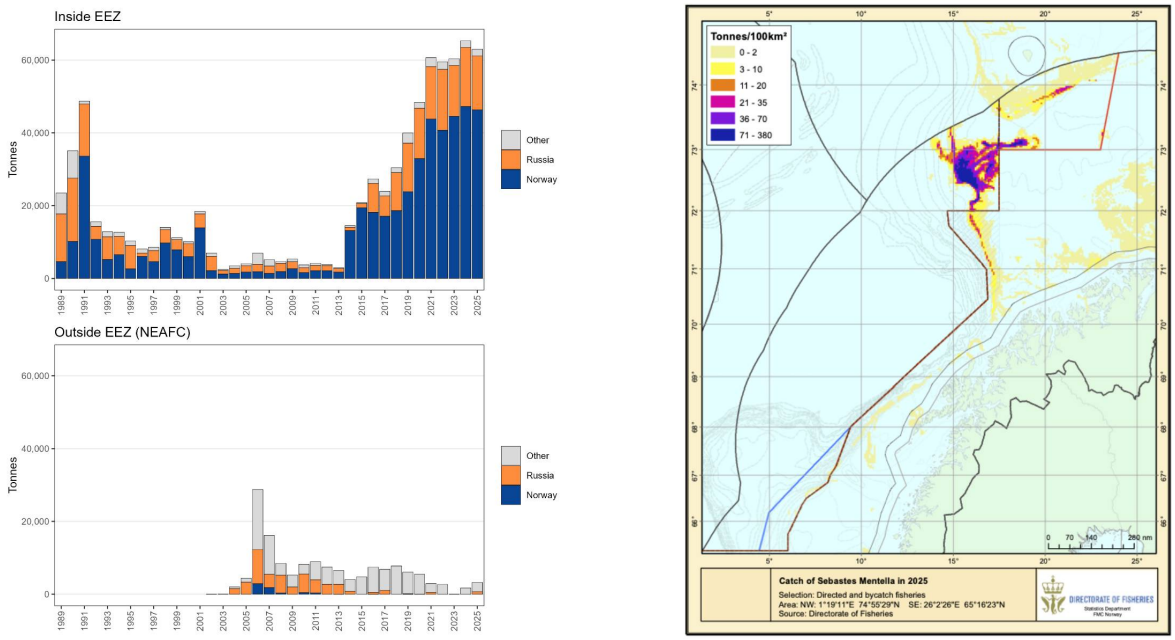

Figure 6.2. S. mentella in subareas 1 and 2. Left panel: Catch in tonnes reported by national fleets for the subareas 27.1 and 27.2 and in the NEAFC regulatory area in 2025. Geographical location of the directed Norwegian fishery in 2025 within the Norwegian Exclusive Economic Zone and by catches by Norwegian vessels in all areas. Directed fishing with bottom trawl is not permitted to the east of the red line. Directed fishing with pelagic trawl is not permitted to the east of the blue line. Directed fishing is not permitted in the Fishery Protection Zone around Svalbard.

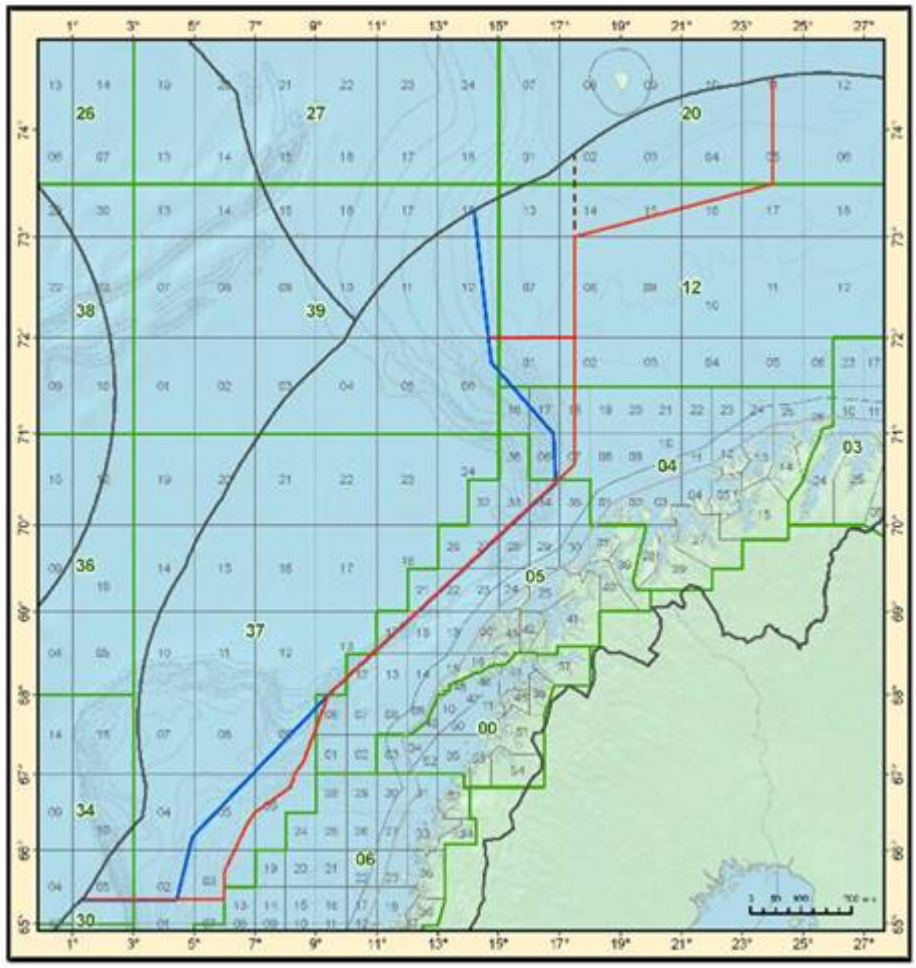

Figure 6.3. S. mentella in subareas 1 and 2. Delineation of the geographical limits for directed fishing in the Norwegian Economic Zone in 2014–2025. Directed pelagic trawling is only allowed west of the blue line. Directed demersal trawling is only allowed between the blue and the red line. The area east of the stippled line inside NEZ south of Bear Island is only open for directed demersal trawling after 10 May. The other areas for directed fishing are also open during 1 January to last February. Due to high bycatch ratios of golden redfish 72°N was suggested as southern limit for directed demersal fishing marked by the red line along that latitude to the Norwegian directorate of fisheries in November 2018.

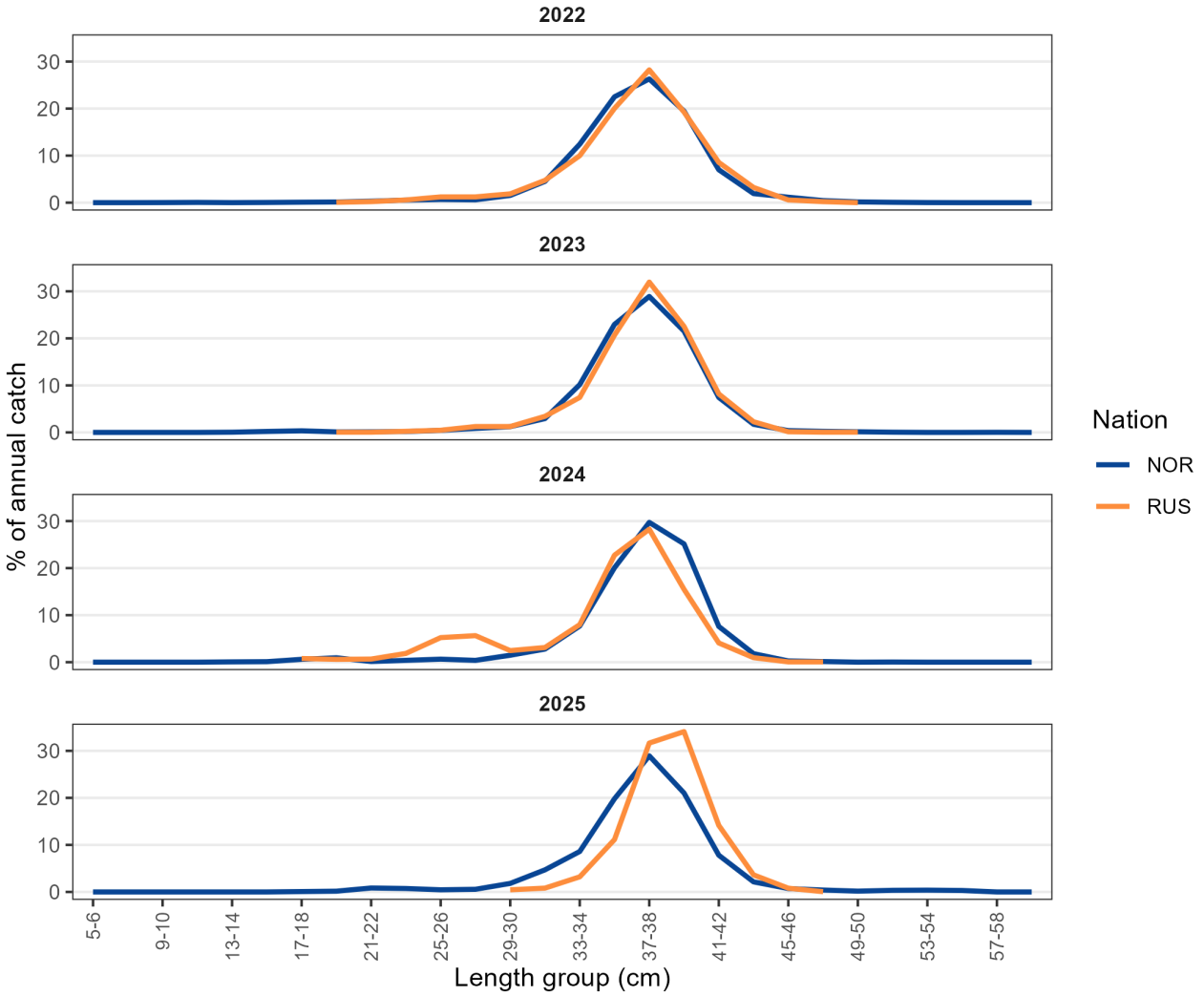

Figure 6.4. S. mentella in subareas 1 and 2. Length-distributions of the commercial demersal catches by Norway and Russia in 2022–2025.

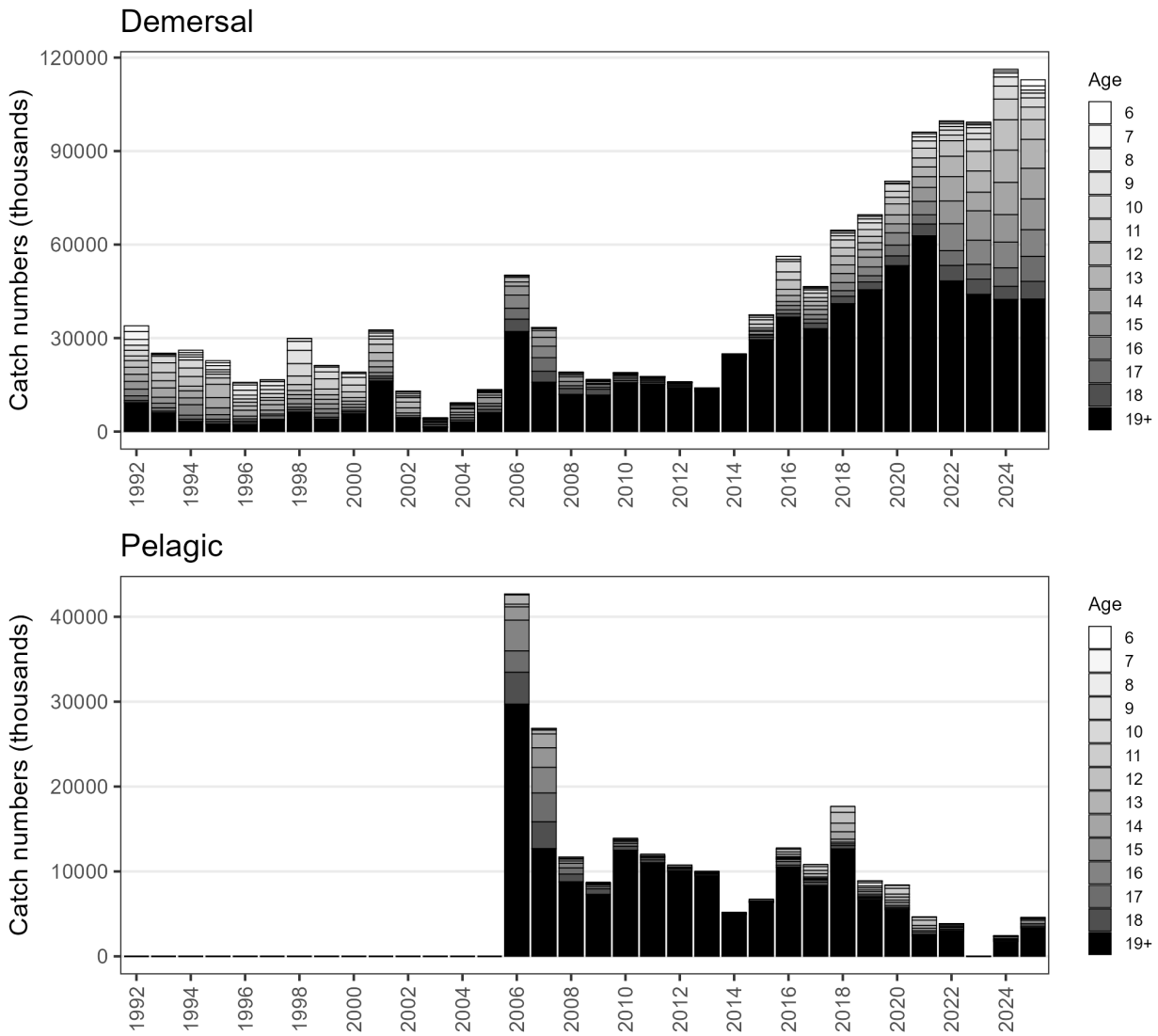

Figure 6.5. S. mentella in subareas 1 and 2. Upper panels: Catch numbers-at-age for the demersal and pelagic fleets 1992–2021. Lower panel: Age composition of the commercial demersal catches by Norway and Russia in 2021 (calculated using ALK).

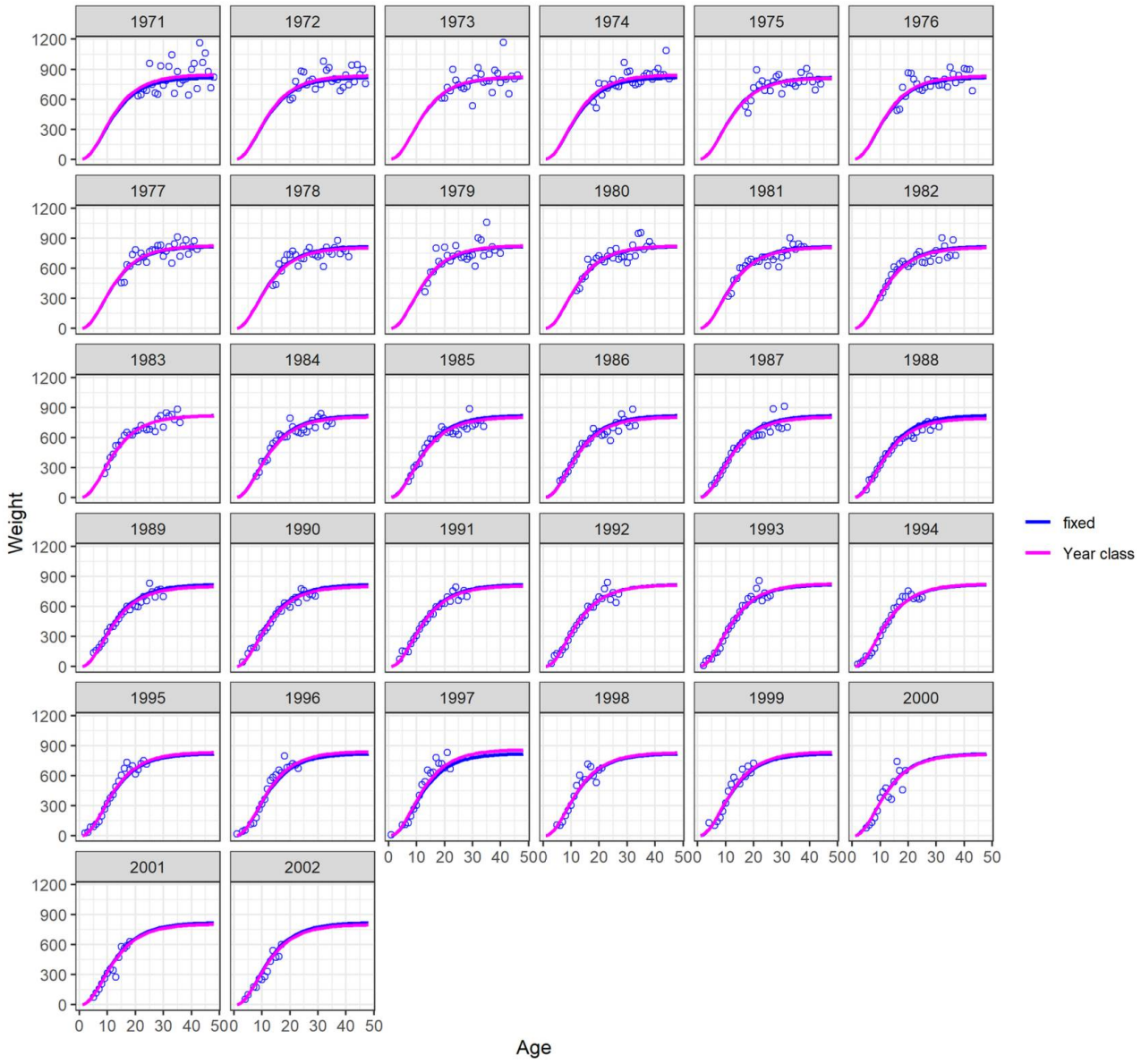

Figure 6.6. S. mentella in subareas 1 and 2. Weight-at-age of S. mentella per year class in subareas 1 and 2 derived from Norwegian commercial and survey data (Table 6.7). The weights were derived from samples with at least five individuals and are expressed in grammes. The blue and purple lines show the fitted mixed-effect models.

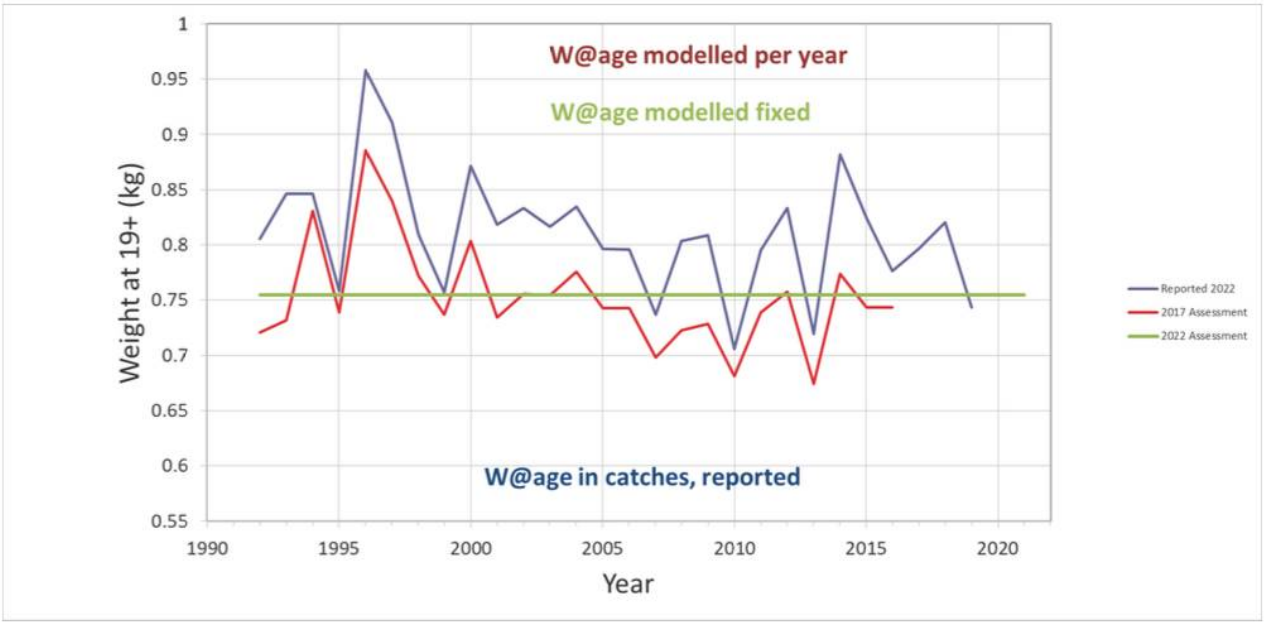

Figure 6.7

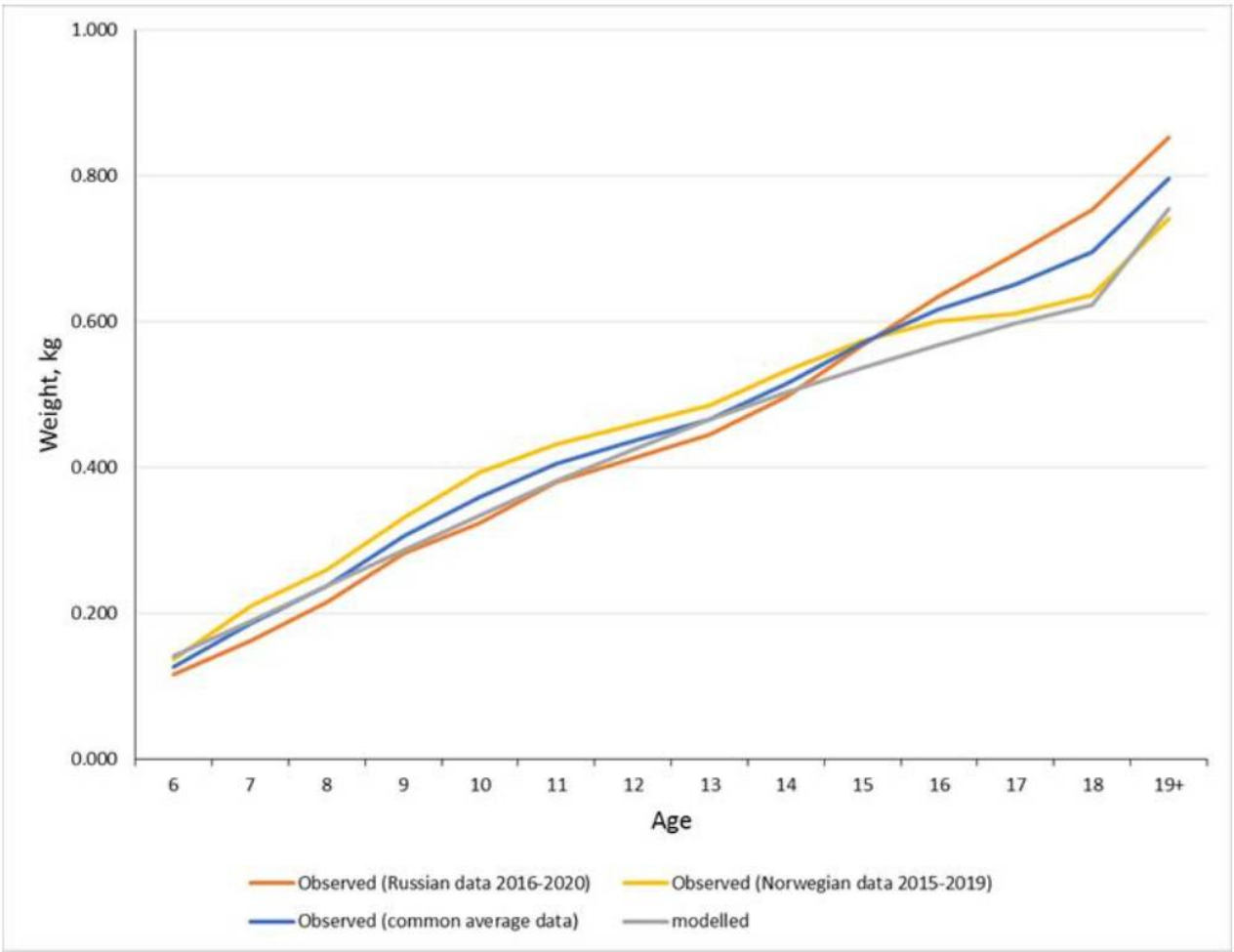

Figure 6.7. S. mentella in subareas 1 and 2. The upper panel shows weight-at-age 19+ as reported from catches (blue) or modelled from catches and survey observations (red) using a mixed effect model. AFWG 2017 was the last working group using the annual mixed effect model. The weights-at-age used in the assessment were based on the fixed effects model and are therefore the same for every year. These weights were updated in 2022 and differ only slightly from those estimated in the assessments since 2018. The bottom panel shows comparison of the observed Norwegian and Russian weight by age with the modelled one up to 2020.

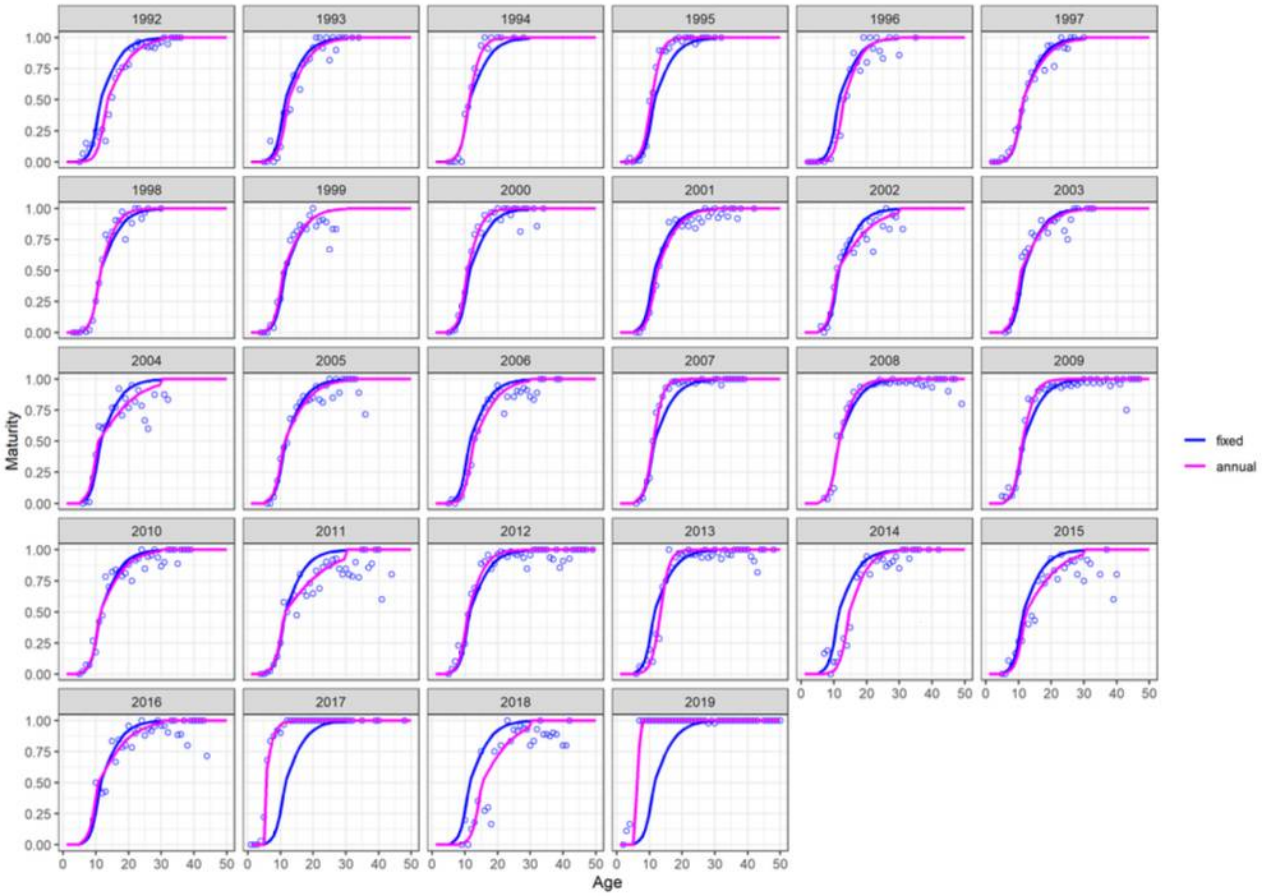

Figure 6.8. S. mentella in subareas 1 and 2. Proportion maturity-at-age of S. mentella in subareas 1 and 2 derived from Norwegian commercial and survey data (Table D7). The proportions were derived from samples with at least five individuals. The blue and purple lines show the fitted mixed-effect models. For 2008, 2011 and 2016–2019 the common model (fixed effects blue) was used for other years the annual models (random effects purple) were used. Available data for 2019 was insufficient at the time of the meeting and the fixed effect model was used and there was no age data available after 2020.

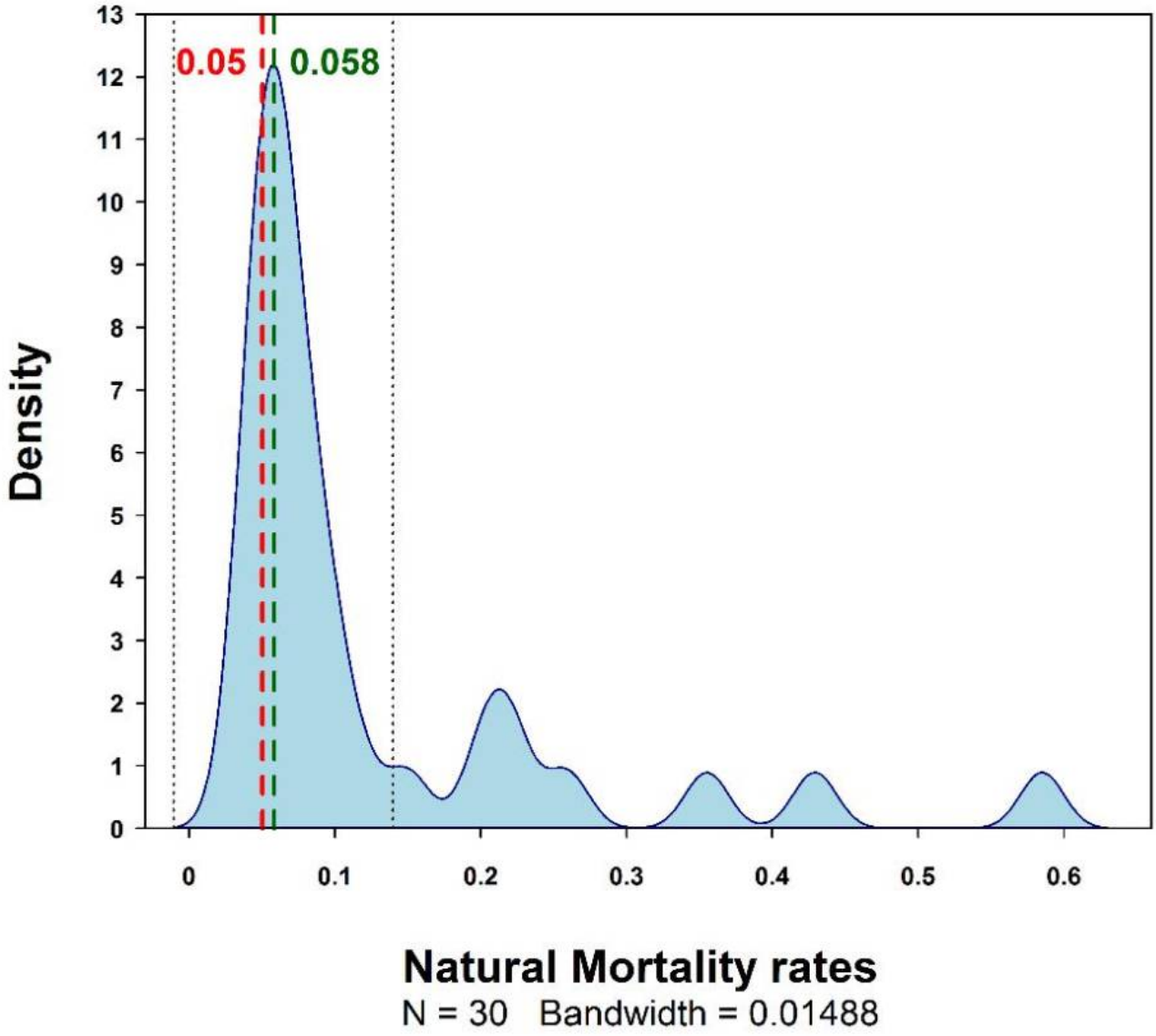

Figure 6.9. S. mentella in subareas 1 and 2. Density distribution of natural mortality rates calculated with 30 of the 39 compared methods at the 2018 benchmark. The excluded methods are those based on certain taxa or areas. The broken red line indicates the currently used value; the broken green line the most frequent one and the black dotted lines indicate the beginning and end of the distribution's peak.

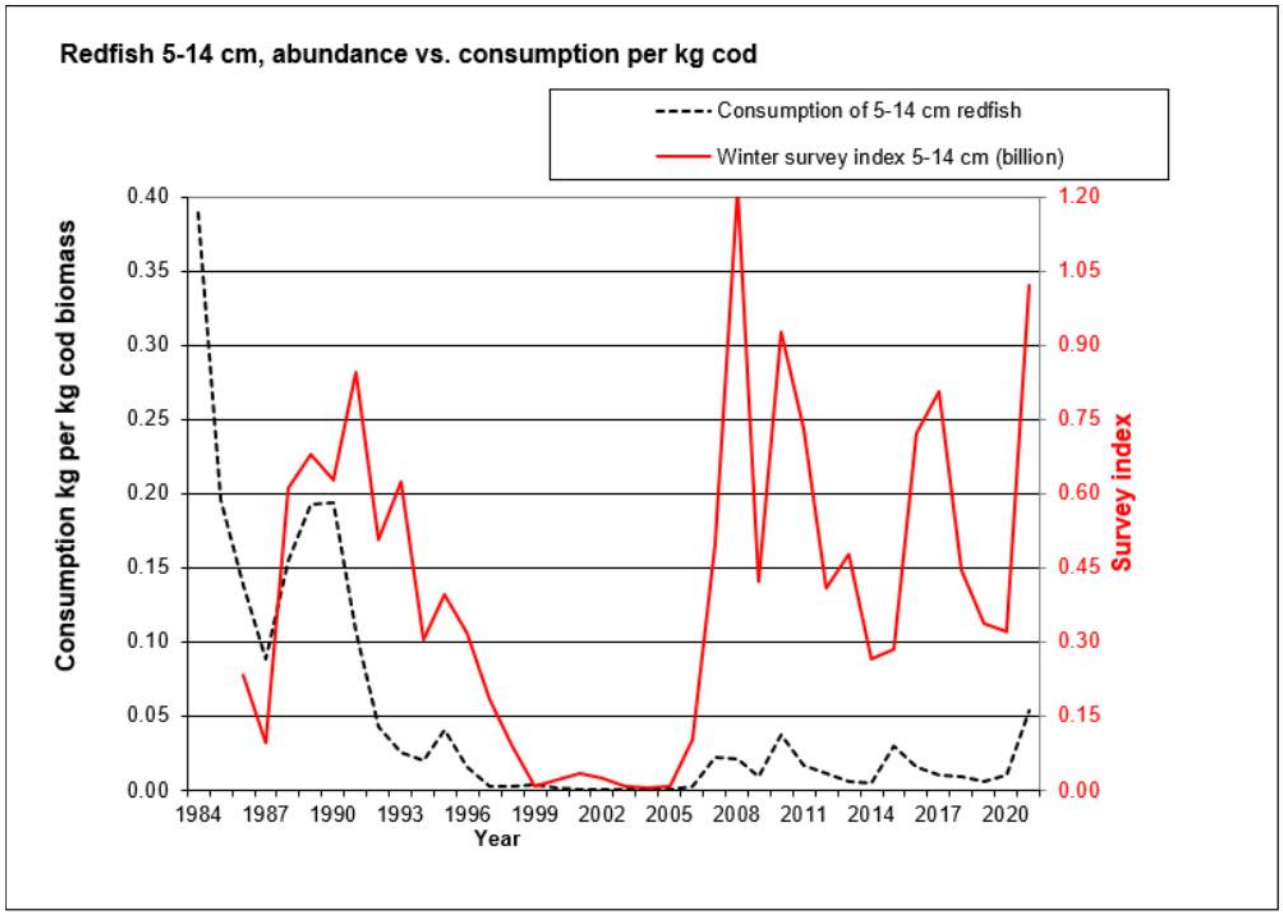

Figure 6.10. S. mentella in subareas 1 and 2. Abundance of S. mentella (5–14 cm) during the winter survey (February) in the Barents Sea compared with the consumption of redfish (mainly S. mentella) by cod (See Section 1 Table 1.1).

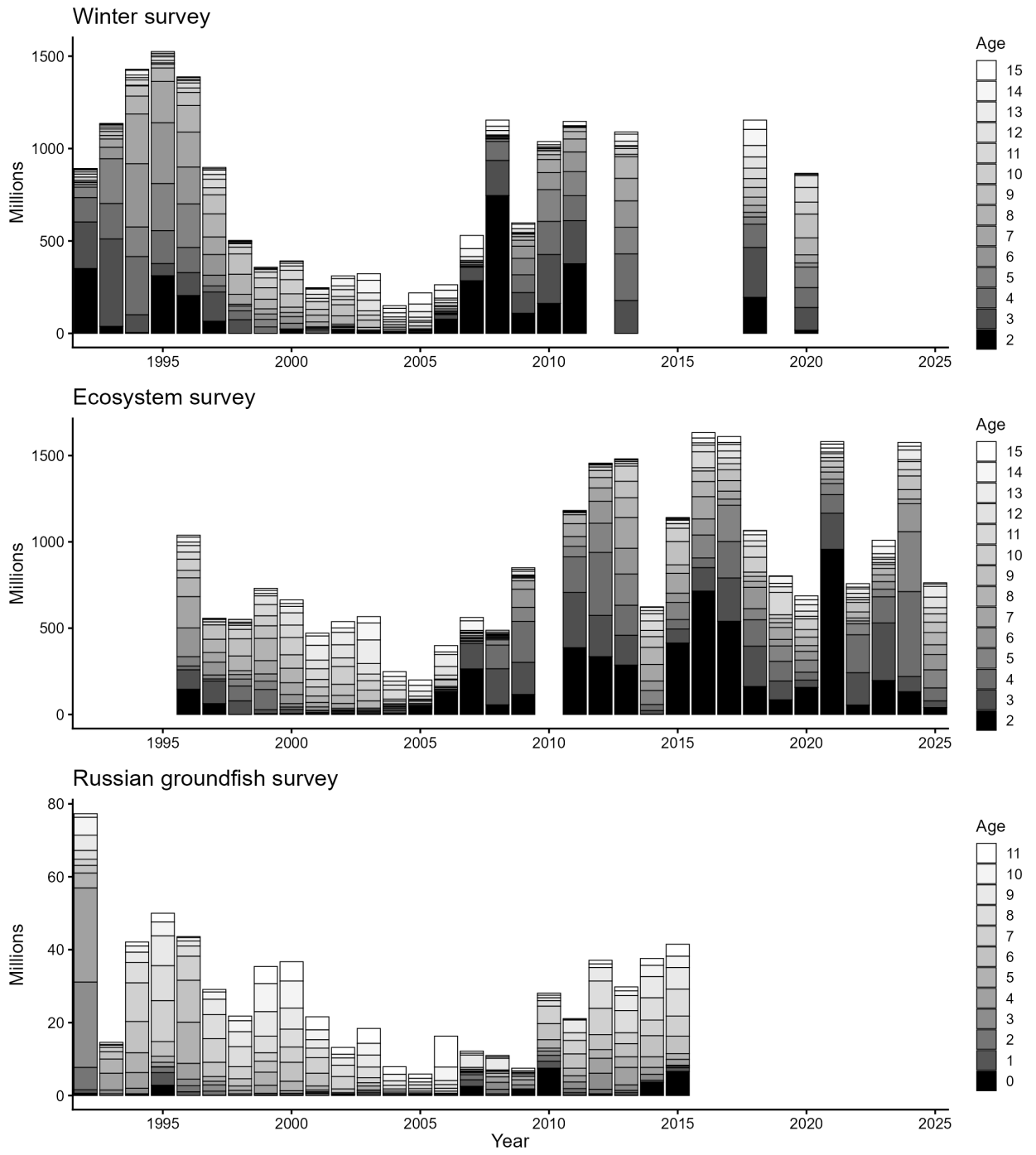

Figure 6.11. S. mentella in subareas 1 and 2. Age disaggregated abundance indices for bottom-trawl surveys 1992–2024 in the Barents Sea in winter (winter survey top) in summer (Ecosystem survey middle) and in autumn (Russian groundfish survey bottom)

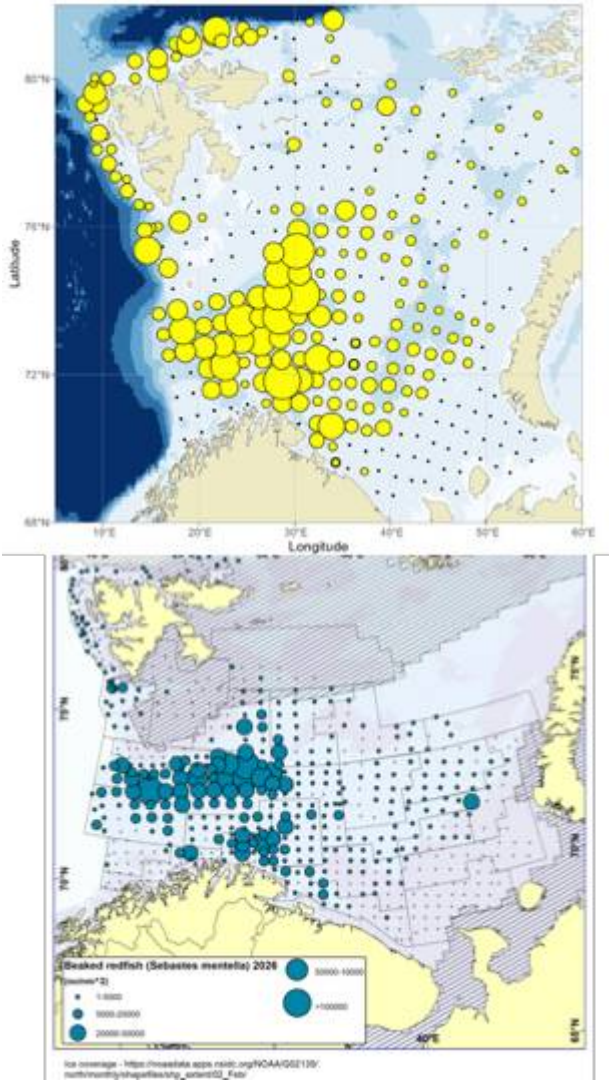

Figure 6.12. S. mentella in subareas 1 and 2. Abundance indices for individual trawl stations during the ecosystem survey in autumn 2025 (top) and winter survey 2026 (bottom).

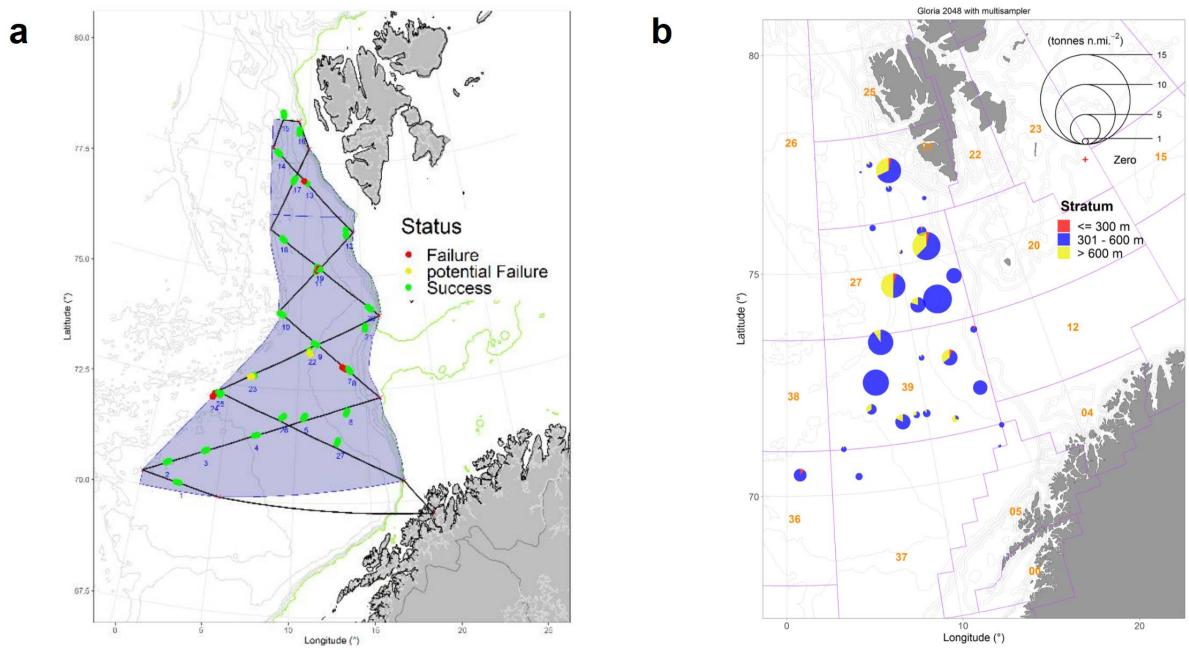

Figure 6.13. S. mentella in subareas 1 and 2. (a) Survey track of the Deep Pelagic Ecosystem Survey in 2022 and categorized trawls. (b) Catch rates in tonnes per square nautical mile for the surveyed depth layers from the 2019 survey.*

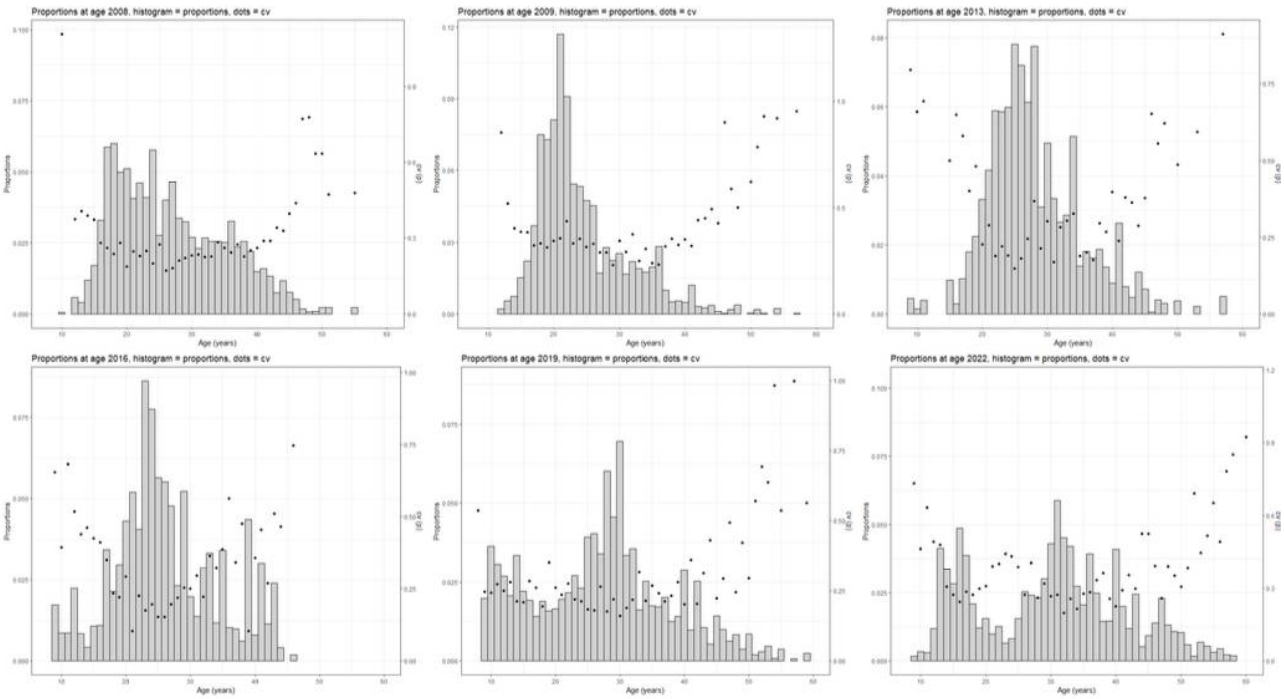

Figure 6.14. S. mentella in subareas 1 and 2. Proportions at age during the International Deep Pelagic Ecosystem Survey (WGIDEEPS) in the Norwegian Sea. Bars show proportions at age and dots shows the coefficient of variation for each age. Estimated with StoX

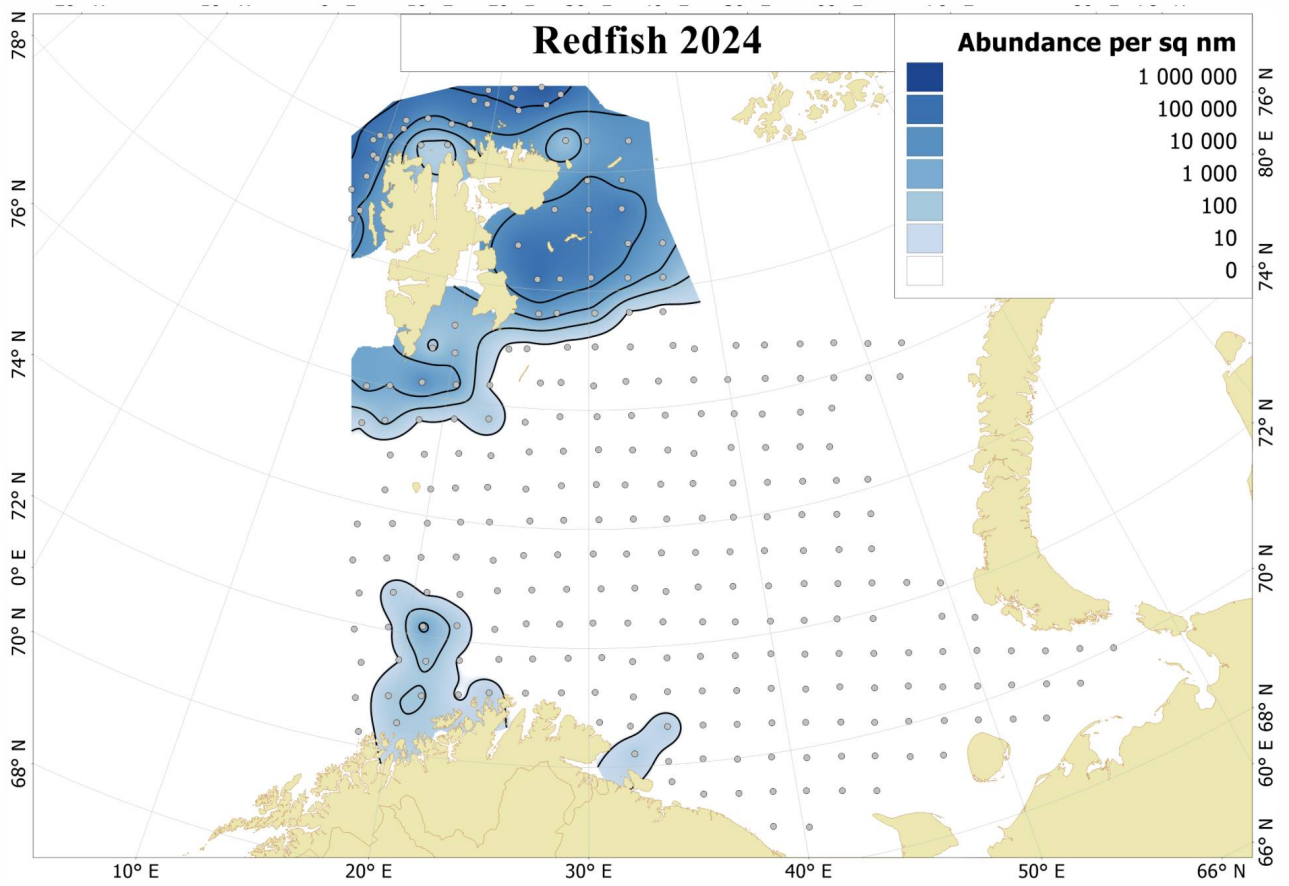

Figure 6.15. S. mentella in subareas 1 and 2. Map showing the specific pelagic 0-group trawl stations and the abundance of 0-group S. mentella during the joint Norwegian- Russian Ecosystem survey in the Barents Sea and Svalbard in 2024. Not updated in 2025.

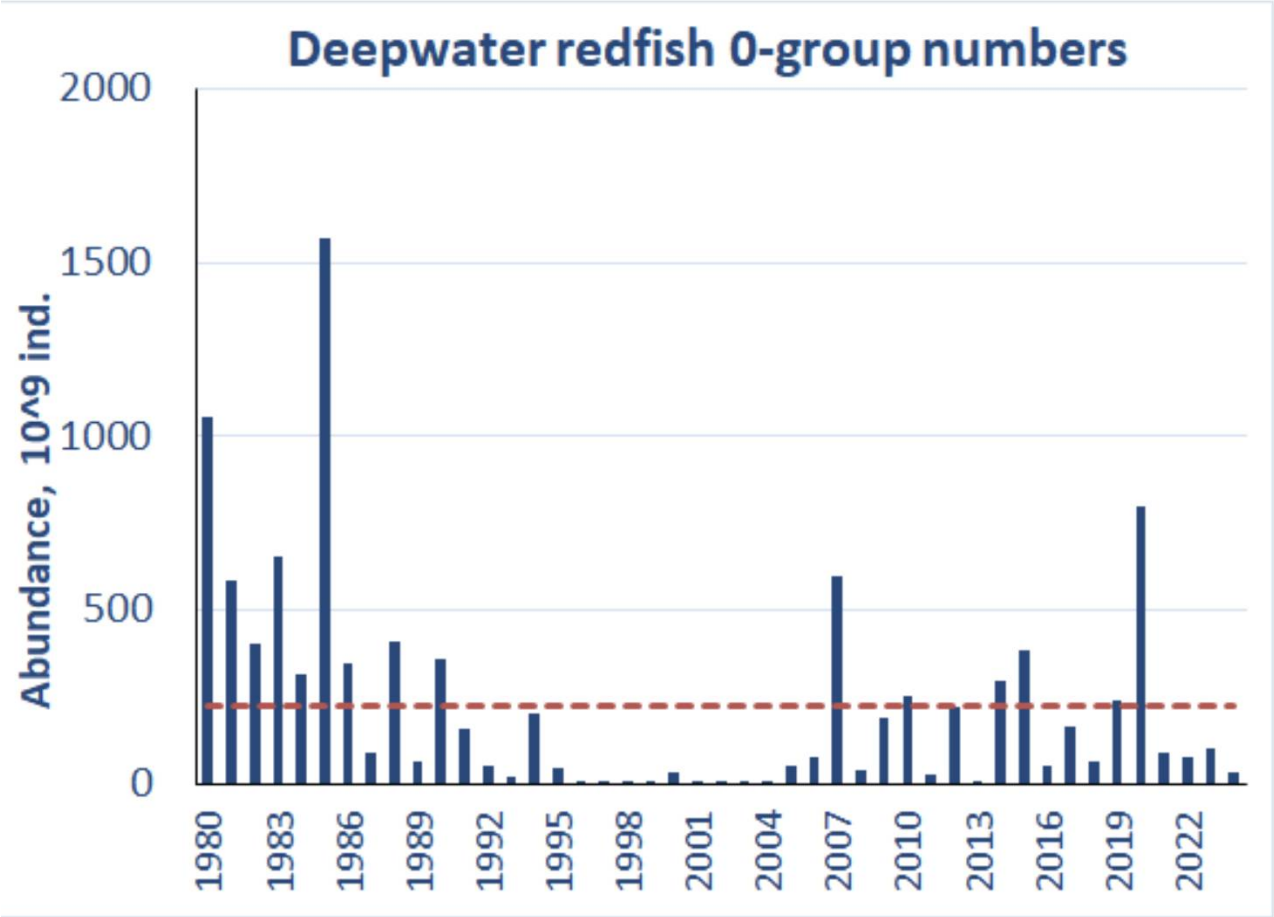

Figure 6.16. S. mentella in subareas 1 and 2. Abundance indices (in billions) of 0-group redfish (believed to be mostly S. mentella) in the international 0-group survey in the Barents Sea and Svalbard areas in August-September 1980–2024. Data not available from 2025-survey.

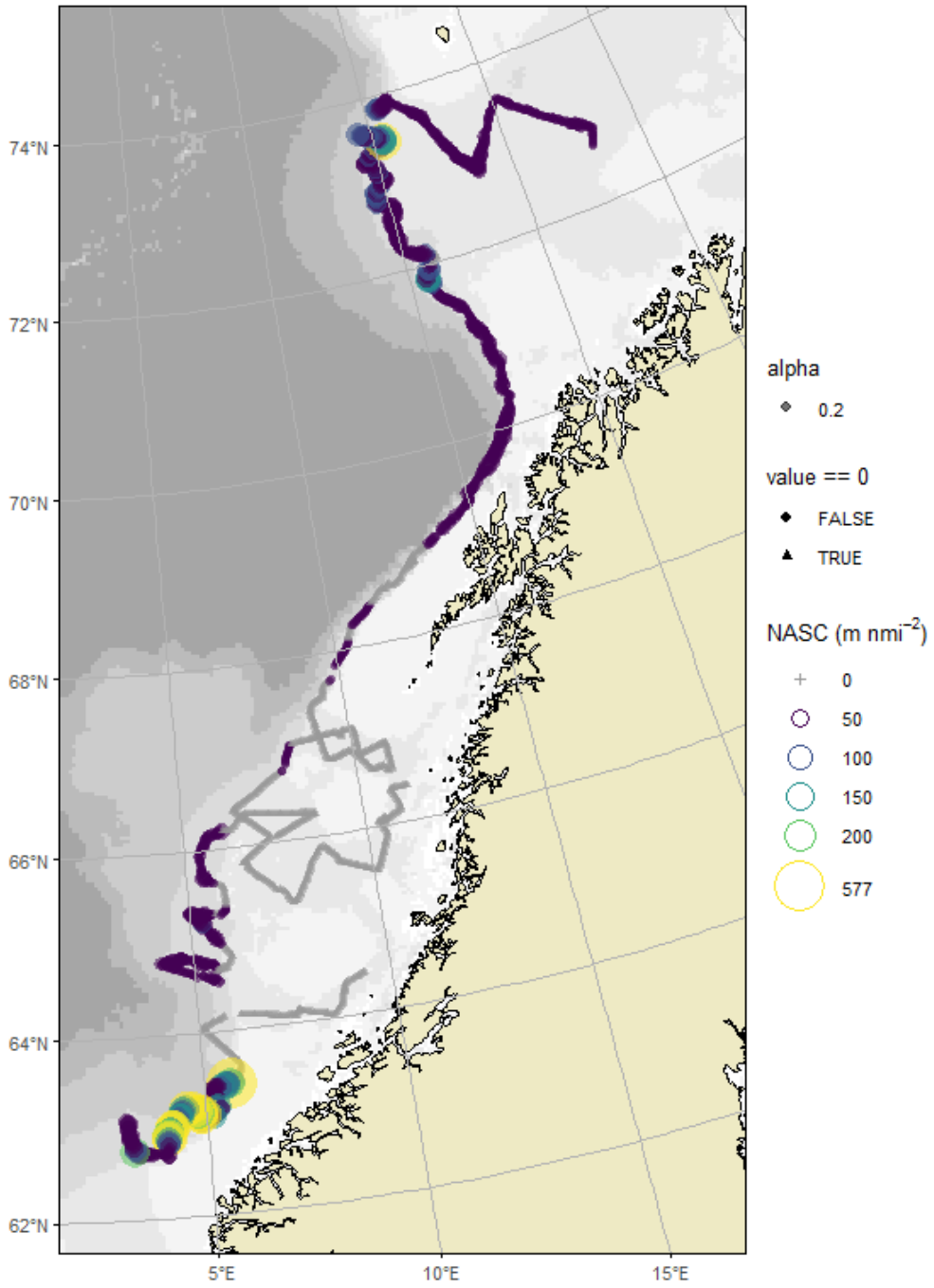

Figure 6.17. S. mentella in subareas 1 and 2. Horizontal distribution of S. mentella hydroacoustic backscattering (sA) during the Norwegian slope survey in spring 2026. The circles are proportional to the sA assigned to redfish along the vessel track.

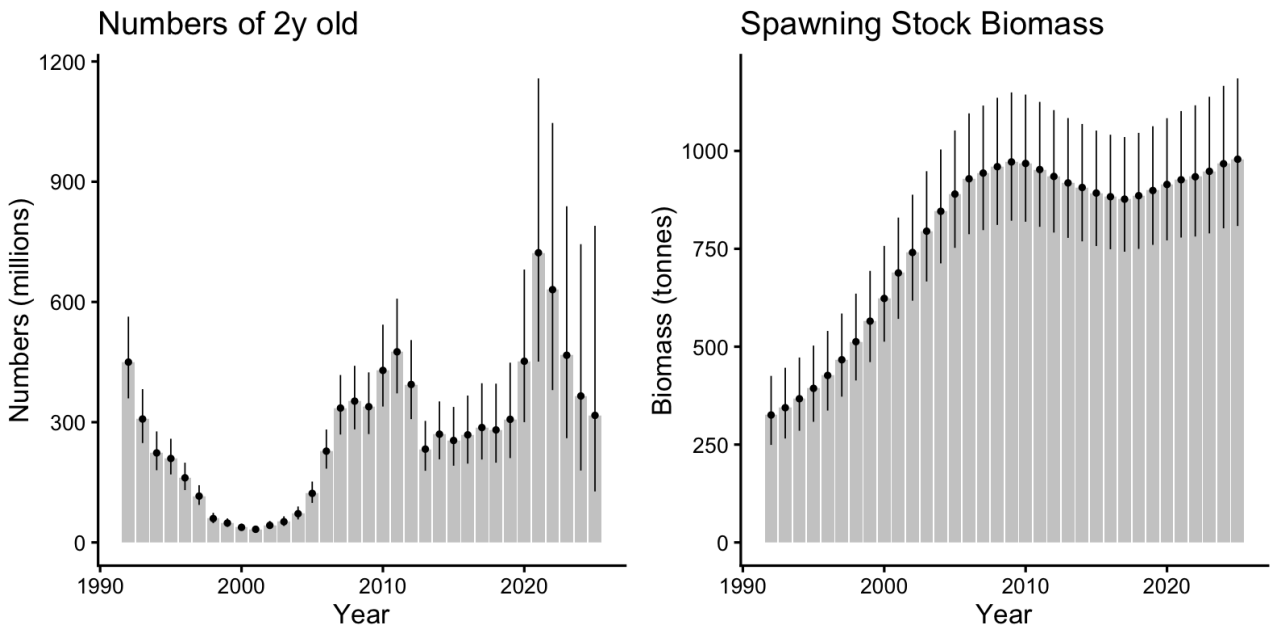

Figure 6.18. S. mentella in subareas 1 and 2. Results from the statistical catch-at-age assessment runs showing the estimated recruitment-at-age 2 spawning-stock biomass from 1992 to 2025.

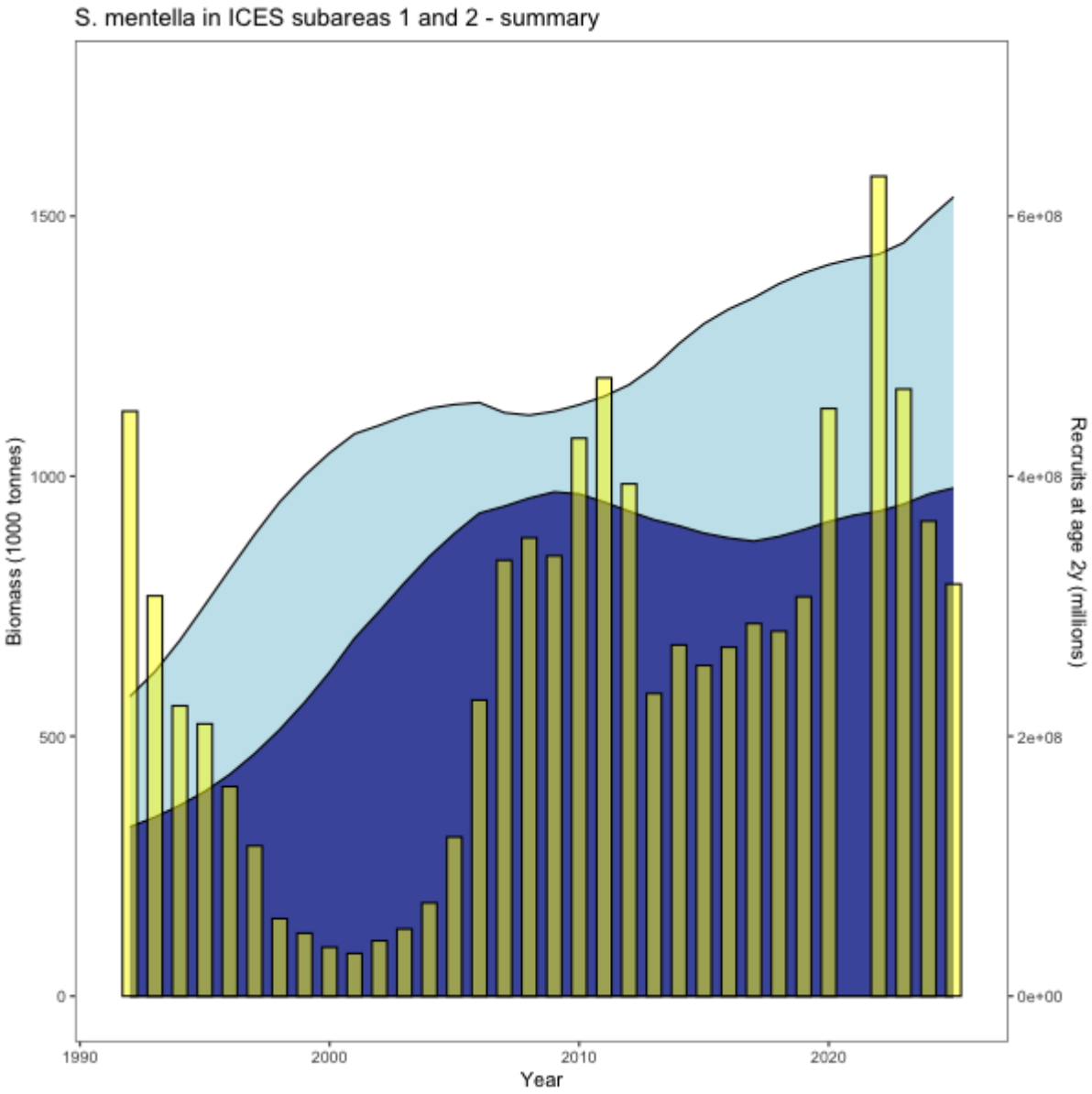

Figure 6.19. S. mentella in subareas 1 and 2. Results of the statistical catch-at-age model showing the evolution of total biomass (in tonnes, light blue, left axis), spawning stock biomass (in tonnes, dark blue, left axis) and recruitment-at-age 2 (in numbers, yellow, right axis) for the period 1992-2025.

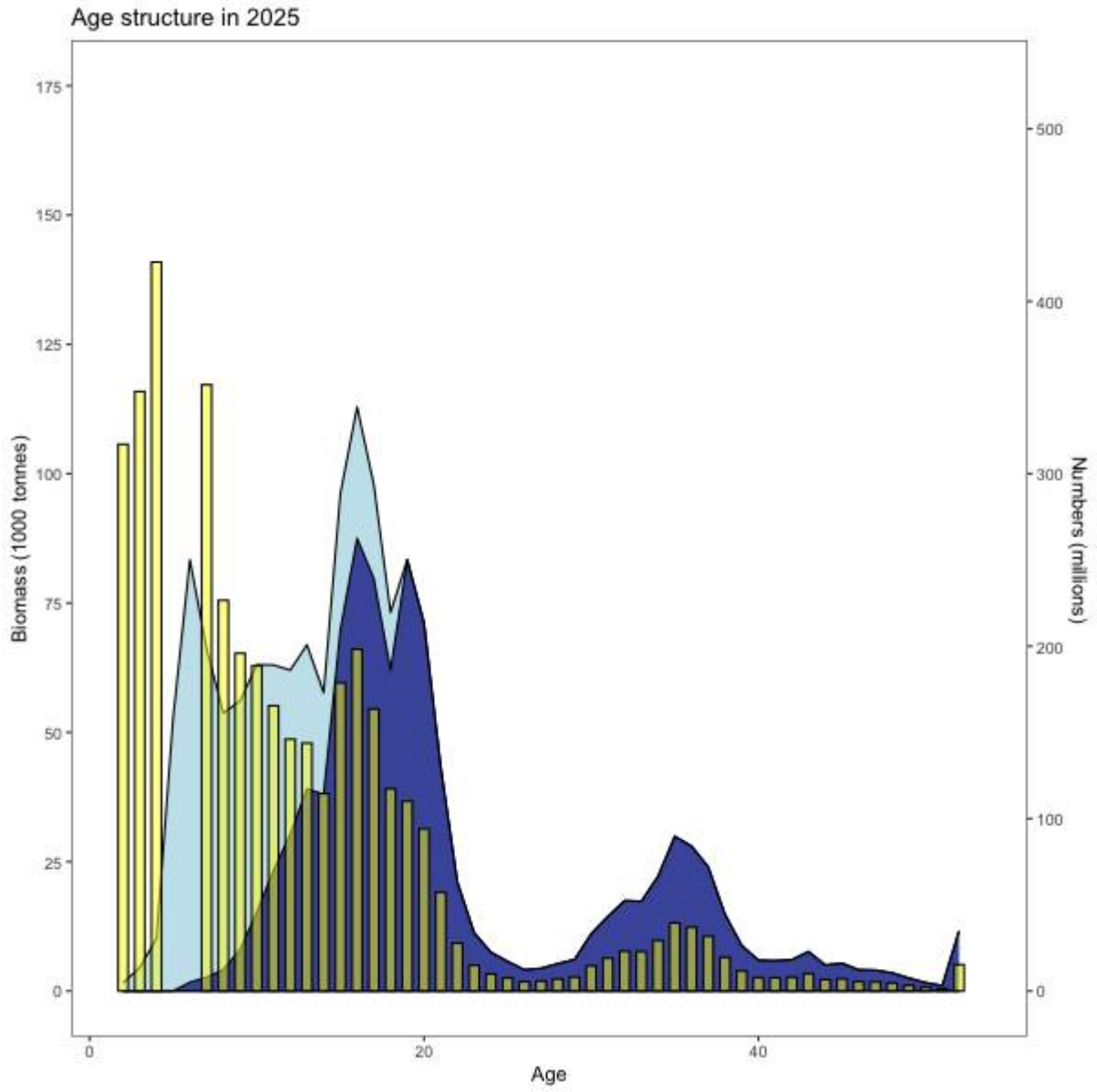

Figure 6.20. S. mentella in subareas 1 and 2. Modelled distribution of numbers (yellow bars right y-axis) biomass (light blue left y-axis) and spawning-stock biomass (dark blue left y-axis) at age 2–45+ in 2025.

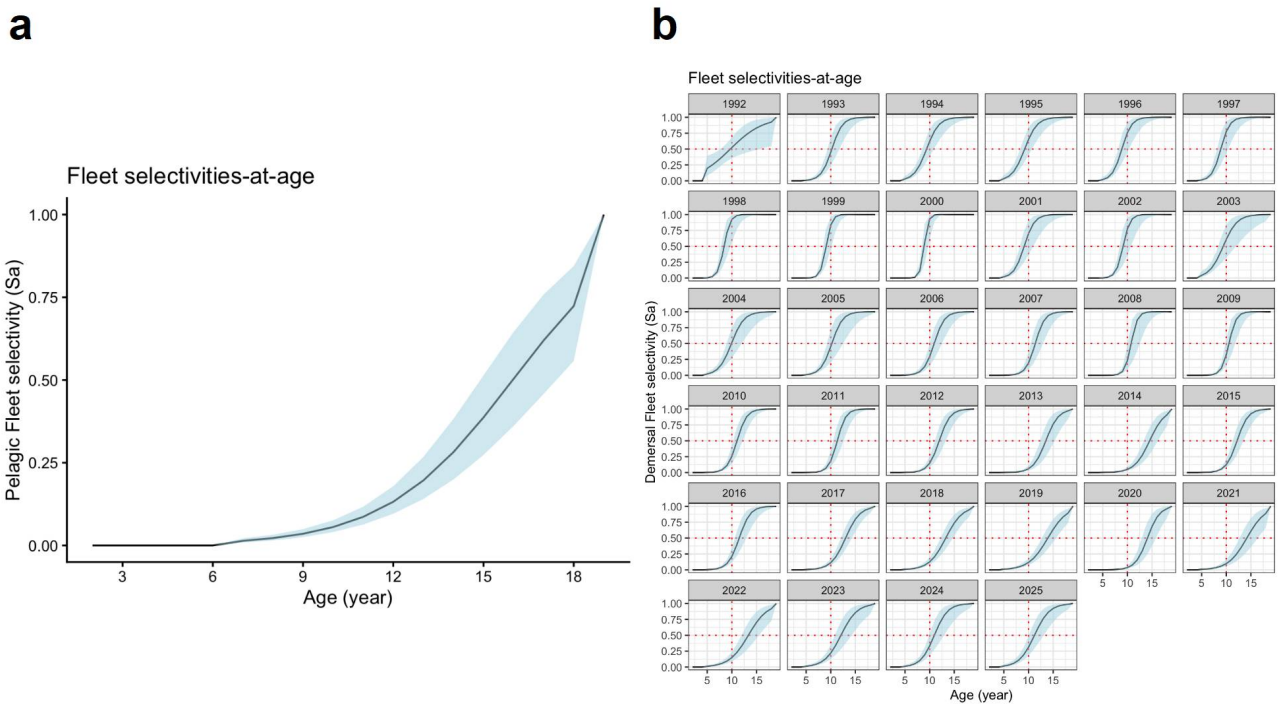

Figure 6.21. S. mentella in subareas 1 and 2. Results from the statistical catch-at-age assessment runs showing the estimated annual fleet selectivity by age (Fa) from the pelagic (left panel) and demersal (right panel) fleets. Coloured envelopes indicate 95% confidence limits.

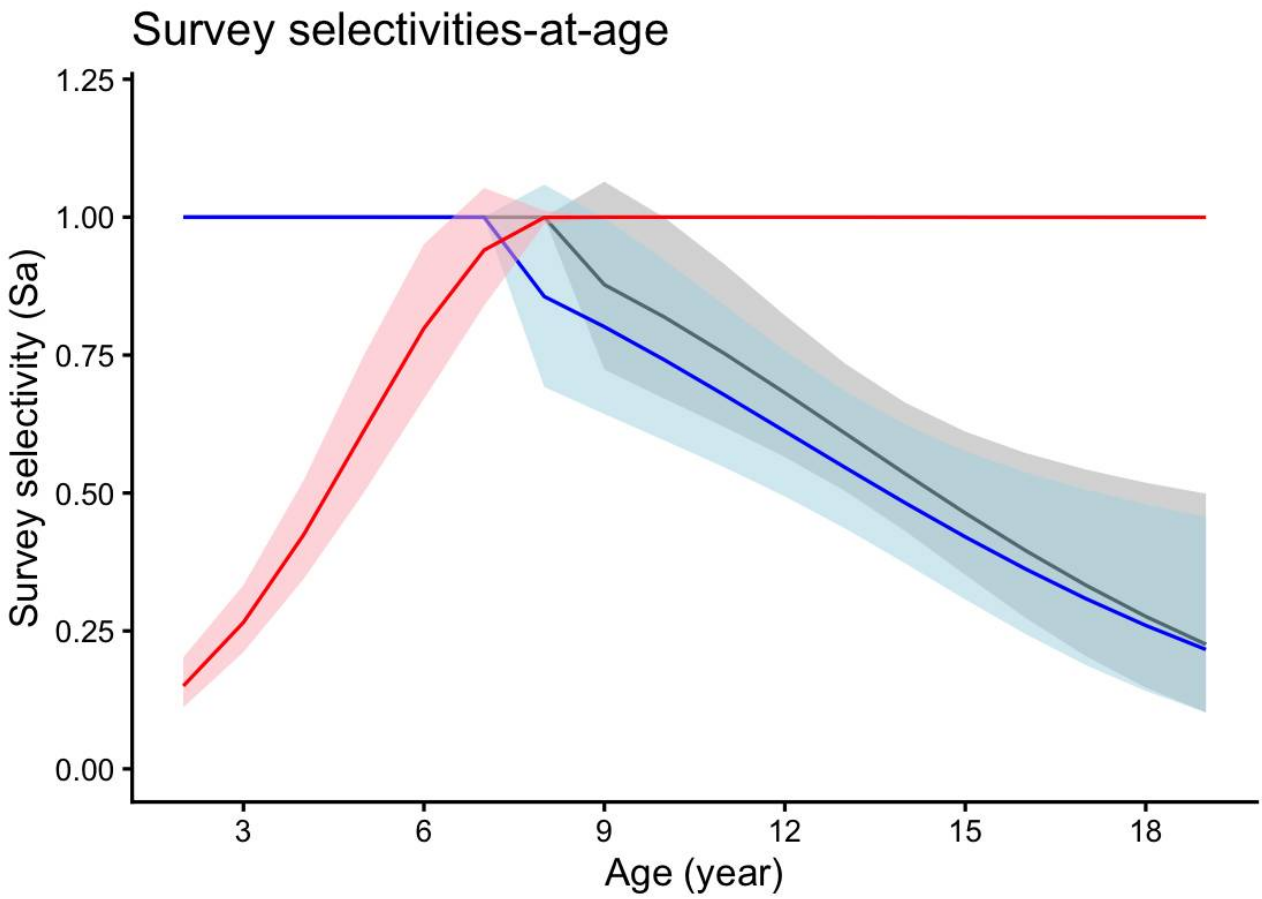

Figure 6.22. S. mentella in subareas 1 and 2. Results from the statistical catch-at-age assessment runs showing the selectivity-at-age for winter (blue) ecosystem (grey) and Russian groundfish (red) surveys.

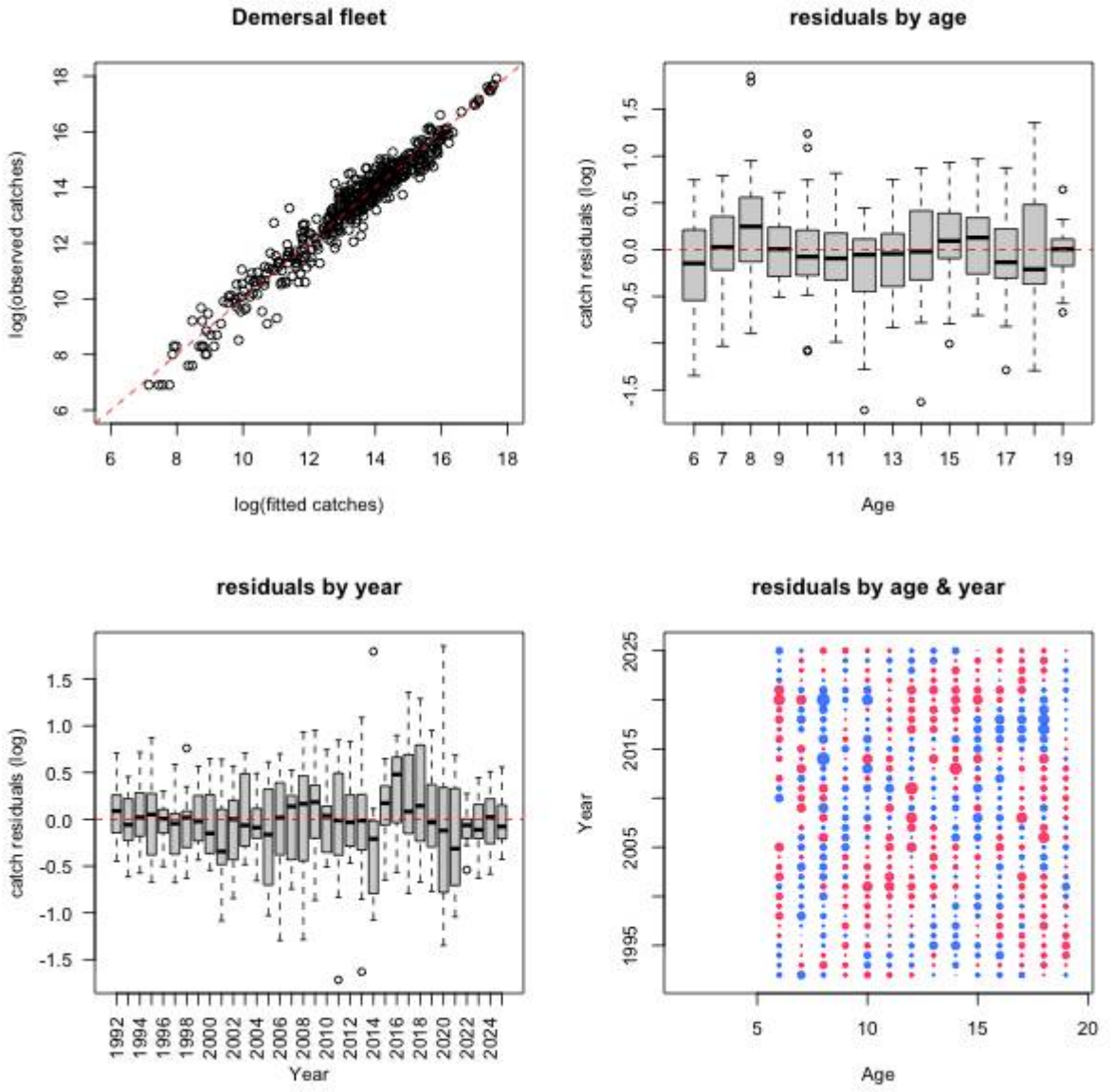

Figure 6.23. S. mentella in subareas 1 and 2. Diagnostic plots for the demersal fleet catch-at-age data. Top-left: scatter plot of observed vs. fitted indices. The dotted red line indicates a 1:1 relationship. Top-right: box plot of residuals (observed - fitted) for each age. Bottom-left: box plot of residuals for each year. Bottom-right: bubble plot of residuals for each age/year combination. Bubble size is proportional to mean residuals; blue bubbles are positive residuals and red bubbles are negative residuals.

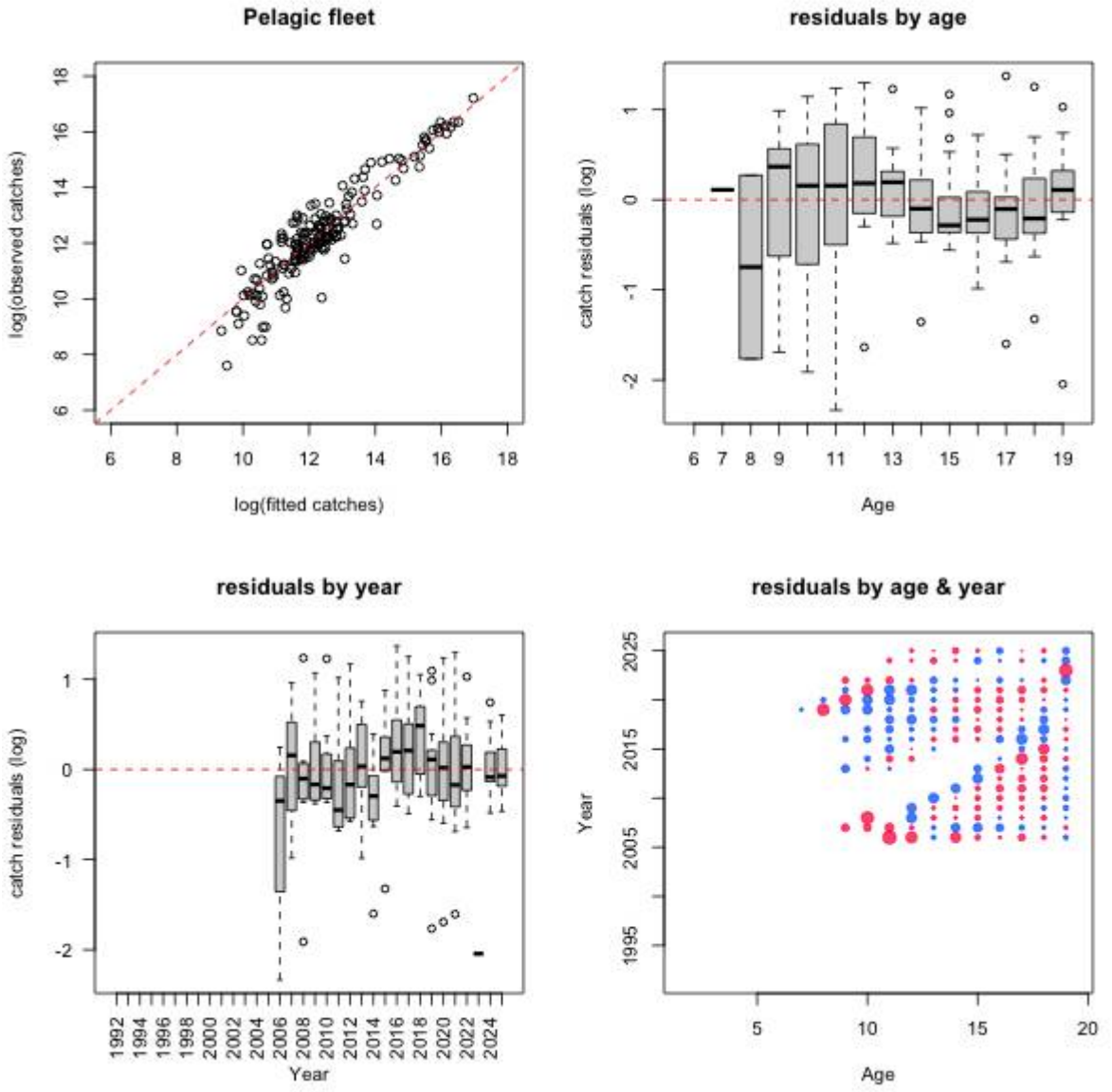

Figure 6.24. S. mentella in subareas 1 and 2. Diagnostic plots for the pelagic fleet catch-at-age data. See legend for Figure 6.23.

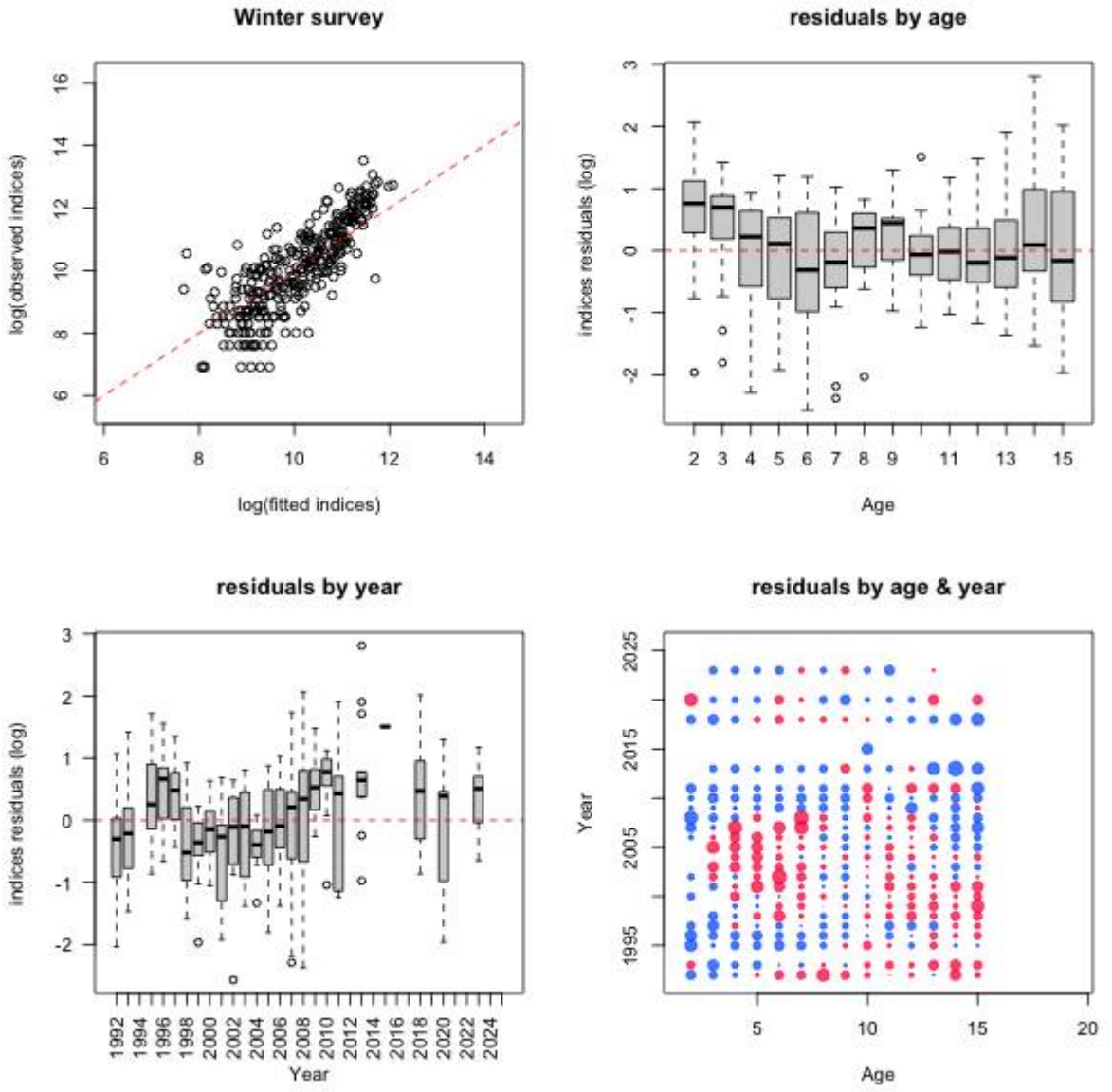

Figure 6.25. S. mentella in subareas 1 and 2. Diagnostic plots for the winter survey data. See legend for Figure 6.23.

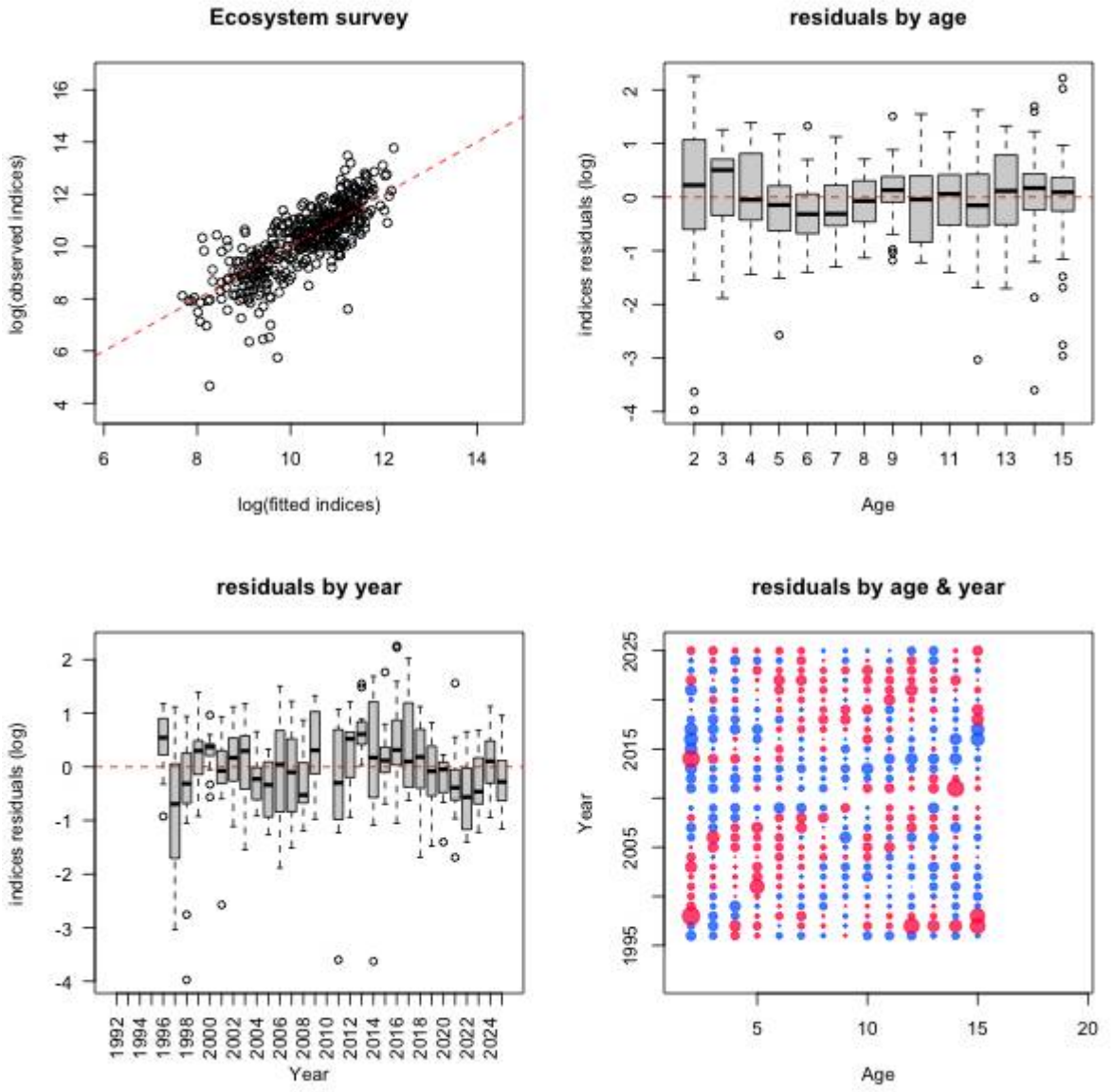

Figure 6.26. S. mentella in subareas 1 and 2. Diagnostic plots for the ecosystem survey data. See legend for Figure 6.23.

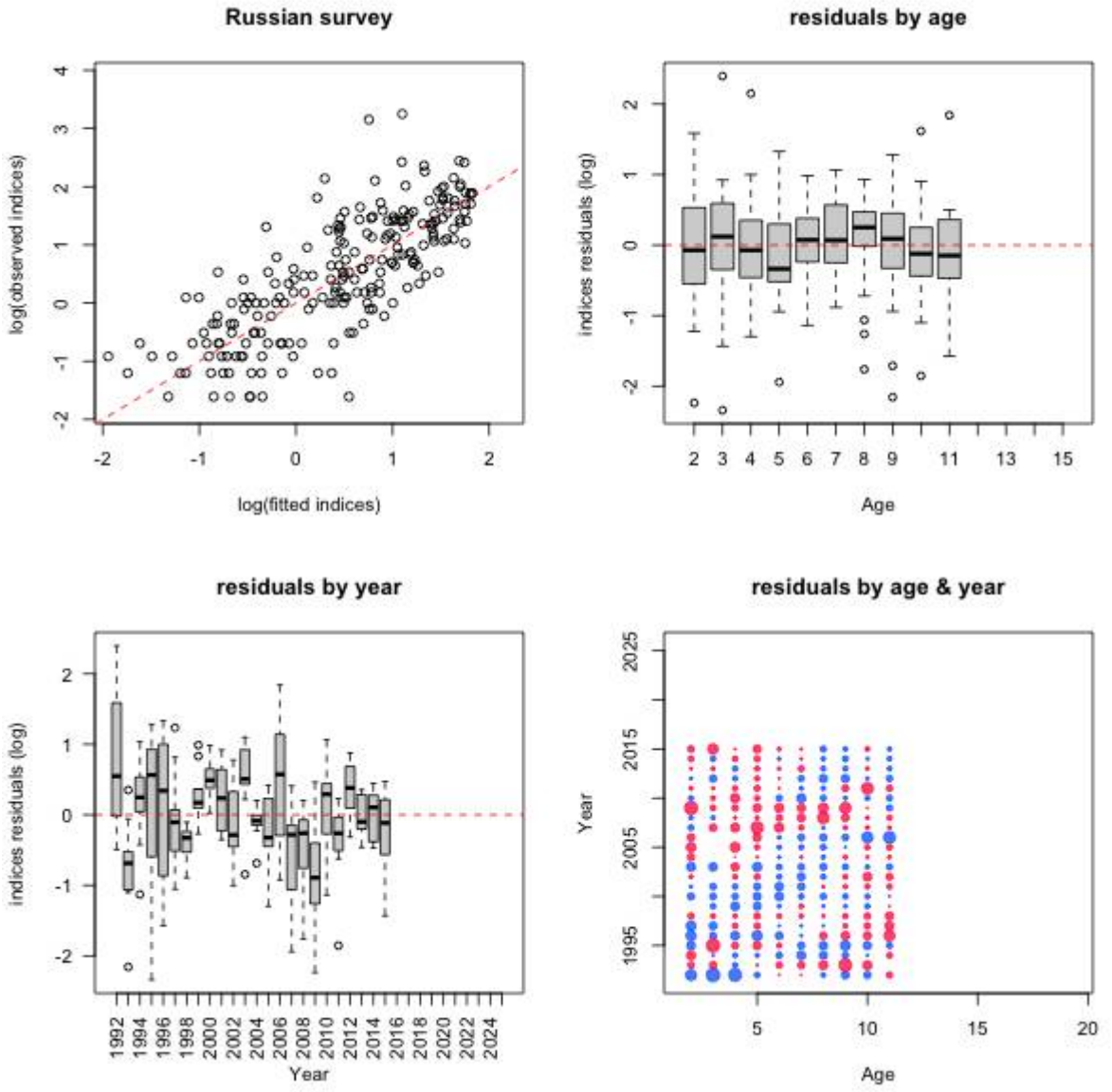

Figure 6.27. S. mentella in subareas 1 and 2. Diagnostic plots for the Russian groundfish survey data. See legend for Figure 6.23.

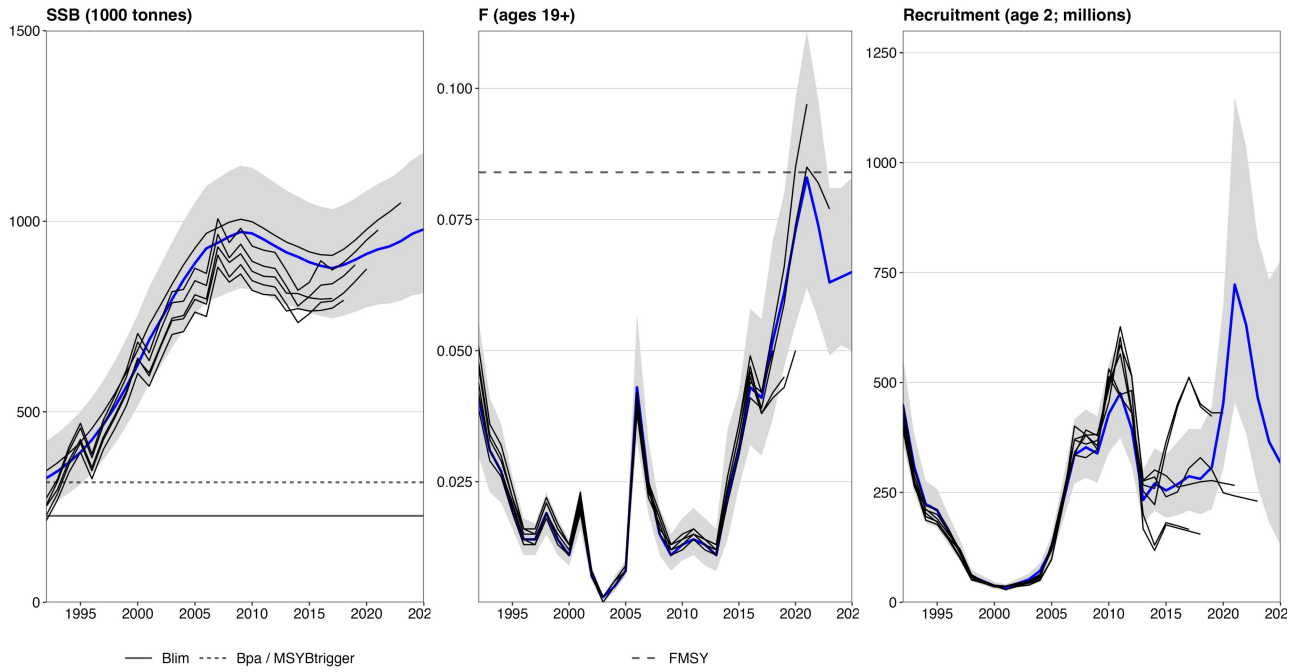

Figure 6.28. Historic retrospective patterns of the spawning-stock biomass, F19+ and recruitment at age 2 of S. mentella as estimated by the SCAA model.

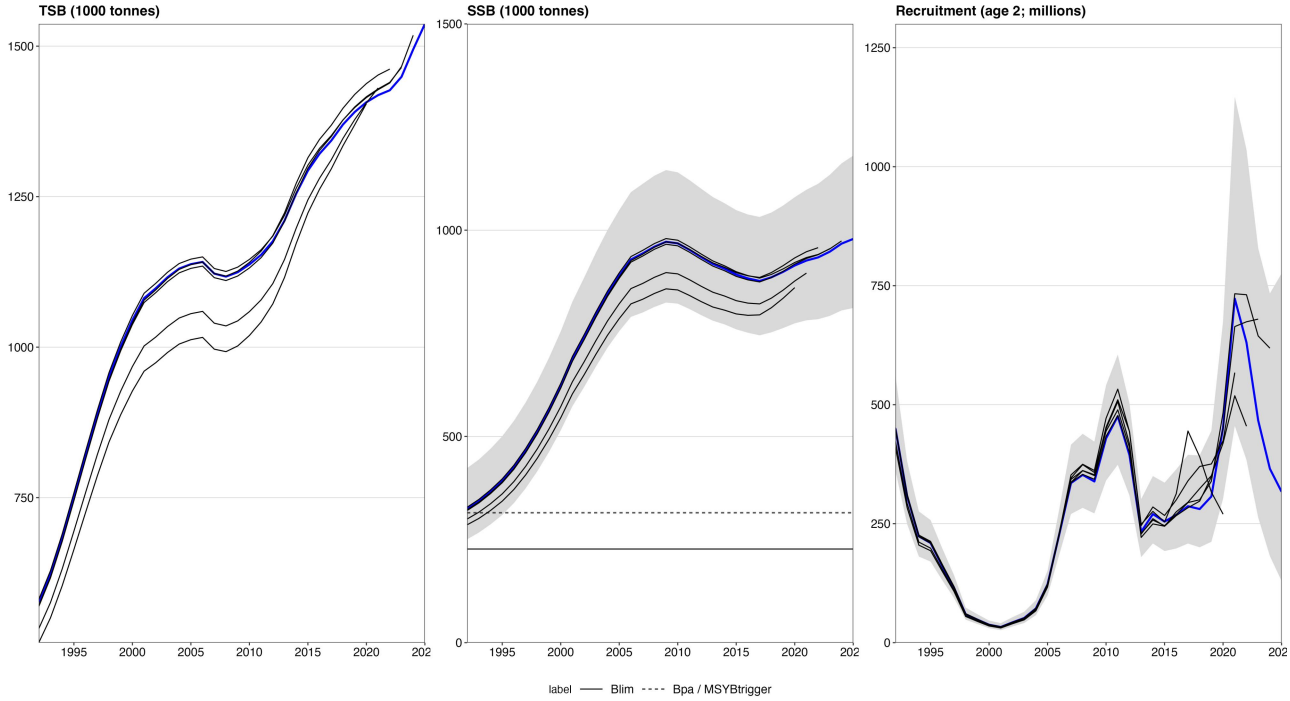

Figure 6.29. Analytical retrospective patterns of the total stock biomass, spawning-stock biomass, and recruitment at age 2 of S. mentella as estimated by the SCAA model.

8. Greenland halibut in subareas 1 and 2 (Northeast Arctic)

8.1 Status of the fisheries

8.1.1 Landings prior to 2026 (Tables 8.1–8.8, Figures 8.1–8.3)

Nominal landings by country for subareas 1 and 2 combined are presented in Table 8.1. Tables 8.2 to 8.4 give the landings for Subarea 1 and divisions 2.a and 2.b separately. Landings separated by gear type are presented in Table 8.5. Catch per unit effort is presented in Table 8.6 and total catch from 1935 to 2025 is presented in Table 8.7 and Figure 8.1.

The preliminary estimate of the total landings for 2025 is 20652 tonnes. This is 1954 tonnes less than the landings in 2024 and 8221 tonnes more than the ICES advised maximum catch for 2025 (12431 tonnes). The catches from most countries remained stable, compared to 2024. Combined landings exceeded the quotas set by the Joint Russian-Norwegian Fisheries Commission for 2025 by 1652 tonnes (total TAC 19000 tonnes). Catches in the report include all landings in ICES 1 and 2 and thus include catches in EU waters in the southern part of ICES area 2.

Some fishing for Greenland halibut has taken place in the northern part of Division 4.a during the past 20–30 years, varying between a few tonnes and up to 2577 in 1999 (Table 8.8). From 2000 total catch has ranged from 64 to 1330 tonnes, primarily taken by Norway, France, and the UK. Preliminary numbers show 318 tonnes in 2025 (Figures 8.2 and 8.3). Although there is a continuous distribution of this species from the southern part of Division 2a along the continental slope towards the Shetland area, the stock structure is unclear in this area and these landings have therefore not been added to the total from subareas 1 and 2. Recent mark-recapture and genetic investigations indicate that the stock might have a more south and westward distribution than the current ICES definition of the stock boundaries (Albert and Vollen, 2015; Vihtakari et al. 2022; Lindegren et al. 2025; Westgaard et al., 2016).

8.1.2 Advice applicable to 2027-2028

JRN-AFWG advised that when the precautionary approach is applied, catches in 2027 should be no more than 19610 tonnes. Catches in 2028 should be no more than 19914 tonnes. All catches are assumed to be landed.

A benchmark and data workshop process led to an agreed ICES analytic assessment in 2023. The JRN-AFWG approved the use of this assessment method to generate advice in June, the same year. Greenland halibut is a long-lived species, and it is sufficient to give advice every other year. This year’s assessment will provide advice for 2027 and 2028. The assessment is described in the benchmark report (ICES 2023).

8.1.3 Management

During the 38th session of the Joint Norwegian-Russian Fisheries Commission (JNRFC) in 2009, the ban on targeted Greenland halibut fishery was lifted, and a Total Allowable Catch (TAC) of 15000 tonnes was established for the years 2010 and 2011. From then on, the TAC gradually increased, reaching 27000 tonnes in 2021. After that, there has been a slight reduction in the TAC, driven by a reduction in the advice given.

The TAC for NEA Greenland halibut set by JNRFC applies to catches in ICES areas 1, 2a and 2b, except the Jan Mayen EEZ and the part of the UK EEZ which is north of 62°N.

In 2025, 204 tonnes were reported in the Jan Mayen area (within ICES Subarea 2), where Greenland halibut fisheries are not regulated by TAC.

Previously, Norway had a quota for Greenland halibut in the EU EEZ, which could be fished in ICES subareas 2a and 6. This TAC was partially within and partially outside the stock boundary. This area is now within the UK EEZ. The TAC allocated to Norway in the UK part of area 2a was 600 tonnes in 2024 and 360 tonnes in 2025. There is no separate ICES advice for Greenland halibut fishery in this area.

EU set a TAC of 2571 tonnes for 2024 and 1772 tonnes in 2025 in area 6; United Kingdom and Union waters of area 4; United Kingdom waters of 2a and United Kingdom and international waters of 5b. For the Greenland halibut stock in area 1 and 2, the EU/UK TAC in the part of area 2a that is within UK EEZ is of most interest. Further investigations need to be conducted to reveal historical catches in this area.

8.1.4 Expected landings in 2026

Catches in 2025 were 20652 tonnes, which exceeded the TAC set by JRNFC and the official advice. The total Greenland halibut landings in the Barents Sea and adjacent waters (ICES subarea 1 and divisions 2a and 2b) in 2026 may thus be higher than the JRNFC TAC of 19000 tonnes. Discards are not regarded as a problem. Expected catch is therefore set to 20750 tonnes (TAC, plus the mean catch over TAC for 2020-2025, 1750 tonnes.

8.2 Status of research

8.2.1 Survey results (Tables 8.9–8.11, Figures 8.4–8.10)

The assessment uses data from the following surveys:

The Russian bottom-trawl surveys conducted in October-December (ICES acronym: G5348) cover large parts of the known distribution area of the Greenland halibut at depths of 100–900 m. A working document presenting a revised Russian index was provided to the 2021 meeting (Russkikh et al. 2021, WD12). Revised and recalculated length distributions were implemented in the 2023 assessment. Survey biomass indices increased steeply from 2005 to 2011, decreased until 2015, and have since remained relatively stable (Figures 8.4 and 8.5). Abundance indices by length are shown in Table 8.9.

The Norwegian autumn slope survey (G1165) covers the northern part of the continental slope off Norway, including the main spawning area. Biomass and abundance indices have been declining since 2010 but are now showing signs of stabilizing. (Figures 8.4–8.6). Length distributions from this survey (Figure 8.7, and Tables 8.10 and 8.11) show modes that can be tracked over time and indicate new recruitment to the adult stock. The last strong recruitment event occurred in 2017-2018, and these fish are now entering the fishable biomass. This survey was conducted annually from 1994–2009 and biennially thereafter.

The Joint Ecosystem Survey in autumn (A5216) covers a large part of the Barents Sea down to 500 m and covers areas with mainly juvenile and immature fish. Three indices for Greenland halibut are derived from this survey: one for fish between 10-17 cm, denoted Eco_SI_1, (Figure 8.8), one for fish between 17-27 cm, denoted Eco_SI_2 (Figure 8.8) and one for fish between 28 and 65 cm, denoted EcoS (Figure 8.9). The juvenile indices (Eco_SI_1 and Eco_Si_2) indicate highly variable recruitment, with intermittent strong year classes. The EcoS index for shows large fluctuations but overall remains at a lower level than at the beginning of the time-series.

The joint winter survey in the Barents Sea (A6996) has been run from 1986 to the present (jointly with Russia since 2000, except 2006 and 2007). The survey mainly covers depths of 100–500 m and does not cover the deeper slope areas. Spatially, the survey focuses on the central Barents Sea, and in later years areas west of Svalbard. Northern coverage is limited by sea ice in some years. The survey is conducted in February and thus

provides information on the stock at a different time of the year than the autumn surveys. The biomass index has shown an increasing trend since 2004, with large interannual variability in recent years. From this survey, only catch distributions are used in the assessment model (Figure 8.10).

The Norwegian Southern Deepwater slope survey (G6149) is a trawl acoustic survey conducted in 2009, 2012 and biennially since then, along the continental slope in Norwegian EEZ from 62–74°N (subareas 1 and 2). Only catch distributions are used in the assessment (Figure 8.10).

8.2.2 Commercial catch-per-unit-effort (Table 8.6)

The CPUE series (Table 8.6) for the stock was subject to the 2015 benchmark and associated data workshops (see reports from WKBUT 2013, DCWKNGHD 2014 and IBPHALI 2015, and working documents by Bakanev (WD14 WKBUT 2013) and Nedreaas (WD 2 DCWKNGHD 2014). An alternative CPUE series for the Russian fisheries for the years 2004–2015 was presented at the 2016 meeting (Mikhaylov, WD14 AFWG 2016). It shows some discrepancies compared to the previous CPUE series used for the Russian fisheries for the same years. In the CPUE series, values before 1992, when the partial moratorium was implemented, are not comparable with values after 1992 due to reduced effort leading to increased catchability. The CPUE series is not currently used in the assessment.

8.2.3 Age readings

Based on the scientific understanding that the species is slower growing and more vulnerable than the previous age readings suggest, the Norwegian age reading methods were changed in 2006 (Albert et al., 2009). The new Norwegian age readings are not comparable with older data or the Russian age readings.

The report from Workshop on Age Reading of Greenland Halibut (WKARGH) 14–17 February 2011 (ICES CM 2011/ACOM:41) described and evaluated several age reading methods for Greenland halibut.

The different methods can be classified into two groups: A) Those that produce age–length relationships that broadly compare with the traditional methods described by the joint NAFO-ICES workshop in 1996 (ICES CM 1997/G:1); and B) Several recently developed techniques that show much higher longevity and approximately half the growth rate from 40–50 cm onwards compared to the traditional method.

A second workshop on age reading of Greenland halibut (WKARGH2) was conducted in August 2016 and worked on further validation of new age reading methods. The workshop recommended that two of the new methods could be used to provide age estimations for stock assessments. Further, recognizing some bias and low precision in methods, the WKARGH2 suggested that an aging error matrix or growth curve with error be provided for use in future stock assessments (WKARGH2 report, ICES 2016).

WKARGH2 recommends regular inter-lab calibration exercises to improve precision (i.e., exchange of digital images between readers for each method and between methods).

AFWG suggests that Russian and Norwegian scientists and age readers meet to work out issues of disagreements on Greenland halibut aging.

8.3 Data used in the assessment

At the 2023 benchmark, all Norwegian input data were scrutinized and revised (Windsland et al. 2023, WD 2 ICES WKBNORTH). The Russian slope survey was revised by Russkikh et al. (ICES 2021, AFWG WD12) and implemented for the 2023 JRN-AFWG.

In the assessment, the catch data are split into five aggregated fleets by gear and countries. Longline/gillnet

fleets include landings from gillnet, longline, and handline. Trawl fleets include landings from bottom trawl, purse-seine (very minor catches, can be bycatch or misreporting) and Danish seine. Catch in tonnes and length distributions per quarter per fleet and sex from 1992–2020 are used in the assessment. Fleets are split between Norwegian catches, Russian catches, and catches from 3rd countries. Selectivities are allowed to vary by sex to account for sexual dimorphism influencing vulnerability to fishing. Catches are aggregated into following fleets:

- Russian, trawl and minor gears
- Russian, gillnet and longline
- Norwegian, trawl and minor gears
- Norwegian, gillnet and longline
- 3rd countries

No survey covers the whole stock distribution area. The model uses length distributions and biomass indices from three surveys. From these surveys the following indices go into the current assessment:

- EggaN_S– based on the Norwegian slope survey.
- Eco_SI_1 and Eco_SI_2 - juvenile indices based on 10-17 cm and 18-27 cm fish in the Joint Ecosystem survey.
- EcoS_SI - an index for fish 28-65 cm, based on data from the Joint Ecosystem survey.
- RussianS_SI - Russian bottom-trawl survey in the Barents Sea in autumn.

In addition, catch length distributions from the Norwegian Southern Deepwater slope survey and the Joint Winter Survey are used in the assessment. Age data from the Norwegian autumn slope survey was used in the tuning. The age data was provided using the frozen whole right otolith method recommended by WKARGH2 (ICES 2017).

No CPUE indices are used in the tuning.

8.4 Methods used in the assessment (Table 8.13)

A new assessment method with a length and age-based GADGET model was benchmarked in 2023.

At the JRN_AFWG meeting in 2024, the revision of the Russian Slope Survey was implemented in the assessment. This revision required recalculation of reference points that are given in Table 8.13. Advice for the stock is given biennially.

This year’s assessment provides advice for 2027 and 2028.

8.4.1 Model settings

Model used: Gadget3 (Lentin et al. 2022)

- Start-year 1980.
- One year time-step.
- Single area model, with variable distributions handled through fleet selectivity (“fleets as areas” approach)

- Two sexes, split into mature and immature stock components
- Logistic maturity estimated for each sex
- 1 cm length classes and 1-year age classes o Lengths: females; immature 1-100 cm, mature 1-120 cm - males; immature 1-65 cm, mature 1-90 cm o Age: immature 1-25+, mature 3-25+
- Von Bertanlanffy growth estimated separately for males and females, with L_{inf} for males fixed to 68 cm. Length at age one fixed.
- Natural mortality set to 0.12 for females and 0.16 for males
- Initial size of recruits fixed at 14 cm (model has proved unable to estimate this)
- Recruitment modeled as annual numbers, no relationship with SSB (estimated directly), assumed equal recruitment of male and female
- Initial population follows a simplifying assumption of constant recruitment, M and F, giving an exponential decay by age. A fixed maturity ogive is used to split immature and mature proportions. Standard deviations of lengths at age are externally fixed.
- Fisheries and surveys are modeled with fixed catch in tonnes per fleet, and sex-specific selectivity estimated using length distribution data and sex-at-length data.
- Five aggregated commercial fleets (as described above), each with sex-specific logistic selectivity
- Three surveys used for indices (EcoS, EggaN and RussianS), with logistic selectivity (but with a min:max length range to avoid bias in indices on fish suspected to be poorly selected)
- Only length distributions used from Winter and EggaS surveys

More detailed model description, as well as outputs and diagnostics, are shown in Vihtakari et al. (2023) (WD 17, WKBNORTH).

8.5 Results of the assessment (Tables 8.12-8.14, figure 8.11-8.15)

Model results, retrospective pattern, jitter, and short-term projections from the assessment are shown in Figures 8.11-8.15. Reference points and catch scenarios are shown in Table 8.12-8.14. The stock biomass is presented for the total 45+ cm (minimum legal landing size) population and the spawning stock (Figure 8.11).

Biomass peaked around 2013–2014 and has declined steadily since then. This trend is broadly consistent across all three tuning series (Figures 8.4, 8.7, and 8.9). However, the rate of decline appears to be slowing, and total fishable biomass is now showing signs of stabilizing. Female SSB continues to decline, but at a reduced rate compared to previous years. An upward revision of SSB has brought it above B_{pa}. The harvest rate has increased steadily since 2009 and is now above HR_{MSY}.

The retrospective analysis for model biomass has negative Mohn’s rho values (Figure 8.12). The retrospective patterns by year get lumped following the availability of survey data, with the Norwegian slope survey run every other year and missing years in the Russian autumn survey. As a result of this pattern, it is recommended that the assessment be run every other year rather than annually. There is a retrospective trend to increase the stock estimate over time. Peaks in recruitment were most likely exaggerated in the assessment model used before the benchmark, while in the present model they are probably underestimated. Large uncertainties in age

reading probably smooth out the peaks, distributing the recruitment over multiple years. Even though the assessment most likely smooths out the recruitment, the modeled peaks show reasonably good agreement with the data from the juvenile survey indices. This stock is dominated by sporadic recruitment events, and the model does a reasonable job of capturing this.

8.5.1 Biological reference points

Estimates of trends and biomass levels in stock dynamics are stable in the revised assessment. Therefore, the suggested reference points are for ICES category 1 stock (ICES, 2021).

The HR_{TARGET} is set to HR_{MSY} which equals 0.139. As recommended at the recent Benchmark (ICES 2023), this value was calculated during the meeting following the revision of the Russian survey index (Russkikh et al. WD12, AFWG 2021). The fishable biomass is taken to be the 45+ cm biomass. The $B_{TRIGGER}$ in the ICES Advice Rule is set to be B_{pa}, which equals 46 747 t. B_{MSY} has not been calculated.

8.5.2 Exploratory assessments; surplus production models and TSVPA

Results of the assessment of the Barents Sea Greenland halibut stock based on a Bayesian surplus production model were provided by Bakanev in 2013, (WKBUT WD 14). Different sets of abundance indices were used for tuning the model. The analysis of model run results has shown that K is estimated within the range of 810 to 1139 kt, B_{MSY} of 405 to 570 kt and MSY of 23 to 47 kt. However, the model was sensitive to the choice of prior on K. Taking into consideration a high probability of the stock size being at the level, which was quite a bit above B_{MSY}, the risk of the biomass being below this optimal one was very small in 2002–2012 (<1%). The risk analysis of the stock size in the prediction years (2013–2020) under the catch of 0 to 30 kt indicated that the probability of the stock size being under the threshold levels (B_{MSY}, B_{lim}) was also minor (less than 1%). It was concluded that further work was needed on the historical CPUE series. Based on scrutiny of the CPUE series, it was recommended to examine runs with the surplus production model for the period 1964-1991 and 1964-2005, in addition to runs for the whole 1964–2013 period. The CPUE series were considered less reliable to reflect stock dynamics than survey indices in the period after regulations of the fishery were introduced in 1992. The Bayesian surplus model was not updated for presentation at the current meeting.

A production model was presented at the 2016 meeting (Mikhaylov, 2016, WD 14), although this model has not been reviewed at a benchmark, nor were biomass trends presented at this meeting. The model has been proposed as a possible method for the estimation of long-term reference points. An update was presented at the 2019 meeting (Mikhaylov 2019, AFWG 2019 WD21). In the current version, the MSY would be around 34 kt, the B_{MSY} around 500 kt and F_{MSY} on the level 0.069. It should be noted that these values are not directly transferable to a different model with different biomass levels and in any case a long-term average. The WD concluded that, in general, the stock can withstand the fishing pressure in 2016, and the fishing regime was approaching optimum, indicating that the results of the exploratory surplus production model were in general alignment with the assessment.

F_{MSY} is not appropriate to this stock given the recent extended run of poor recruitment, and such values have not been evaluated for precautionarity. In a plenary, it was concluded that it would be useful for further development of the production model to conduct separate exploratory runs for CPUE split into before and after 1992 and run with CPUE only before 1992 and survey data after 1992. This production model was not updated for presentation at the current meeting.

At the 2018 meeting, AFWG results from SPiCT production model were presented (AFWG report 2018). In the run that is presented in this report, all available data up to 2016 were used. For run with default, priors applied K = 995 421 t and deterministic reference points were B_{MSY} = 419 955 t, F = 0.07 and MSY = 29 742 t. Stochastic

reference points for this run were in a similar range. Run with default priors deactivated gives similar MSY estimates but otherwise, rather different estimates; K = 2 504 006 t, B_{MSY} = 609 410 t, F = 0.05 and MSY = 28 097 t. Further utilization of this approach demands closer scrutiny of model settings in relation to diagnostics. The SPiCT model can be a flexible tool to examine the production model approach to Greenland halibut, however, concerns highlighted below still apply.

In principle, a production model could be used in conjunction with the GADGET assessment model to extend the simulations back in time and provide better estimates for B_{lim}. However, the inability of production models to follow variable recruitment, and especially runs of above or below average recruitment, limits their ability to advise on this stock. In the benchmark report (IBPHALI 2015), Table 3.3 gives CPUE series and survey estimates that can be helpful for this task.

A working document (Bulatov et al. 2023, WD1 JNR-AFWG 2023) presents a comparison of two types of models: several different formulations of production models for Greenland halibut and age-structured TSVPA mode alongside a production model (the “combi” model) tuned to an index constructed from the TSVPA results. Tuning data for production model included catch in tonnes, Norwegian CPUE, Russian Survey and Winter survey indices. The biomass models showed F_{MSY} (in a biomass model context) of around 0.05 to 0.07 and B_{MSY} of 437-620 kt, giving long-term MSY yields of between 32.3kt and 37.47kt. A TSVPA model was constructed, and the overall trend (with F_{MSY} at age 9 at 0.14, and MSY yield of between 28.2kt and 31.5kt) was presented. A biomass model tuned to TSVPA as a relative index of abundance gave a F_{MSY} (again in production model context) of 0.15 and long-term MSY yield of 28.4kt. The use of TISVPA results allowed us to build a recruitment model (Beverton-Holt and “hockey stick” models) that predicts an approximately constant replenishment level (25 million at age 5), which justifies the assumptions accepted in new version of GADGET. However, given difficulties in the tuning indices noted below, the group does not feel that reliance can be placed on the absolute level of these results.

By analogy with the calculations carried out in 2023 (Bulatov et al. 2023, WD1 JNR-AFWG 2023), the stock status was estimated in 2026 (WD8 JNR-AFWG 2026) using the TSVPA model for natural mortality levels m=0.12 (females) and m=0.16 (males). The results of the assessment of TSB and SSB amounted to 129 and 99 ktonnes for the first case and 186 and 140 ktonnes for the second case, respectively. The number of recruitment (age 5) was estimated at 20.1 million numbers in the first case and 33.6 million numbers in the second one. The TISVPA model has shown stable recruitment over the past 15 years for both cases. The median recruitment level was 21.5 million numbers in the first case, and 29.6 in the second. The yield per recruit were 0.966 kg and 0.750 kg. The MSY and TAC estimates were 20.9 and 19.6 ktonnes for the first case and 22.2 and 25.2 ktonnes for the second case, respectively.

The group notes that there are two key problems in tuning data used in this WD, one is that the CPUE has an artificial step-change (increase) after the reduction in effort due to the partial moratorium in 1992 and will thus likely drive the hypothetical artificial fast rise in population from that point. The other is that the winter survey has had a trend to expand coverage area over time, and therefore the increasing trend in the swept area index is, at least partially, driven by this rather than any stock trends. Therefore, neither the full time series of CPUE nor the simple winter survey estimate should be used for model tuning. Furthermore, the new age reading methods imply considerably slower growth rate and increased longevity, compared to the traditional method used for age data in the TSVPA model (ICES WKARGH 2011, ICES WKARGH2 2016), and the old age readings should not be used in model tuning. It is also questionable if a biomass model is able to track the trends of this stock (where the population seems to be driven by variability in recruitment success).

In terms of trends, the TSVPA and the “Combi” biomass model tuned to a TSVPA-derived index were broadly

similar to each other and to the new Gadget model. Key differences were that the TSVPA rose more steeply than Gadget after the 1992 low point, and the Combi model more steeply again. It seems likely that this could be explained by the use of CPUE tuning data (with its artificial rise post 1992) in the Combi and TSVPA models. The other key point of difference is that the Gadget model shows a downturn starting in c. 2012, while the other models only turn down in 2021. One possible reason for this is that the Gadget model uses Ecosystem and Norwegian slope survey indices alongside the Russian index, while the models presented here use the Winter Survey (which has an artificial increasing trend due to increasing coverage).

The group concluded that the TSVPA model was worth continuing developing, with potential use as an auxiliary model (as for NEA cod and haddock), although its accuracy would continue to be hampered by the limited age reading on this species with new age reading methods. Using different tuning series and the more modern age reading method should result in a TSVPA model which could be used as an auxiliary model and could then be compared with the Gadget assessment. Effort should also be placed into continuing the age reading work, as an improved age data series would benefit both Gadget and age-based models such as TSVPA.

8.6 Comments to the last assessment

An overview of model exploration before, and at, the benchmark is given in the benchmark report (Vihtakari et al. WD 17, ICES 2023). At the JRN-AFWG in 2023 the assessment was updated by adding the revised Russian survey index. Between the end of the physical benchmark meeting and completion of the final model the following adjustments were made: recalculation of data weighting, and flat-top selectivity applied to all fleets. In addition, the Russian survey was revised as noted previously.

Within the fisheries in the Barents Sea and the associated continental slope, fish tend to move to the slope as they mature. This means that fisheries on the shelf tend to catch fewer large, mature fish. The Barents Sea Greenland halibut Gadget model was designed to be a “fleets as areas model”, where fleet selectivity would take care of the issue of the larger fish moving out of the areas covered by some fleets and surveys. However, the dome-shaped selectivity required for this was problematic. Dome-shaped selectivity increased the estimated biomass for mature females early on during the time-series but did not influence female SSB estimates toward the end of the time-series. This led to unrealistically pessimistic ratio between current stock status and recalculated B_{lim} , reducing the TAC estimate for 2025 to 7200 tonnes, which was deemed too low in the current situation by the experience and other model exploration using compiled survey indices. The model was therefore again run with logistic (flat-topped) selectivities, as in the 2023 assessment. The logistic selectivities were also kept in this year’s assessment.

The Greenland halibut population extends past the Joint Norwegian Russian Fisheries Commission (JNRFC) domain and surveys considered in the assessment do not cover the entire distribution (Albert & Vollen 2015, Westgaard et al. 2017, Vihtakari et al. 2022, Ubeda et al. 2023).

In the EggaN 2025 survey, one very large station (4.5 tonnes) contributed about 12% of the total biomass and strongly influenced the assessment and advice. Removing it reduced the advice by 1200 tonnes. This shows that the results are sensitive to single extreme observations, so this influence should be kept in mind when interpreting the advice, and quotas should not be set above the recommended level.

According to the jitter analysis, the model trends can be considered stable (Figure 8.13).

8.6.1 Future work

Efforts to improve stock assessment in the future should include:

- Gather age data over more years.
- Examine further Norwegian and joint Norwegian/Russian survey indices using VAST (mixed models) or similar statistical analysis.
- Start the work on preparing data for the future benchmark and for subsequent developing harvest control rules
- Examine how to implement new evidence for south and westward extension of stock structure. Extensive work studying this extension as presented at the meeting.

8.7 Tables and figures

Table 8-1. Greenland halibut in subareas 1 and 2. Nominal Catch (t) by countries (Subarea 1, divisions 2a, and 2b combined) as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
1984	0	0	0	2165	138	0	0	0	0	0	3540	0	0	15181	0	23	21047
1985	0	0	0	4000	239	0	0	0	0	0	5287	0	0	10237	0	5	19768
1986	0	0	42	2718	13	0	0	0	0	0	7783	0	0	12200	0	12	22768
1987	0	0	0	2024	13	0	0	0	0	0	6893	0	0	9733	0	81	18744
1988	0	0	186	744	67	0	0	0	0	0	8811	0	0	9430	0	84	19322
1989	0	0	67	600	31	0	0	0	0	0	8837	0	0	8812	0	6	18353
1990	0	0	163	954	49	0	0	0	0	0	16615	0	0	4764	0	10	22555
1991	11	2564	314	101	119	0	0	0	0	0	27585	0	0	2490	132	2	33318
1992	0	0	16	13	111	13	0	0	0	0	7668	0	31	718	23	10	8603
1993	2	0	61	22	80	8	56	0	0	30	10379	0	43	1235	0	16	11932
1994	4	0	18	296	55	3	15	5	0	4	8428	0	36	283	1	78	9226
1995	0	0	12	35	174	12	25	2	0	0	9368	0	84	794	1106	122	11734
1996	0	0	2	81	219	123	70	0	0	0	11623	0	79	1576	200	374	14347
1997	0	0	27	56	253	0	62	2	0	0	7661	12	50	1038	157	92	9410
1998	0	0	57	34	67	0	23	2	0	0	8435	31	99	2659	259	227	11893
1999	0	0	94	34	0	38	7	2	0	0	15004	8	49	3823	319	139	19517
2000	0	0	0	15	45	0	16	1	0	0	9083	3	37	4568	375	154	14297
2001	0	0	0	58	122	0	18	1	0	0	10896	2	35	4694	418	130	16374
2002	0	219	0	42	7	22	4	6	0	0	7143	5	14	5584	178	69	13293
2003	0	0	459	18	2	14	0	1	0	0	8215	5	19	4384	230	99	13446

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
2004	0	0	0	9	0	0	10	0	0	0	13939	1	50	4662	186	43	18900
2005	0	170	0	8	32	0	0	0	0	0	13011	0	23	4883	660	47	18834
2006	0	0	204	8	46	0	8	0	0	196	11118	201	26	6055	2	12	17876
2007	0	0	203	8	40	198	15	0	0	0	8230	200	50	6484	11	19	15458
2008	0	0	663	5	41	0	28	0	0	0	7393	201	46	5294	112	26	13809
2009	0	0	422	19	16	16	15	2	0	0	8446	204	237	3335	202	68	12982
2010	0	0	272	14	102	15	16	0	0	0	7700	3	11	6888	188	26	15235
2011	0	0	538	80	46	4	7	0	0	234	8348	169	21	7053	144	40	16684
2012	0	0	563	40	40	12	13	0	0	0	9331	22	1	10041	186	35	20284
2013	0	0	783	49	168	22	106	1	0	0	10404	30	7	10306	12	92	21980
2014	0	0	887	33	269	24	86	0	0	0	10997	19	0	10061	23	212	22611
2015	0	0	724	33	230	16	98	0	0	0	10874	13	1	12953	25	114	25081
2016	2	353	1078	9	229	18	75	0	0	0	12932	26	19	10561	27	56	25385
2017	0	523	993	21	177	26	10	0	3	72	13741	26	13	10713	36	83	26437
2018	2	574	401	50	150	20	24	0	0	206	14875	27	6	12071	60	134	28600
2019	0	588	350	44	105	23	10	0	0	348	14867	122	8	12196	87	75	28823
2020	1	579	514	73	39	48	19	0	0	261	14526	97	9	12265	96	45	28572
2021	1	382	749	88	137	14	40	0	0	125	14008	14	0	12396	125	177	28256
2022	0	253	1052	94	86	50	27	0	0	136	13800	0	0	11746	163	114	27521
2023	1	98	1026	77	61	11	33	0	84	75	14198	0	0	11317	72	73	27126
2024*	0	172	1062	186	83	16	13	0	69	0	11290	0	44	9581	56	34	22606
2025*	0	96	1568	208	38	59	0	1	61	56	9928	0	54	8440	76	67	20652

*** Preliminary figures.**

Table 8-2 . Greenland halibut in subareas 1 and 2. Nominal catch (t) by countries in Subarea 1 as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
1984	0	0	0	0	0	0	0	0	0	0	398	0	0	81	0	17	496
1985	0	0	0	0	0	0	0	0	0	0	524	0	0	122	0	1	647
1986	0	0	0	1	0	0	0	0	0	0	538	0	0	615	0	6	1160
1987	0	0	0	2	0	0	0	0	0	0	771	0	0	259	0	10	1042
1988	0	0	9	4	0	0	0	0	0	0	901	0	0	420	0	7	1341
1989	0	0	0	0	0	0	0	0	0	0	2038	0	0	482	0	0	2520
1990	0	0	7	0	0	0	0	0	0	0	1304	0	0	321	0	0	1632
1991	0	164	0	0	0	0	0	0	0	0	2027	0	0	522	0	0	2713
1992	0	0	0	0	0	0	0	0	0	0	2349	0	0	467	0	0	2816
1993	0	0	32	0	0	0	56	0	0	0	1754	0	0	867	0	0	2709
1994	0	0	17	217	0	0	15	0	0	0	1165	0	0	175	0	0	1589
1995	0	0	12	0	0	0	25	0	0	0	1352	0	0	270	84	0	1743
1996	0	0	2	0	0	0	70	0	0	0	911	0	0	198	0	0	1181
1997	0	0	15	0	0	0	62	0	0	0	610	0	0	170	0	0	857
1998	0	0	47	0	0	0	23	0	0	0	859	0	0	491	0	2	1422
1999	0	0	91	0	0	13	7	0	0	0	1101	0	0	1203	0	0	2415
2000	0	0	0	0	0	0	16	0	0	0	1021	0	0	1169	0	0	2206
2001	0	0	0	0	0	0	9	0	0	0	858	0	0	951	0	2	1820
2002	0	0	0	3	0	0	0	0	0	0	834	0	0	1167	0	0	2004
2003	0	0	48	0	0	2	0	1	0	0	962	1	0	887	0	1	1902
2004	0	0	0	0	0	0	1	0	0	0	866	0	0	633	0	3	1503
2005	0	0	0	0	1	0	0	0	0	0	572	0	0	595	0	3	1171

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
2006	0	0	17	1	0	0	1	0	0	0	575	0	0	626	0	2	1222
2007	0	0	18	0	1	198	3	0	0	0	514	0	3	438	0	4	1179
2008	0	0	13	0	1	0	5	0	0	0	599	0	0	390	0	0	1008
2009	0	0	33	0	0	16	5	0	0	0	734	0	0	483	0	0	1271
2010	0	0	15	0	0	0	16	0	0	0	659	0	0	708	0	0	1398
2011	0	0	63	0	0	0	6	0	0	0	862	0	0	782	0	0	1713
2012	0	0	8	5	0	0	7	0	0	0	921	0	0	1368	0	7	2316
2013	0	0	39	1	8	0	100	0	0	0	1055	4	0	1440	2	8	2657
2014	0	0	143	8	11	19	38	0	0	0	1036	7	0	1261	1	14	2538
2015	0	0	108	14	5	14	47	0	0	0	1091	5	0	1681	8	10	2983
2016	0	353	88	2	3	3	38	0	0	0	1265	12	0	1171	0	20	2955
2017	0	519	133	4	4	2	8	0	3	72	1389	9	1	1125	3	21	3293
2018	0	574	104	9	16	2	20	0	0	199	1008	4	1	1083	2	97	3119
2019	0	588	116	27	9	6	6	0	0	348	939	119	0	932	16	49	3155
2020	0	579	123	37	3	15	18	0	0	258	1389	96	0	788	36	2	3344
2021	0	382	200	17	1	10	35	0	0	125	1617	9	0	713	14	11	3134
2022	0	253	117	21	24	6	0	0	0	136	1151	0	0	494	18	0	2220
2023	0	98	181	6	9	5	0	0	84	74	978	0	0	611	28	0	2074
2024*	0	172	73	81	7	2	0	0	63	0	632	0	3	991	7	0	2031
2025*	0	96	31	142	7	1	0	1	61	56	677	0	38	518	1	1	1630

*** Preliminary figures.**

Table 8-3 . Greenland halibut in subareas 1 and 2. Nominal catch (t) by countries in Division 2a as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
1984	0	0	0	265	138	0	0	0	0	0	3062	0	0	5459	0	1	8925
1985	0	0	0	254	239	0	0	0	0	0	4691	0	0	6894	0	2	12080
1986	0	0	6	97	13	0	0	0	0	0	6302	0	0	5553	0	6	11977
1987	0	0	0	75	13	0	0	0	0	0	5550	0	0	4739	0	54	10431
1988	0	0	177	150	67	0	0	0	0	0	7671	0	0	4002	0	58	12125
1989	0	0	67	104	31	0	0	0	0	0	6265	0	0	4964	0	6	11437
1990	0	0	133	12	49	0	0	0	0	0	7605	0	0	1246	0	1	9046
1991	0	1400	314	21	119	0	0	0	0	0	11189	0	0	305	0	1	13349
1992	0	0	16	1	108	13	0	0	0	0	3586	0	15	58	0	1	3798
1993	0	0	29	14	78	8	0	0	0	0	7977	0	17	210	0	2	8335
1994	0	0	0	33	47	3	0	4	0	0	6382	0	26	67	0	14	6576
1995	0	0	0	30	174	12	0	2	0	0	6354	0	60	227	0	85	6944
1996	0	0	0	34	219	123	0	0	0	0	9508	0	55	466	4	335	10744
1997	0	0	0	23	253	0	0	0	0	0	5702	0	41	334	1	46	6400
1998	0	0	0	16	67	0	0	1	0	0	6661	0	80	530	5	115	7475
1999	0	0	0	20	0	25	0	2	0	0	13064	0	33	734	1	108	13987
2000	0	0	0	10	43	0	0	0	0	0	7536	0	18	690	1	108	8406
2001	0	0	0	49	122	0	9	1	0	0	8935	0	13	726	5	86	9946
2002	0	0	0	9	7	22	4	0	0	0	5877	0	3	849	0	40	6811
2003	0	0	390	5	2	12	0	0	0	0	6713	0	10	1762	14	63	8971
2004	0	0	0	4	0	0	9	0	0	0	11704	0	24	810	4	1	12556
2005	0	0	0	3	31	0	0	0	0	0	11216	0	11	1406	0	23	12690
2006	0	0	175	0	38	0	7	0	0	0	8897	0	6	950	0	8	10081

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
2007	0	0	162	2	37	0	12	0	0	0	6761	0	2	489	0	10	7475
2008	0	0	646	4	38	0	23	0	0	0	5566	1	1	1170	3	16	7468
2009	0	0	379	0	13	0	10	0	0	0	6456	0	9	1531	0	60	8458
2010	0	0	255	0	102	15	0	0	0	0	6426	0	0	4757	0	22	11577
2011	0	0	467	0	45	4	1	0	0	0	7080	0	0	3643	0	4	11244
2012	0	0	553	0	37	12	6	0	0	0	7934	0	0	3878	0	14	12434
2013	0	0	739	0	150	22	6	0	0	0	8213	0	2	4144	0	75	13351
2014	0	0	741	0	255	1	48	0	0	0	8640	0	0	4800	0	184	14669
2015	0	0	614	2	221	2	51	0	0	0	8742	0	1	3691	0	79	13403
2016	0	0	986	6	216	14	37	0	0	0	10073	6	7	1797	0	19	13161
2017	0	0	841	0	161	21	2	0	0	0	10126	0	7	1853	0	16	13027
2018	0	0	296	1	104	9	4	0	0	1	11255	2	5	1398	0	6	13081
2019	0	0	232	15	95	16	4	0	0	0	12143	3	7	2754	3	12	15284
2020	0	0	385	21	34	28	1	0	0	0	11430	0	8	2690	0	3	14600
2021	0	0	530	20	123	4	5	0	0	0	9647	0	0	842	5	109	11285
2022	0	0	888	10	27	4	27	0	0	0	9814	0	0	740	0	25	11535
2023	0	0	775	18	14	2	33	0	0	0	11421	0	0	1248	4	24	13539
2024*	0	0	969	26	35	13	13	0	0	0	8885	0	21	1101	1	5	11069
2025*	0	0	1501	30	13	58	0	0	0	0	8613	0	14	2437	3	0	12669

*** Preliminary figures.**

Table 8-4 . Greenland halibut in subareas 1 and 2. Nominal catch (t) by countries in Division 2b as officially reported to ICES.

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
1984	0	0	0	1900	0	0	0	0	0	0	80	0	0	9641	0	5	11626
1985	0	0	0	3746	0	0	0	0	0	0	71	0	0	3221	0	2	7040
1986	0	0	36	2620	0	0	0	0	0	0	944	0	0	6032	0	0	9632
1987	0	0	0	1947	0	0	0	0	0	0	572	0	0	4735	0	17	7271
1988	0	0	0	590	0	0	0	0	0	0	239	0	0	5008	0	19	5856
1989	0	0	0	496	0	0	0	0	0	0	533	0	0	3366	0	0	4395
1990	0	0	23	942	0	0	0	0	0	0	7706	0	0	3197	0	9	11877
1991	11	1000	0	80	0	0	0	0	0	0	14369	0	0	1663	132	1	17256
1992	0	0	0	12	3	0	0	0	0	0	1732	0	16	193	23	9	1988
1993	2	0	0	8	2	0	0	0	0	30	649	0	26	158	0	14	889
1994	4	0	1	46	8	0	0	1	0	4	881	0	10	41	1	64	1061
1995	0	0	0	5	0	0	0	0	0	0	1662	0	24	297	1022	37	3047
1996	0	0	0	47	0	0	0	0	0	0	1204	0	24	912	196	39	2422
1997	0	0	12	33	0	0	0	2	0	0	1349	12	9	534	156	46	2153
1998	0	0	10	18	0	0	0	1	0	0	915	31	19	1638	254	110	2996
1999	0	0	3	14	0	0	0	0	0	0	839	8	16	1886	318	31	3115
2000	0	0	0	5	2	0	0	1	0	0	526	3	19	2709	374	46	3685
2001	0	0	0	9	0	0	0	0	0	0	1103	2	22	3017	413	42	4608
2002	0	219	0	30	0	0	0	6	0	0	432	5	11	3568	178	29	4478
2003	0	0	21	13	0	0	0	0	0	0	541	4	9	1735	216	35	2574
2004	0	0	0	5	0	0	0	0	0	0	1369	1	26	3219	182	39	4841
2005	0	170	0	5	0	0	0	0	0	0	1223	0	12	2882	660	21	4973
2006	0	0	12	7	8	0	0	0	0	196	1647	201	20	4479	2	2	6574

Year	Denmark	Estonia	Faroe Islands	Germany	France	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia	Spain	United Kingdom	Total
2007	0	0	23	6	2	0	0	0	0	0	955	200	45	5557	11	5	6804
2008	0	0	4	1	2	0	0	0	0	0	1229	200	45	3734	109	10	5334
2009	0	0	10	19	3	0	0	2	0	0	1256	204	228	1321	202	8	3253
2010	0	0	2	14	0	0	0	0	0	0	615	3	11	1423	188	4	2260
2011	0	0	8	80	1	0	0	0	0	234	406	169	21	2628	144	36	3727
2012	0	0	2	35	3	0	0	0	0	0	476	22	1	4795	186	14	5534
2013	0	0	5	48	10	0	0	1	0	0	1136	26	5	4724	10	9	5974
2014	0	0	3	25	3	4	0	0	0	0	1321	12	0	4000	22	14	5404
2015	0	0	2	17	4	0	0	0	0	0	1042	8	0	7581	17	25	8696
2016	2	0	4	1	10	1	0	0	0	0	1594	8	12	7593	27	17	9269
2017	0	4	19	17	12	3	0	0	0	0	2226	17	5	7737	33	46	10119
2018	2	0	1	40	30	9	0	0	0	6	2611	21	0	9590	58	31	12399
2019	0	0	2	2	1	1	0	0	0	0	1784	0	1	8512	68	14	10385
2020	1	0	6	15	2	5	0	0	0	3	1707	1	1	8788	60	40	10629
2021	1	0	19	51	13	0	0	0	0	0	2744	5	0	10839	106	57	13835
2022	0	0	47	63	35	40	0	0	0	0	2835	0	0	10512	145	89	13766
2023	1	0	70	53	38	4	0	0	0	1	1800	0	0	9458	40	49	11514
2024*	0	0	20	79	41	1	0	0	6	0	1772	0	20	7489	48	29	9505
2025*	0	0	36	36	18	0	0	0	0	0	639	0	2	5485	72	66	6354

*** Preliminary figures.**

Table 8-5. Greenland halibut in subareas 1 and 2. Landings by gear (t).

Year	Gillnet	Longline	Trawl	Danish seine	Other
1984	1198	3760	16072	9	7
1985	1668	2484	15532	2	83
1986	1637	2626	18501	4	0
1987	2021	2198	14456	7	61
1988	2691	2381	14226	21	3
1989	1282	1738	15304	NA	29
1990	1264	2322	18539	0	430
1991	1904	4652	26698	53	10
1992	1598	1913	5030	33	28
1993	1497	3047	7359	29	NA
1994	1548	2319	5330	29	0
1995	1588	4167	5902	68	8
1996	1495	4582	8123	87	60
1997	998	3388	4984	15	25
1998	1327	3834	6660	25	46
1999	2570	6842	9970	75	61
2000	1765	4972	7431	62	67
2001	2111	6239	7832	124	67
2002	1737	5273	6120	117	46
2003	2049	5330	5791	242	34
2004	2384	7126	8766	614	9
2005	1842	7512	9014	441	24
2006	1503	6137	10023	205	10
2007	998	4500	9836	120	4
2008	901	3574	9318	9	8
2009	1409	4954	6567	34	17
2010	1449	5440	8166	170	10
2011	1583	5040	9807	239	15
2012	1929	5601	12337	413	5
2013	2397	5808	13600	176	0
2014	2647	6146	13628	183	8
2015	2508	6287	15778	489	18
2016	2646	7288	14771	650	30
2017	2677	7223	15832	681	27
2018	3021	7302	17423	842	11

Year	Gillnet	Longline	Trawl	Danish seine	Other
2019	3343	7029	17335	1118	0
2020	2976	6984	17542	1055	17
2021	2930	7382	17025	884	33
2022	2996	6426	17094	990	16
2023	3397	6244	16178	1293	15
2024*	2750	4754	13932	1154	16
2025*	2518	4667	12514	927	27

*** Preliminary figures.**

Table 8-6. Greenland halibut in subareas 1 and 2. Catch per unit effort and total effort.

Year	USSR catch/hour trawling (t)		Norway[10] catch/hour trawling (t)		Average CPUE		Total effort (in 1000 hrs trawling)[5]	CPUE 7+[6]	GDR[7] (catch/day tonnage (kg))
	RT[1]	PST[2]	A[8]	B[9]	A[3]	B[4]			
1965	0.80	-	-	-	0.80	-	-	-	-
1966	0.77	-	-	-	0.77	-	-	-	-
1967	0.70	-	-	-	0.70	-	-	-	-
1968	0.65	-	-	-	0.65	-	-	-	-
1969	0.53	-	-	-	0.53	-	-	-	-
1970	0.53	-	-	-	0.53	-	169	0.50	-
1971	0.46	-	-	-	0.46	-	172	0.43	-
1972	0.37	-	-	-	0.37	-	116	0.33	-
1973	0.37	-	0.34	-	0.36	-	83	0.36	-
1974	0.40	-	0.36	-	0.38	-	100	0.36	-
1975	0.39	0.51	0.38	-	0.39	0.45	99	0.37	-
1976	0.40	0.56	0.33	-	0.37	0.45	100	0.34	-
1977	0.27	0.41	0.33	-	0.30	0.37	96	0.26	-
1978	0.21	0.32	0.21	-	0.21	0.27	123	0.17	-
1979	0.23	0.35	0.28	-	0.26	0.32	67	0.19	-
1980	0.24	0.33	0.32	-	0.28	0.33	47	0.25	-
1981	0.30	0.36	0.36	-	0.33	0.36	42	0.28	-
1982	0.26	0.45	0.41	-	0.34	0.43	39	0.37	-
1983	0.26	0.40	0.35	-	0.31	0.38	58	0.32	-
1984	0.27	0.41	0.32	-	0.30	0.37	59	0.30	-
1985	0.28	0.52	0.37	-	0.33	0.45	44	0.37	-
1986	0.23	0.42	0.37	-	0.30	0.40	57	0.32	-
1987	0.25	0.50	0.35	-	0.30	0.43	44	0.35	-
1988	0.20	0.30	0.31	-	0.26	0.31	63	0.26	4.26

Year	USSR catch/hour trawling (t)		Norway catch/hour trawling (t)		Average CPUE		Total effort (in 1000 hrs trawling)	CPUE 7+	GDR (catch/day tonnage (kg))
	RT	PST	A	B	A	B			
1989	0.20	0.30	0.26	-	0.23	0.28	73	0.19	2.95
1990	-	0.20	0.27	-	-	0.24	95	0.16	1.66
1991	-	-	0.24	-	-	-	134	0.18	-
1992	-	-	0.46	0.72	-	-	20	0.29	-
1993	-	-	0.79	1.22	-	-	15	0.65	-
1994	-	-	0.77	1.27	-	-	11	0.70	-
1995	-	-	1.03	1.48	-	-	-	-	-
1996	-	-	1.45	1.82	-	-	-	-	-
1997	0.71	-	1.23	1.60	-	-	-	-	-
1998	0.71	-	0.98	1.35	-	-	-	-	-
1999	0.84	-	0.82	1.77	-	-	-	-	-
2000	0.94	-	1.38	1.92	-	-	-	-	-
2001	0.82 [11]	-	1.18	1.57	-	-	-	-	-
2002	0.85	-	1.07	1.82	-	-	-	-	-
2003	0.97 [12]	-	0.86	2.45	-	-	-	-	-
2004	0.63 [13]	-	1.16	1.79	-	-	-	-	-
2005	0.61 [12]	-	1.30	2.29	-	-	-	-	-
2006	0.57 [12]	-	0.96	2.09	-	-	-	-	-
2007	0.64 [12]	-	-	-	-	-	-	-	-
2008	0.48 [12]	-	-	-	-	-	-	-	-
2009	0.77 [13]	-	-	-	-	-	-	-	-
2010		1.57 [12]	-	-	-	-	-	-	-
2011		2.32 [12]							
2012		2.06 [12]							
2013		2.25 [12]							
2014		2.52 [12]							

[1] Side trawlers, 800–1000 hp. From 1983 onwards, stern trawlers (SRTM), 1000 hp. From 1997 based on research fishing.

[2] Stern trawlers, up to 2000 HP.

[3] Arithmetic average of CPUE from USSR RT (or SRTM trawlers) and Norwegian trawlers.

[4] Arithmetic average of CPUE from USSR PST and Norwegian trawlers.

[5] For the years 1981–1990, based on average CPUE type B. For 1991–1993, based on the Norwegian CPUE, type A.

[6] Total catch (t) of seven years and older fish divided by total effort.

[7] For the years 1988–1989, frost-trawlers 995 BRT (FAO Code 095). For 1990, factory trawlers S IV, 1943 BRT (FAO Code 090).

[8] Norwegian trawlers, ISSC-code 07, 250–499.9 GRT.

[9] Norwegian factory trawlers, ISSCFV-code 09, 1000-1999.9 GRT

[10] From 1992 based on research fishing. 1992–1993: two weeks in May/June and October; 1994–1995: 10 days in May/June

[11] Based on fishery from April-October only, a period with relatively low CPUE. In previous years fishery was carried out throughout the whole year.

[12] Based on fishery from October-December only, a period with relatively high CPUE.

[13] Based on fishery from October-November only.

Table 8-7. Greenland halibut in subareas 1 and 2. Catch history back to 1935.

Year	Norway	Russia	Other	Total	Year	Norway	Russia	Other	Total
1935	1534	NA	NA	1534	1981	3648	9276	1541	14465
1936	830	NA	NA	830	1982	2997	12394	1189	16580
1937	616	NA	NA	616	1983	4509	15152	2112	21773
1938	329	NA	NA	329	1984	3540	15181	2326	21047
1939	459	NA	NA	459	1985	5287	10237	4244	19768
1940	846	NA	NA	846	1986	7783	12200	2785	22768
1941	1663	NA	NA	1663	1987	6893	9733	2118	18744
1942	955	NA	NA	955	1988	8811	9430	1081	19322
1943	824	NA	NA	824	1989	8837	8812	704	18353
1944	678	NA	NA	678	1990	16615	4764	1176	22555
1945	1148	NA	NA	1148	1991	27585	2490	3243	33318
1946	1337	25	NA	1362	1992	7668	718	217	8603
1947	1409	28	NA	1437	1993	10379	1235	318	11932
1948	1877	110	NA	1987	1994	8428	283	515	9226
1949	198	177	NA	375	1995	9368	794	1572	11734
1950	1853	221	NA	2074	1996	11623	1576	1148	14347
1951	2438	423	NA	2861	1997	7661	1038	711	9410
1952	2576	377	NA	2953	1998	8435	2659	799	11893
1953	2208	393	NA	2601	1999	15004	3823	690	19517
1954	3674	416	NA	4090	2000	9083	4568	646	14297
1955	3010	290	NA	3300	2001	10896	4694	784	16374
1956	3493	446	NA	3939	2002	7143	5584	566	13293

Year	Norway	Russia	Other	Total	Year	Norway	Russia	Other	Total
1957	4130	505	NA	4635	2003	8215	4384	847	13446
1958	2931	1261	NA	4192	2004	13939	4662	299	18900
1959	4307	3632	NA	7939	2005	13011	4883	940	18834
1960	6662	4299	NA	10961	2006	11118	6055	703	17876
1961	7977	3836	NA	11813	2007	8230	6484	744	15458
1962	11600	1760	NA	13360	2008	7393	5294	1122	13809
1963	11300	3240	NA	14540	2009	8446	3335	1201	12982
1964	14200	26191	NA	40391	2010	7700	6888	647	15235
1965	18000	16682	NA	34682	2011	8348	7053	1283	16684
1966	16434	9768	119	26321	2012	9331	10041	912	20284
1967	17528	5737	1002	24267	2013	10404	10306	1270	21980
1968	22514	3397	257	26168	2014	10997	10061	1553	22611
1969	14856	19760	9173	43789	2015	10874	12953	1254	25081
1970	15871	35578	38035	89484	2016	12932	10561	1892	25385
1971	9466	54339	15229	79034	2017	13741	10713	1983	26437
1972	15983	16193	10872	43048	2018	14875	12071	1654	28600
1973	13989	8561	7349	29899	2019	14867	12196	1760	28823
1974	8791	16958	11972	37721	2020	14526	12265	1781	28572
1975	4858	20372	12914	38144	2021	14008	12396	1852	28256
1976	6005	16580	13469	36054	2022	13800	11746	1975	27521
1977	3017	15045	9613	27675	2023	14198	11317	1611	27126
1978	2980	14651	5884	23515	2024*	11290	9581	1735	22606
1979	2314	10311	4088	16713	2025*	9928	8440	2284	20652
1980	2528	7670	2457	12655					

*** Provisional figures.**

Table 8-8. Greenland halibut in ICES Division 4.a (North Sea). Nominal catch (t) by countries as officially reported to ICES. Not included in the assessment.

Year	Denmark	Faroe Islands	France	Germany	Greenland	Ireland	Norway	Russia	United Kingdom	Netherlands	Belgium	Iceland	Portugal	Total
1973	0	0	0	4	0	0	9	8	28	0	0	0	0	49
1974	0	0	0	2	0	0	2	0	30	0	0	0	0	34
1975	0	0	0	1	0	0	4	0	12	0	0	0	0	17
1976	0	0	0	1	0	0	2	0	18	0	0	0	0	21
1977	0	0	0	2	0	0	2	0	8	0	0	0	0	12
1978	0	0	2	30	0	0	0	0	1	0	0	0	0	33
1979	0	0	2	16	0	0	2	0	1	0	0	0	0	21
1980	0	177	0	34	0	0	5	0	0	0	0	0	0	216
1981	0	0	0	0	0	0	7	0	0	0	0	0	0	7
1982	0	0	2	26	0	0	17	0	0	0	0	0	0	45
1983	0	0	1	64	0	0	89	0	0	0	0	0	0	154
1984	0	0	3	50	0	0	32	0	0	0	0	0	0	85
1985	0	1	2	49	0	0	12	0	0	0	0	0	0	64
1986	0	0	30	2	0	0	34	0	0	0	0	0	0	66
1987	0	28	16	1	0	0	35	0	0	0	0	0	0	80
1988	0	71	62	3	0	0	19	0	1	0	0	0	0	156
1989	0	21	14	1	0	0	197	0	5	0	0	0	0	238
1990	0	10	30	3	0	0	29	0	4	0	0	0	0	76
1991	0	48	291	1	0	0	216	0	2	0	0	0	0	558

Year	Denmark	Faroe Islands	France	Germany	Greenland	Ireland	Norway	Russia	United Kingdom	Netherlands	Belgium	Iceland	Portugal	Total
1992	1	15	416	3	0	0	626	0	1	0	0	0	0	1062
1993	1	0	78	1	0	0	858	0	10	0	0	0	0	948
1994	0	103	84	4	0	0	724	0	6	0	0	0	0	921
1995	0	706	165	2	0	0	460	0	335	0	0	0	0	1668
1996	0	0	249	1	0	0	1496	0	264	0	0	0	0	2010
1997	0	0	316	3	0	0	873	0	163	0	0	0	0	1355
1998	0	0	71	10	0	10	804	0	470	0	0	0	0	1365
1999	0	0	0	1	0	18	2157	0	401	0	0	0	0	2577
2000	0	0	41	10	0	19	498	0	259	0	0	0	0	827
2001	0	0	43	0	0	10	470	0	324	0	0	0	0	847
2002	0	0	8	0	0	2	200	0	256	0	0	0	0	466
2003	0	0	1	0	0	0	453	0	122	0	0	0	0	576
2004	0	0	0	0	0	0	413	0	90	0	0	0	0	503
2005	0	0	2	0	0	0	58	0	4	0	0	0	0	64
2006	0	0	3	0	0	0	90	0	7	0	0	0	1	101
2007	0	1	0	0	0	0	133	0	7	0	0	0	0	141
2008	0	0	0	0	0	0	15	0	22	0	0	0	0	37
2009	0	9	23	0	0	0	5	0	129	0	0	0	0	166
2010	0	1	38	0	0	0	10	0	49	0	0	1	0	99
2011	0	1	39	0	0	0	95	0	44	0	0	0	0	178
2012	0	0	14	0	0	0	788	0	43	0	0	0	0	844
2013	0	0	25	0	0	0	377	0	174	0	0	0	0	577
2014	0	2	27	0	0	0	723	0	104	0	0	0	0	856

Year	Denmark	Faroe Islands	France	Germany	Greenland	Ireland	Norway	Russia	United Kingdom	Netherlands	Belgium	Iceland	Portugal	Total
2015	0	0	34	1	0	0	1151	0	127	0	0	0	0	1313
2016	0	0	31	0	0	0	983	0	120	0	0	0	0	1133
2017	0	0	20	0	0	0	753	0	73	0	0	0	0	847
2018	0	1	15	0	0	0	472	0	42	2	0	0	0	532
2019	0	0	21	0	0	0	241	0	14	4	0	0	0	281
2020	0	0	10	0	0	0	663	0	45	4	0	0	0	722
2021	0	4	19	0	0	0	0	0	121	0	0	0	0	143
2022	0	207	9	0	0	0	522	0	150	0	0	0	0	888
2023	0	61	5	0	0	0	473	0	171	0	0	0	0	709
2024*	0	44	6	0	125	0	739	0	52	0	0	0	0	966
2025*	0	73	1	0	0	0	224	0	20	0	0	0	0	318

*** Preliminary figures.**

Table 8-9. Abundance indices (in thousands) of different length groups in Russian autumn survey.

Year	(0,30]	(30,35]	(35,40]	(40,45]	(45,50]	(50,55]	(55,60]	(60,65]	(65,70]	(70,75]	(75,80]	80+	Total
1984	1138	2975	5319	9159	7185	5597	2256	1731	1539	1033	536	246	38713
1985	5606	2581	5506	7348	6676	3978	2038	1279	1154	834	414	173	37587
1986	2273	3488	6409	8074	7712	6427	2596	1263	1335	918	398	142	41034
1987	1666	2857	4025	4357	3065	1670	696	505	357	162	105	31	19496
1988	1194	1975	2647	2007	1599	1179	270	282	181	69	118	77	11599
1989	419	2180	5852	6088	3742	1990	804	490	448	233	43	30	22318
1990	254	1601	4303	3911	3608	2729	915	309	204	191	41	40	18106
1991	306	1026	3632	5059	3590	2257	639	544	153	128	56	27	17417
1992	36	879	9184	16058	12586	10043	4542	2209	1322	380	173	53	57464
1993	0	72	1456	6016	9200	5377	1954	1324	991	574	145	122	27231
1994	107	87	725	5931	6872	5827	2262	927	602	314	40	41	23736
1995	0	14	1024	10123	12263	5162	1722	1063	640	371	101	32	32516
1996	0	21	1451	17480	30966	17523	5763	1852	1029	576	151	32	76844
1997	70	121	1056	7606	16561	10309	3292	1116	943	436	107	36	41653
1998	26	166	1559	7456	19972	15019	5668	1851	869	285	105	43	53018
1999	236	131	766	5583	16452	15352	6263	2966	1435	446	194	78	49902
2000	755	708	2266	8003	17910	17443	8610	3513	2125	791	221	101	62448
2001	427	1335	4399	11113	23242	20938	9356	4117	2607	1201	518	299	79553
2002	310	1407	3845	7322	9536	5214	2657	1262	678	174	64	25	32494
2003	122	1162	3339	6484	9135	5230	3218	2948	2557	722	301	187	35403
2004	266	1529	6759	9240	13358	11174	7596	5329	3867	1819	674	506	62117
2005	136	1680	4136	8258	8866	8399	4791	3777	2361	852	293	464	44013
2006	73	1565	14827	25958	25724	18234	9501	4934	3461	1506	565	504	106850
2007	678	2394	12640	14752	15438	12187	7122	3749	2186	799	273	152	72369
2008	338	2444	10242	17093	21842	24209	18308	8870	7414	3776	1657	850	117044
2009	80	3270	22312	31713	28283	24096	16933	5995	3994	2158	706	590	140130
2010	144	3998	30662	51444	39762	32576	16815	7180	6761	3539	1334	1259	195474
2011	200	1001	18079	42924	55212	46426	38215	15612	8480	6278	3031	864	236322
2012	10	524	8728	39585	41830	33768	23212	9040	5025	3093	1598	835	167248
2013	-	-	-	-	-	-	-	-	-	-	-	-	-
2014	16	1319	8446	30085	37787	26980	16527	5917	3299	1657	571	360	132964
2015	39	1119	9310	29876	34420	24963	12575	6904	2702	820	506	183	123416

Year	(0,30]	(30,35]	(35,40]	(40,45]	(45,50]	(50,55]	(55,60]	(60,65]	(65,70]	(70,75]	(75,80]	80+	Total
2016	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	7	1270	5064	14951	24982	29977	17329	7054	3473	1502	343	387	106339
2018	-	-	-	-	-	-	-	-	-	-	-	-	-
2019	144	2186	13500	27130	28572	22536	13943	5825	3080	1654	707	466	119742
2024	1285	12941	18416	21808	20507	16015	10789	7256	5126	1434	702	189	116469

Table 8-10. Abundance indices of different length groups in Norwegian autumn slope survey (in thousands).

Year	(0,30]	(30,35]	(35,40]	(40,45]	(45,50]	(50,55]	(55,60]	(60,65]	(65,70]	(70,75]	(75,80]	(80,200]	Sum
1996	2	29	1009	10692	20030	11244	3760	1536	1014	411	133	58	49918
1997	1	80	1421	10690	19311	10802	3807	1837	1052	484	184	95	49764
1998	3	74	957	5763	14474	12658	5265	2243	1309	523	192	115	43577
1999	3	57	550	4629	13893	15236	6684	3356	2305	922	393	176	48203
2000	8	169	1121	4495	9538	11646	5816	2590	1347	590	220	111	37650
2001	22	355	1955	5980	11835	12829	6680	3084	1863	694	317	131	45746
2002	43	449	1897	5234	9620	11161	6319	2987	1571	636	239	126	40281
2003	23	748	3515	6958	10931	13029	8279	4769	2547	928	469	222	52419
2004	22	1014	3674	5504	8941	11044	6255	4019	2176	968	402	232	44251
2005	110	2128	5859	8307	8145	6792	4108	2866	1724	670	294	199	41202
2006	35	1214	5140	7416	8448	8047	5092	3315	2022	809	370	253	42162
2007	144	4034	18450	16416	10410	6954	4086	2026	1125	414	163	110	64331
2008	458	6041	12820	11714	7884	5978	3023	1743	1110	440	149	176	51538
2009	54	2645	13536	16751	11332	8344	4747	2413	1823	711	284	211	62851
2011	0	377	5536	14368	13765	10668	5352	1793	1612	881	440	330	55123
2013	4	134	2420	11053	12859	7408	3880	1389	688	357	213	115	40520
2015	9	774	3982	13688	15619	9195	4165	1859	867	440	194	151	50943
2017	18	342	2259	6006	9796	8924	5035	1841	832	259	132	125	35570
2019	0	677	4192	8117	9053	5738	3064	1215	570	222	73	84	33005
2021	86	1644	4635	10264	12302	9064	4643	2445	917	275	112	32	46418
2023	362	2698	3624	5179	6120	5472	2881	1388	557	183	44	63	28571
2025	295	2460	6264	8534	9110	9990	5792	2564	1304	400	190	62	46963

Table 8-11. Abundance indices of females of different length groups in Norwegian autumn slope survey (in thousands).

Year	(0,30]	(30,35]	(35,40]	(40,45]	(45,50]	(50,55]	(55,60]	(60,65]	(65,70]	(70,75]	(75,80]	(80,200]	Sum
1996	0	11	334	2127	4277	2893	1893	1347	942	404	133	58	14420
1997	0	42	657	2052	3711	2902	1897	1643	1008	484	182	95	14671
1998	2	26	353	1037	2785	3986	2864	2050	1281	521	192	115	15210
1999	1	11	207	880	2367	4214	3510	2996	2235	906	385	176	17889

2000	5	64	435	1083	1377	2012	2428	2109	1292	589	220	111	11725
2001	11	159	758	1407	1648	1905	2556	2595	1838	694	317	131	14020
2002	29	207	733	1243	1297	1749	2297	2352	1528	632	239	126	12434
2003	18	345	1649	2009	1670	2340	3434	4121	2493	925	469	222	19695
2004	9	445	1534	1550	1436	2113	3029	3675	2145	950	401	232	17517
2005	35	737	1910	1925	1254	1341	2093	2576	1703	668	294	199	14735
2006	19	542	2096	2163	1789	1587	2158	2890	1971	801	369	249	16634
2007	85	2111	8639	6230	2667	1620	1897	1735	1106	405	163	107	26766
2008	249	3159	5536	3703	2137	1456	1463	1577	1095	440	149	175	21137
2009	28	1052	5223	5459	3072	2176	2155	2038	1736	700	268	200	24107
2011	0	149	1623	2757	2367	1578	1063	1354	1553	875	440	330	14088
2013	0	35	492	1632	2023	1421	1004	1035	679	354	213	115	9003
2015	5	308	1385	1954	2623	2502	1694	1374	854	440	194	151	13484
2017	15	169	864	1435	1863	1725	1908	1270	820	259	132	125	10587
2019	0	321	1714	2004	1867	1530	1379	952	531	222	73	84	10678
2021	40	851	1775	1793	2203	1798	2152	2066	880	275	112	32	13976
2023	164	1284	1578	1298	1390	1338	1318	1187	546	183	44	63	10392
2025	134	1035	2270	1931	1575	1589	1826	1994	1263	392	190	62	14260

Table 8-12. Reference points, values, and their technical basis for NEA G. halibut.

Framework	Reference point	Value	Technical basis
MSY approach	MSY	19142 t	Maximum sustainable yield
	HR_{MSY}	0.139	HR (>=45cm) leading to MSY
Precautionary approach	B_{lim}	33391 t	Lowest modelled mature female substock biomass
	B_{pa}	46747 t	B_{lim} x 1.4
	$B_{trigger}$	46747 t	B_{pa}
	HR_{lim}	0.165	HR (>=45cm) leading to P(SSB<B_{lim})=0.5
	HR_{pa}	0.145	HR(>=45cm), when ICES AR is applied, leading to P(SSB > Blim) = 0.05

Table 8-13. Greenland halibut in ICES subareas 1 and 2 (Northeast Arctic). Annual catch scenarios for 2027. All weights are in tonnes. The advice basis using HRMSY and two other scenarios are listed in the first column. Columns thereafter: total allowable catch (TAC), harvest rate (HR) for ≥45 cm fish, female spawning stock biomass (SSB) in the beginning of 2028.

Basis	Total catch (2027)	HR (2027)	SSB (2028)	% Biomass change *	% TAC change **	% Advice change ***
Advice basis						
HR_{MSY}	19610	0.139	51979	-1.2	3.2	31.7
Other scenarios						
HR=0	0	0	61249	16.4	-100	-100
HR_{MSY} + expected catch over TAC****	21360	0.151	51152	-2.8	12.4	43.4

* SSB start of 2028 relative to end of 2026.

** Advice value for 2027 relative to the TAC value in 20226 (19 000 tonnes).

*** Advice value for 202 7 relative to the advice value for 202 6 (14891 tonnes) .

****** Assuming that TAC for 2027 is set equal to advice, but accounting for the 2020-2025 average catch over TAC (1750 tonnes)**

Table 8-14. Greenland halibut in ICES subareas 1 and 2 (Northeast Arctic). Annual catch scenarios for 2028. All weights are in tonnes. The advice basis using HRMSY and three other scenarios are listed in the first column. Columns thereafter: total allowable catch (TAC), harvest rate (HR) for ≥45 cm fish, female spawning stock biomass (SSB) in the beginning of 2029.

Basis	Total catch (2028)	HR (2028)	SSB (2029)	% Biomass change *	% TAC change **	% Advice change ***
Advice basis						
HR_{MSY}	19914	0.139	51828	-1.5	4.8	33.7
Other scenarios						
HR=0	0	0	71062	35	-100	-100
HRMSY + expected catch over TAC****	21664	0.153	50154	-4.7	14.0	45.5

* SSB start of 2029 relative to end of 2026, i.e the cumulative change over the 2-year advice period.

** Advice value for 2027 relative to the TAC value in 2024 (19 000 tonnes).

*** Advice value for 202 7 relative to the advice value for 202 4 (14 891 tonnes) .

****** Assuming that TAC for 2028 is set equal to advice, but accounting for the 2020-2025 average catch over TAC (1750 tonnes)**

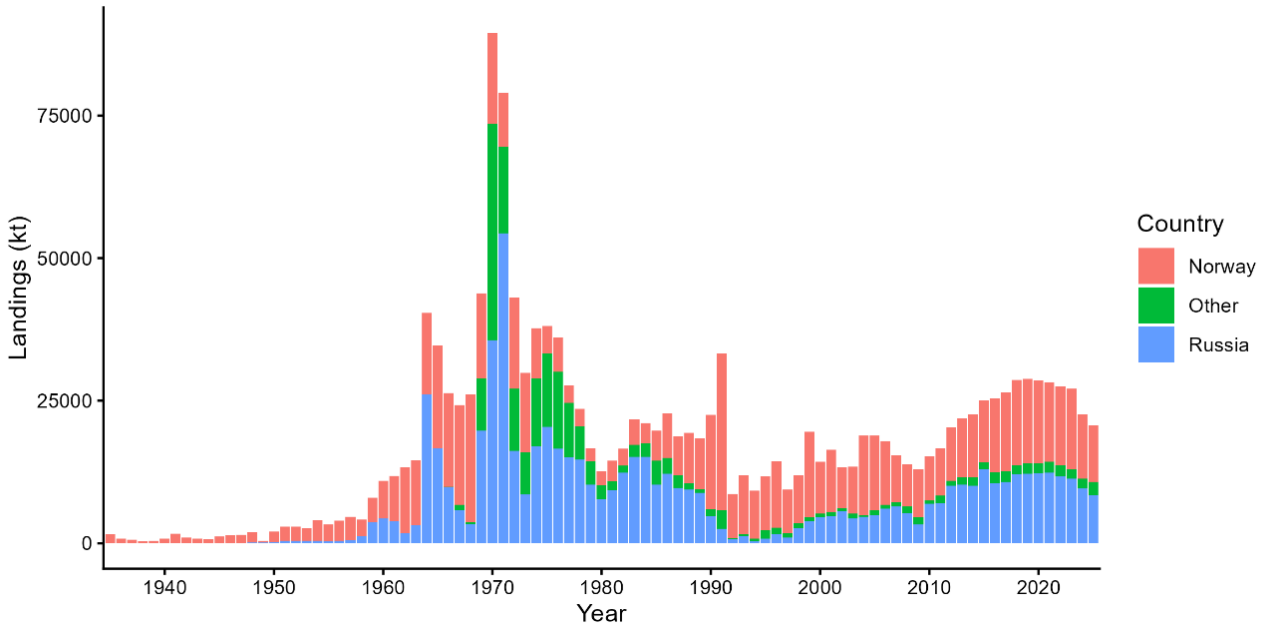

Figure 8 - 1 . NEA Greenland halibut landings. Historical landings (Nedreaas and Smirnov 2003 and AFWG).

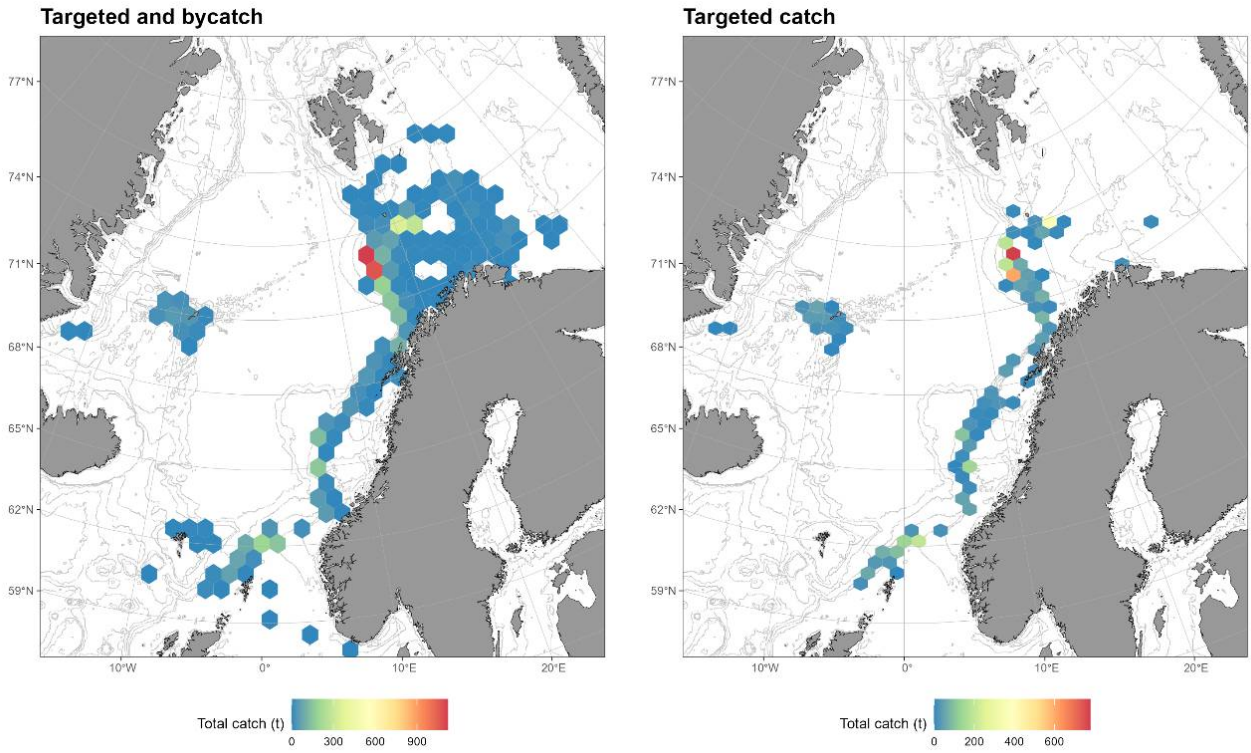

Figure 8 - 2 . Spatial distribution of Greenland halibut catches in 2025 according to Norwegian electronic logbooks, in all registered fisheries including bycatch (A), and catches where Greenland halibut make more than 50% of the total catches (B).

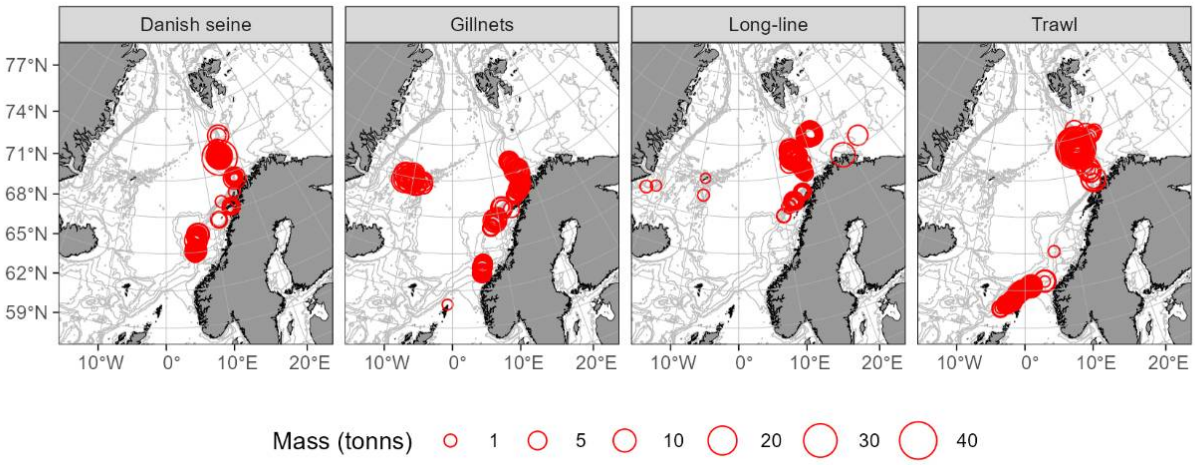

Figure 8 - 3 . Spatial distribution of catches where Greenland halibut make more than 50% of the total catches, according to Norwegian electronic logbooks from 2025. Bubble area is proportional to the size of single catches expressed in metric tonnes.

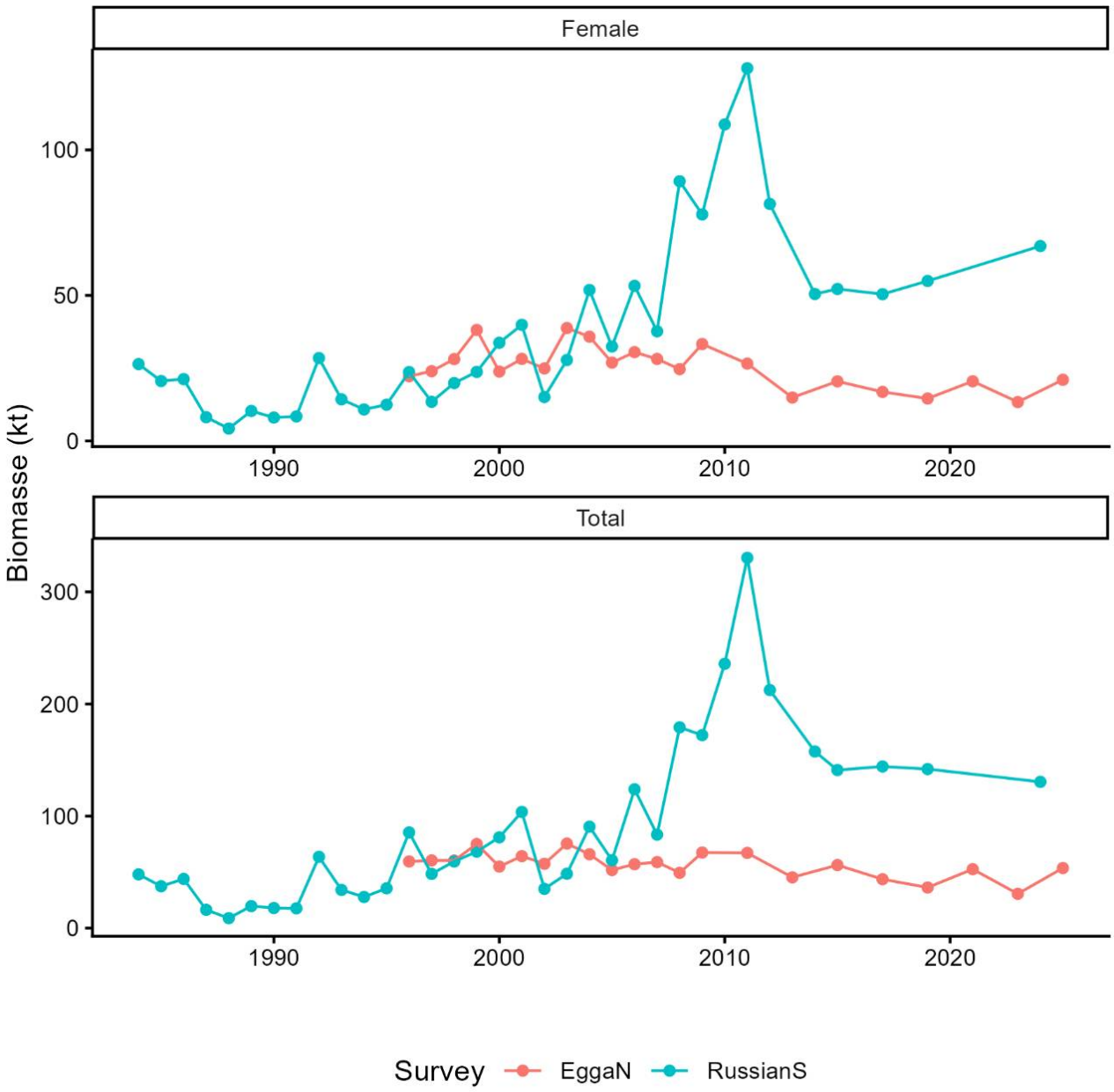

Figure 8 - 4 . NEA Greenland halibut. Total biomass estimates from Russian autumn survey and the Norwegian slope survey (for females (top panel) and sexes combined (bottom panel)). Note that the Norwegian survey is run every other year since 2009.

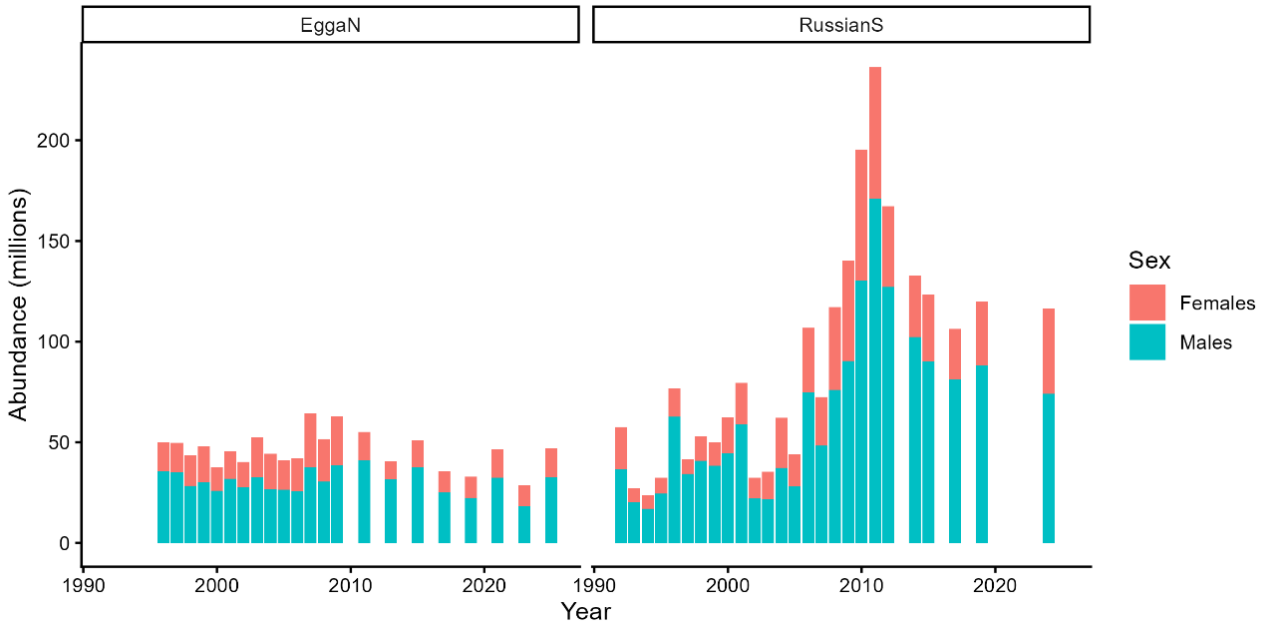

Figure 8 - 5 . Greenland halibut abundance by sex for Russian autumn survey (Russkikh and Smirnov, WD16 AFWG 2016) and Norwegian slope survey. Russian data from 1992 and onwards are revised in 2021 (Russkikh WD12).

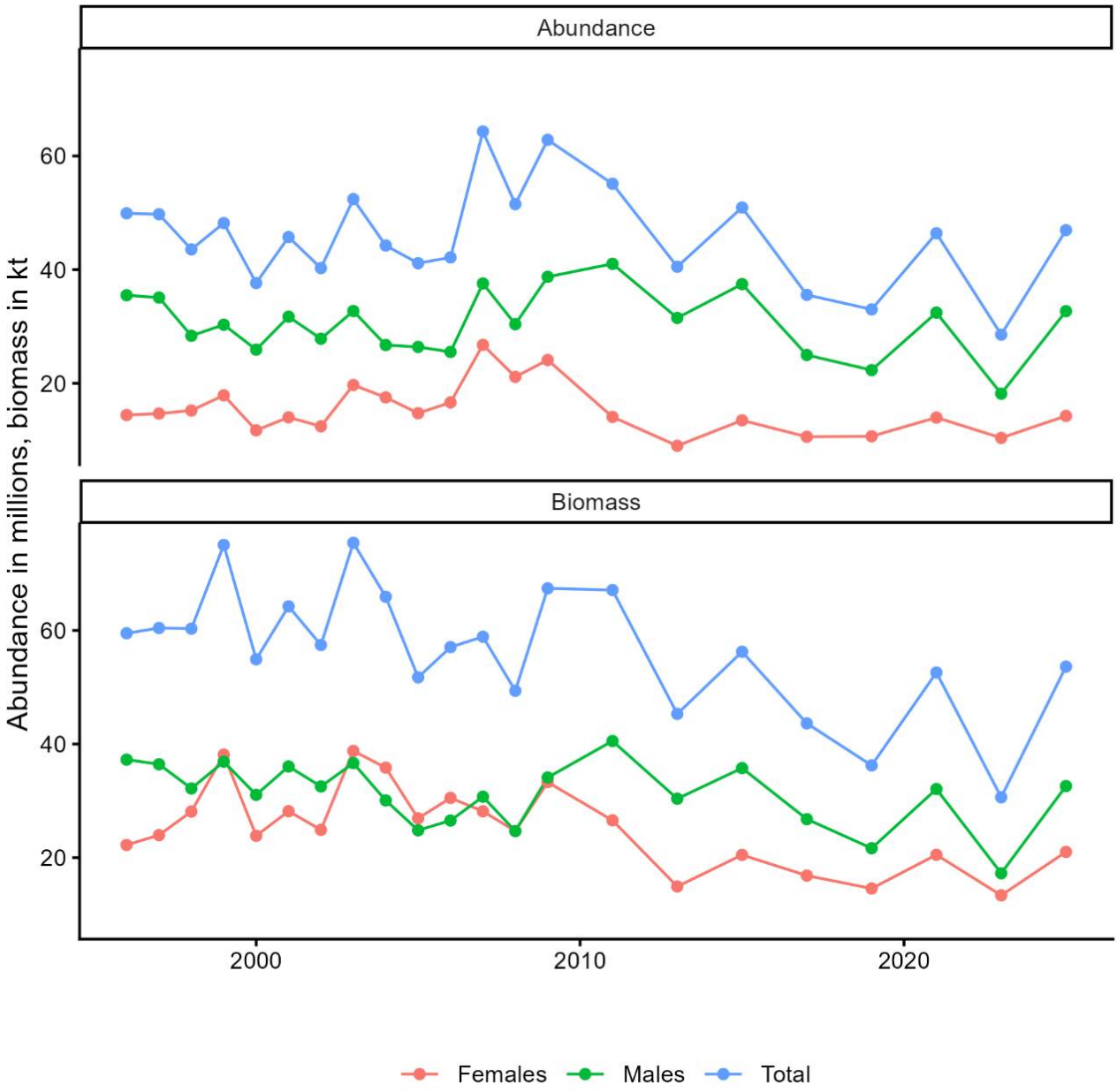

Figure 8 - 6 . Estimated Greenland halibut abundance (upper panel) and biomass (lower panel), by sex, from the Norwegian autumn slope survey (EggaN).

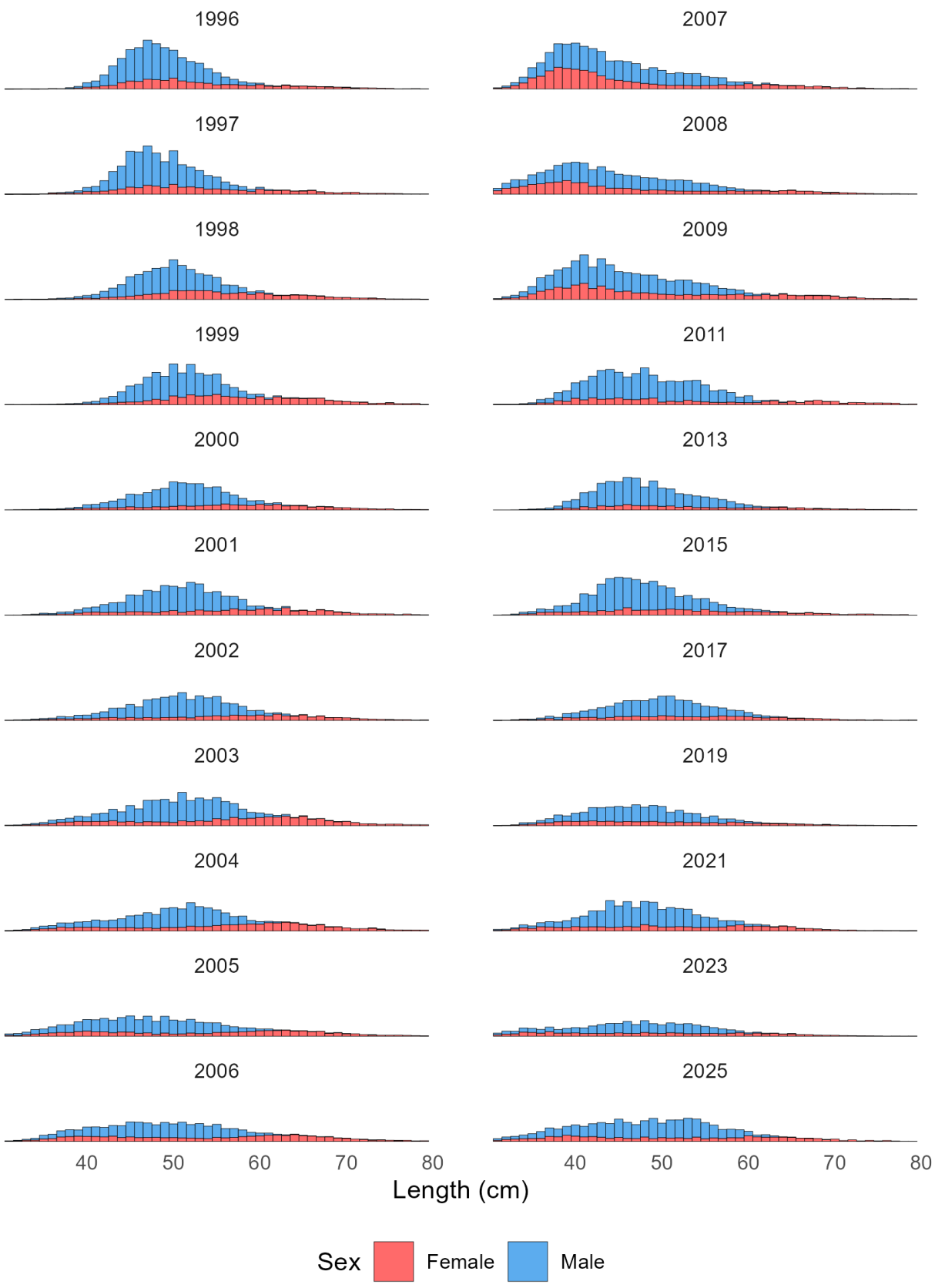

Figure 8 - 7 . Length frequency distribution in the EggaN abundance index. Note biennial surveys after 2009.

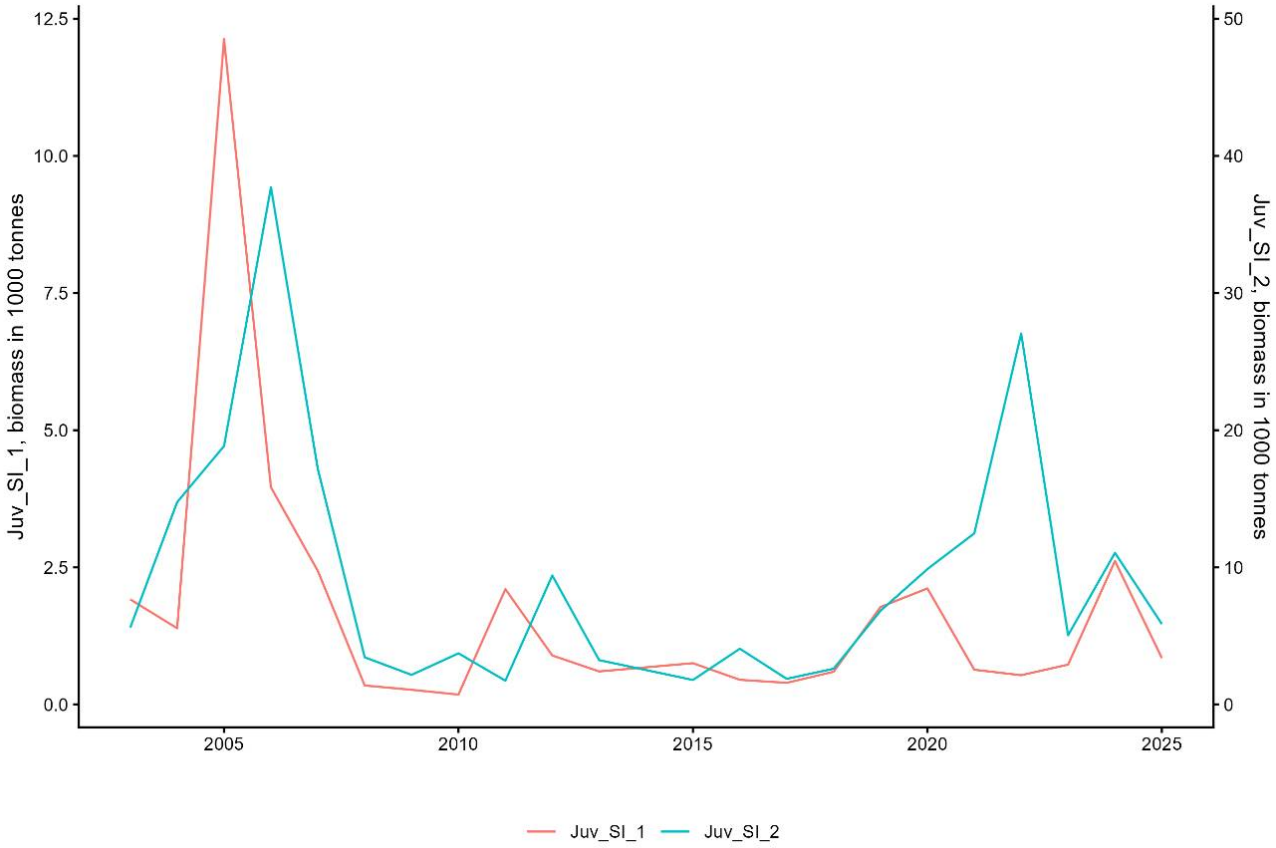

Figure 8 - 8 . Total juvenile biomass indices Eco_SI_1 (10-17cm) and Eco_SI_2(18-27cm) (sex distribution is assumed 50/50 in the juvenile area) for Greenland halibut based on the Barents Sea Ecosystem Survey (A5216).

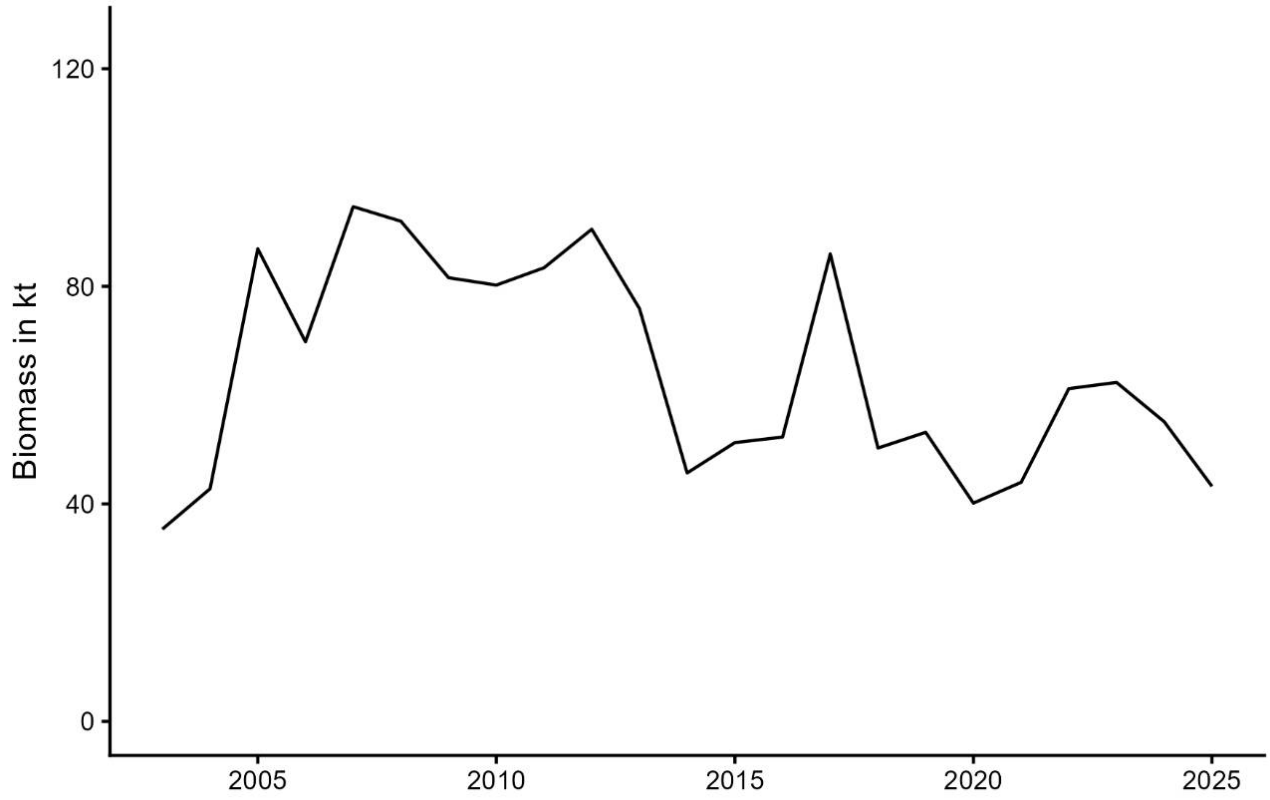

Figure 8 - 9 . EcoS biomass index for Greenland halibut in the Barents Sea Ecosystem Survey (A5216).

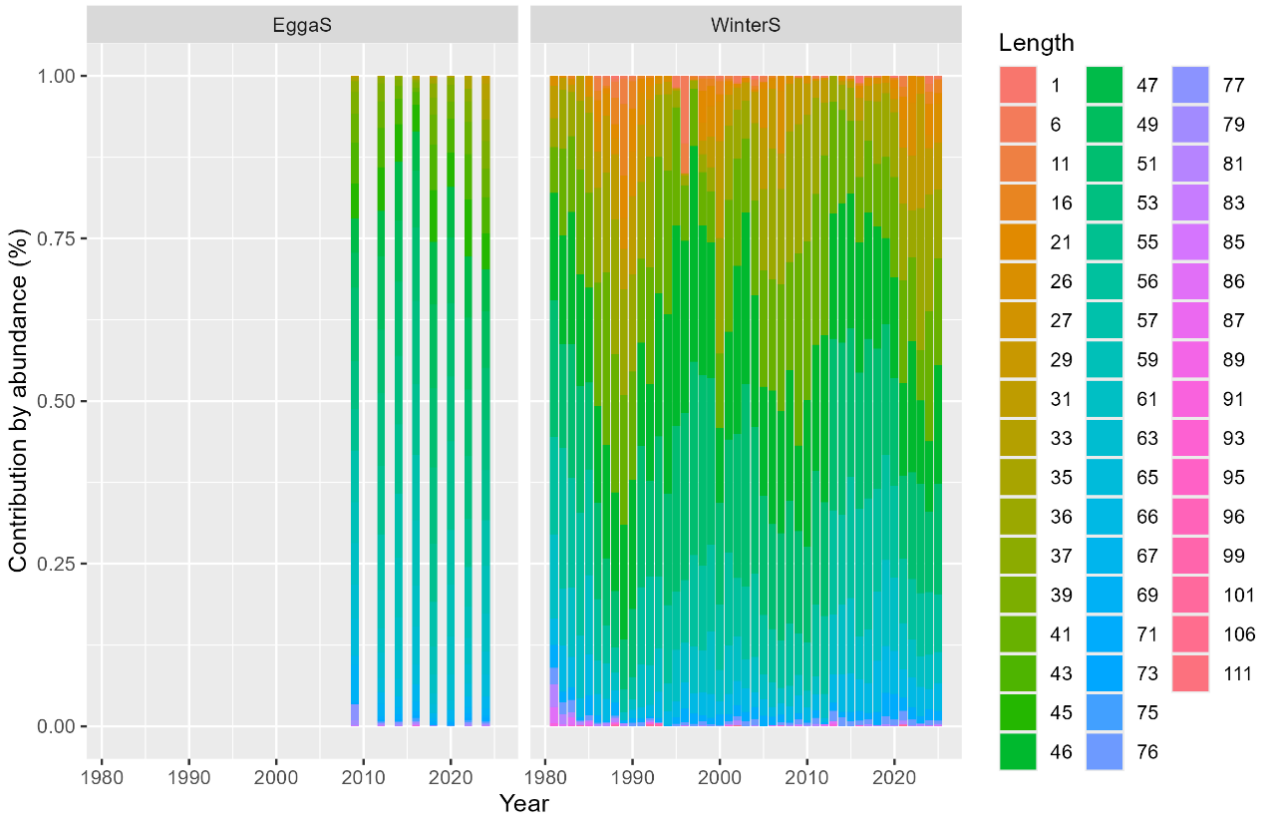

Figure 8 - 10 . Length distributions from survey data: EggaS (left) and WinterS (right).

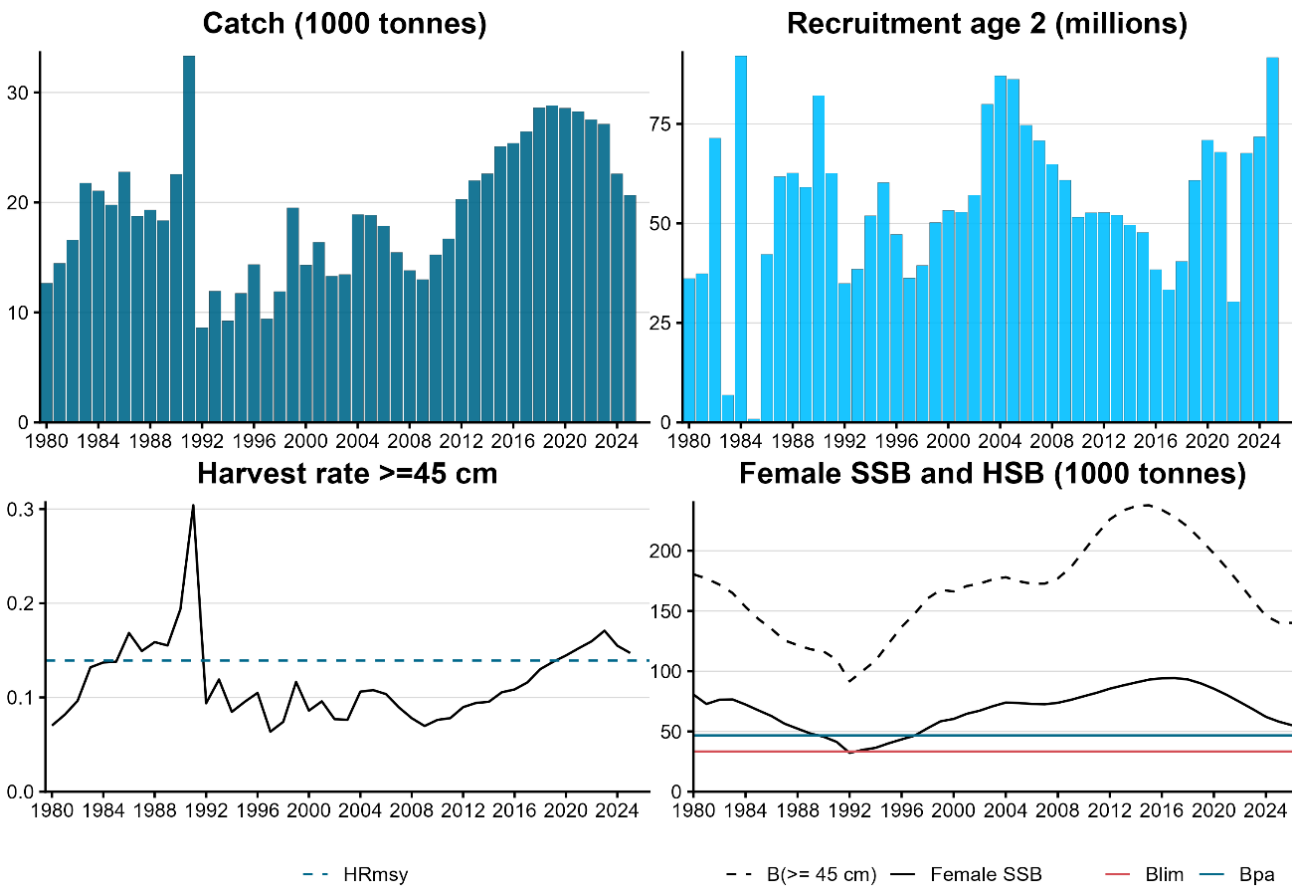

Figure 8 - 11 . From top left to bottom right: Catch (1000 tonnes), recruitment estimate (in millions) for 2year olds, harvest rate and Spawning stock biomass (SSB) and total stock biomass (TSB) for Greenland halibut as estimated by the GADGET model.

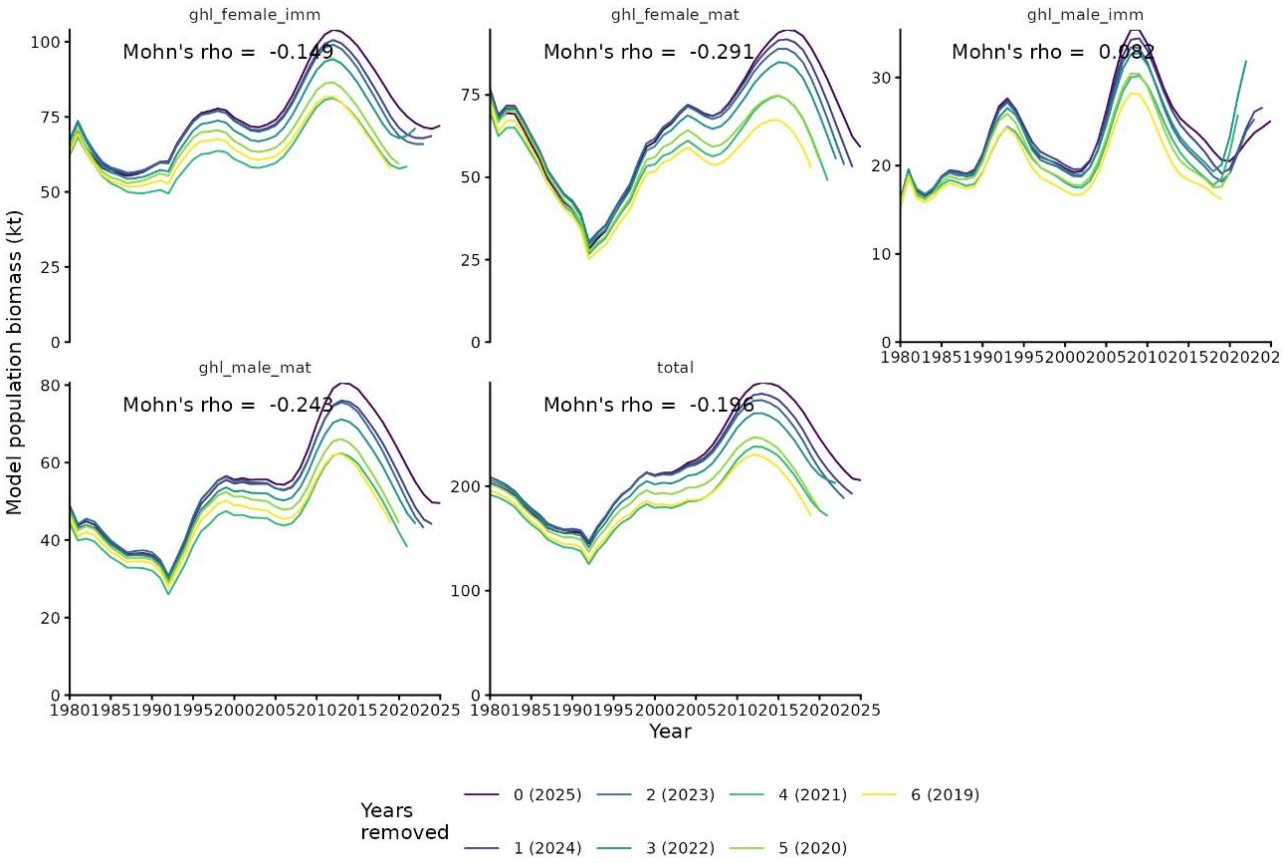

Figure 8 - 12 . Retrospective analysis using model biomass for each sub-stock and total biomass. Colours are scaled to the number of years removed.

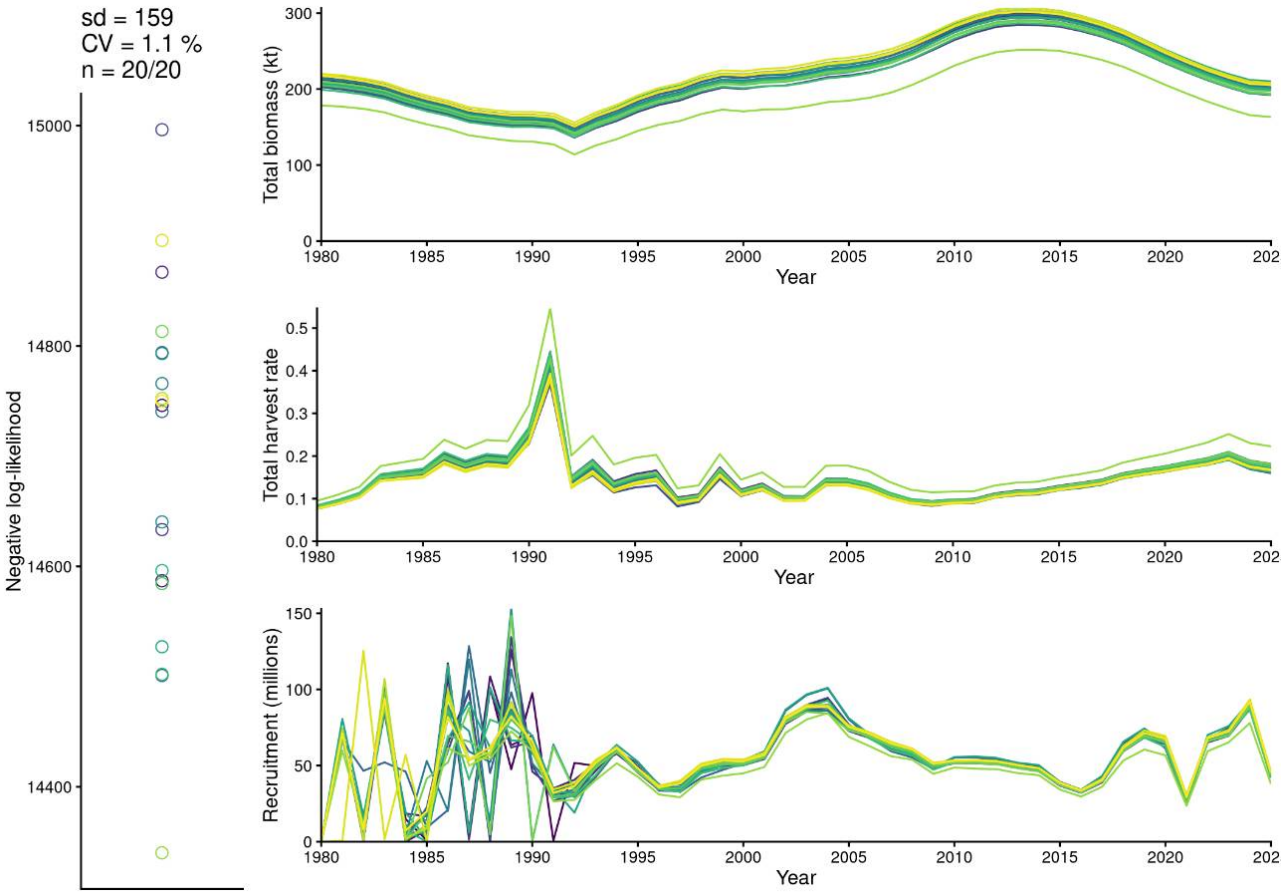

Figure 8 - 13 . Jitter results for the model. Negative log-likelihood scores of jitter runs are shown on the left together with standard deviation and CV (in percentage). Total biomass, harvest rate and recruitment are on top of each other on the right. Colour indicates the run number and is standardized across all panels.

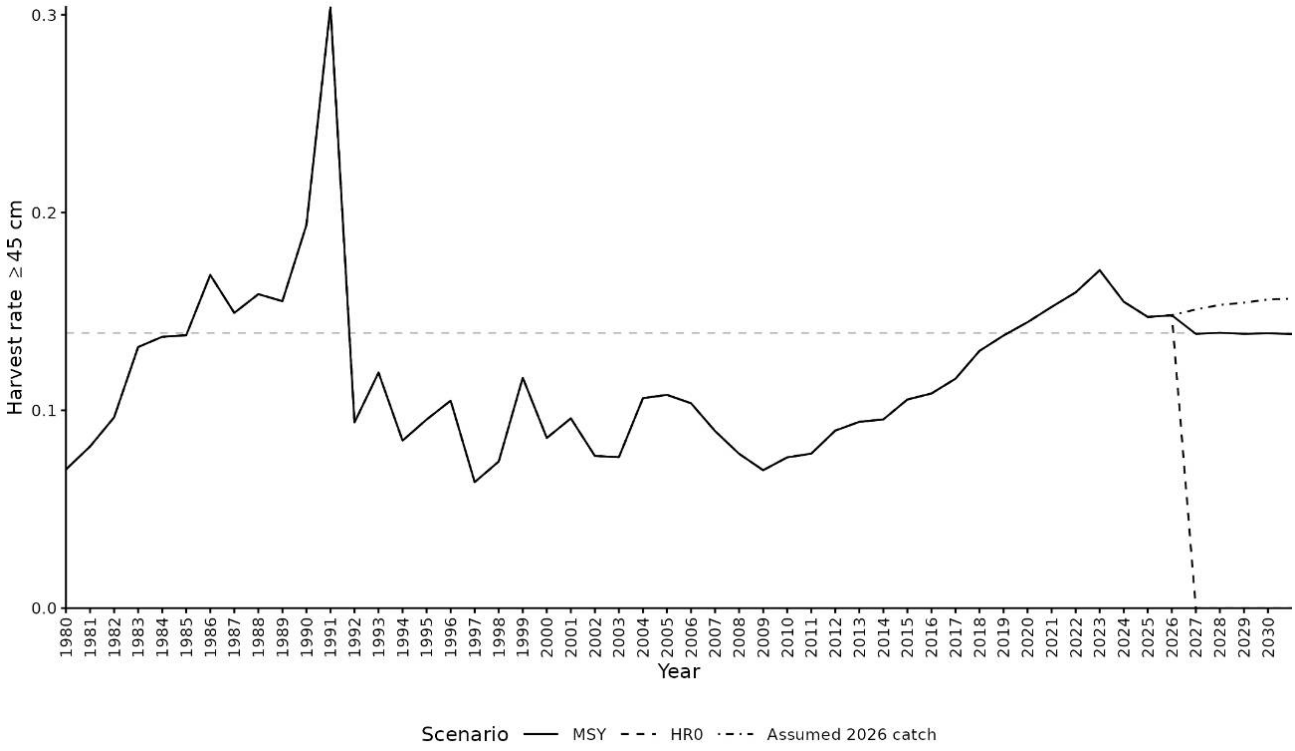

Figure 8-14. Internal harvest rates of short-term projection scenarios. Harvest rates are influenced by Bpa.

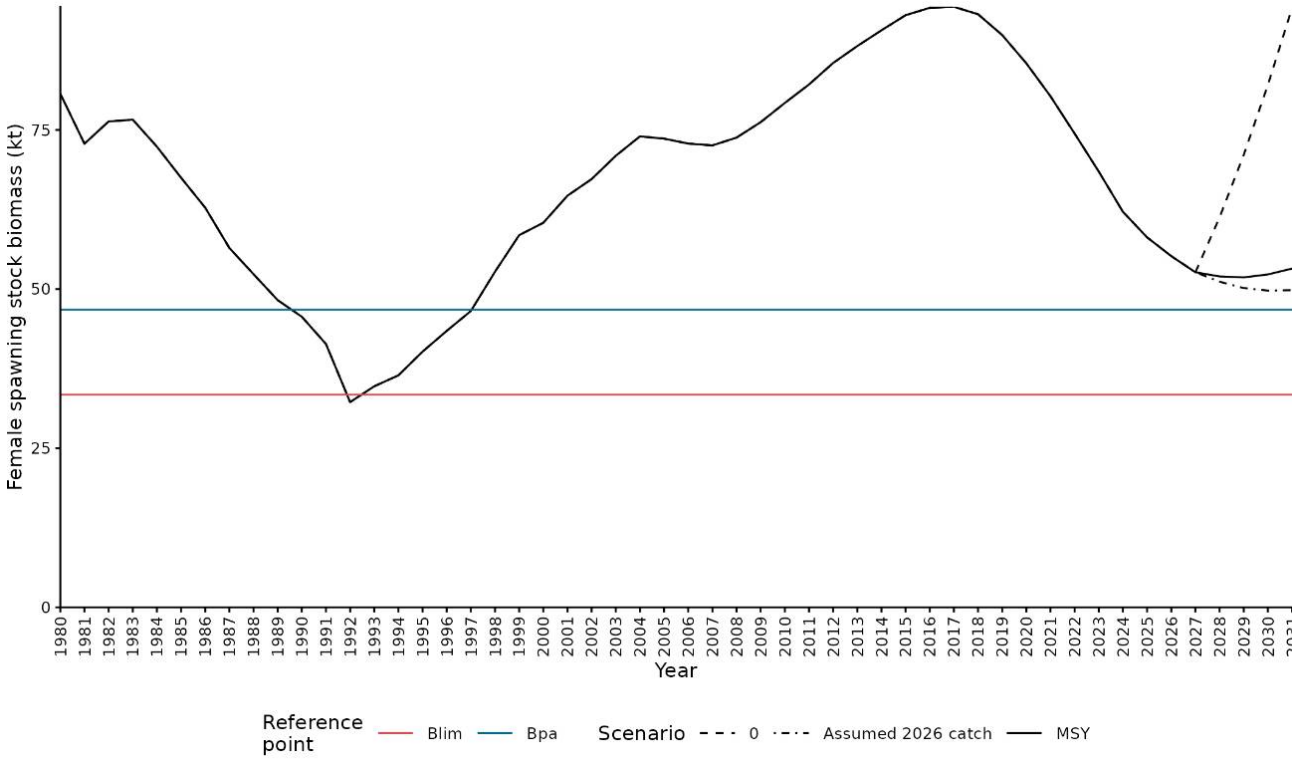

Figure 8 - 15 . Female spawning stock biomass (SSB) of short-term projection scenarios.

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1 The onshore and the at-sea sampling programs coordinated by the IEO were suspended in most of 2020, due notably to administrative problems and to a lesser extend to COVID-19. This affected all stocks. Both sampling programmes are hired by IEO through call for tenders addressed to specialized companies. The public tender launched in 2019 (to start in 2020) was declared void, having to be re-launched again. This second launch was delayed as a result of the paralysis of public activity during the state of alarm due to the COVID-19 pandemic and could only be reopened in June-July. Given that the process of awarding the contract by public tender takes three-four months under normal conditions, it was finally resolved in December 2020 and signed in January 2021. Since then, all activities have been resumed. The sampling to obtain the biological variables of the population (mainly reproduction and growth) is normally carried out in the IEO laboratories. This activity has also faced problems in 2020. On the one hand the administrative and financial difficulties of the IEO prevented the purchasing of samples in the market and on the other hand the three months closure of the labs (15 March to 21 June) due to COVID-19 did not allow for a normal activity.

2 Greenland halibut (*Reinhardtius hippoglossoides*) in subareas 1 and 2 (Northeast Arctic); ghl.27.1-2.



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