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Advice on fishing opportunities for Northeast Arctic cod in 2026 in ICES subareas 1 and 2

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Advice on fishing opportunities for Northeast Arctic cod in 2026 in ICES subareas 1 and 2

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Content

Stock Name: Northeast Arctic cod (ICES subareas 1 and 2)

Advice on fishing opportunities

The Joint Russian-Norwegian Arctic Fisheries Working Group (JRN-AFWG) advises that when the Joint Norwegian–Russian Fisheries Commission management plan is applied, catches in 2026 should be no more than 269 440 tonnes.

Stock development over time

Fishing pressure on the stock in 2024 was above F_{pa} and above the F_{mgt} range, but below F_{lim}. The spawning-stock biomass in 2025 is below MSY $B_{trigger}$ and B_{pa}, but above B_{lim}.

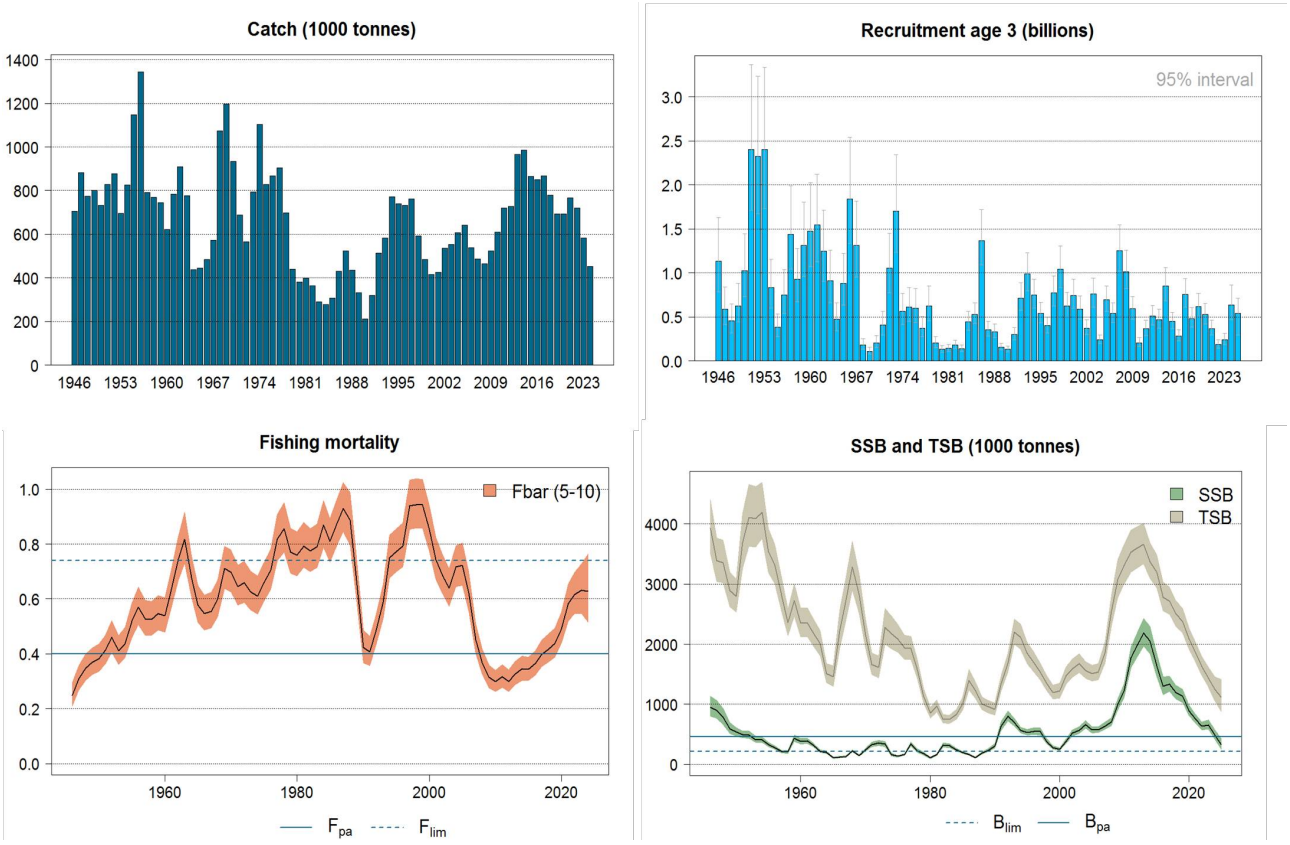

Figure 1. Cod in ICES subareas 1 and 2 (Northeast Arctic). Catch, recruitment, F, SSB and TSB (total stock biomass, age 3+) with 95 % confidence levels. The biomass reference points relate to SSB. For this stock, F_{mgt} ranges from 0.40 to 0.60, and there are three SSB_{mgt} values (460 000, 920 000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

Catch scenarios

Table 1. Cod in ICES subareas 1 and 2 (Northeast Arctic). Assumptions made for the interim year and in the forecast. SSB, catch in tonnes, and recruitment in thousands.

Variable	Value	Notes
F ages 5–10 (2025)	0.511	TAC constraint
SSB (2026)	325 486	Short-term forecast
R age 3 (2025)	537 000	From recruitment model
R age 3 (2026)	378 000	From recruitment model
R age 3 (2027)	322 000	From recruitment model
R age 3 (2028)	356 000	From recruitment model
Total catch (2025)	340 000	Corresponding to TAC

Table 2 . Cod in ICES subareas 1 and 2 (Northeast Arctic). Annual catch options. All weights are in tonnes.

Basis	Total catch (2026)	F (2026)	SSB (2027)	% SSB change *	% TAC change **	% Advice change ***
Management plan^	269 440	0.367	359 319	10	- 21	-14
Other options						
F=0.40 ****	289 647	0.40	347 646	7	- 15	- 7
F = 0	0	0	527 732	62	- 100	- 100
F = 0.283 ^^	214 765	0.283	391 622	20	- 31	- 37
F = F_{2025}	354 709	0.511	311 083	- 4	4	14
F = F_{pa}	289 647	0.40	347 646	7	- 15	- 7
F_{lim}	472 332	0.74	249 215	- 23	39	52

* SSB 2027 relative to SSB 2026.

** Advice for 2026 relative to TAC for 2025 (340 000 tonnes).

*** Advice for 2026 relative to advice for 2025 (311 587 tonnes)

**** F = 0.40 corresponds to the lower bound of the F_{MSY} range (0.40-0.60), F not reduced for SSB being below B_{pa} .

^ Since SSB in 2026 is below B_{pa} = 460 000 t, F = 0.40*SSB_{2026} /B_{pa} = 0.283 is used in the 3-year prediction, giving catches of 214 765, 270 953 and 322 601 tonnes in 2026, 2027 and 2028, respectively. The average of this is 269 440 tonnes. As SSB is below B_{pa} in 2026, the 20% limit on annual change in TAC does not apply.

^^F=0.283 corresponds to applying the harvest control rule without a 3-year prediction.

The advice for 2026 is 14% lower than the advice for 2025.

Basis of the advice

Table 3. Cod in ICES subareas 1 and 2 (Northeast Arctic). The basis of the advice.

Advice basis	Joint Norwegian-Russian Fisheries Commission management plan
Management plan	At the 46th meeting of the Joint Norwegian-Russian Fisheries Commission (JNRFC) in October 2016, the previously used management plan was amended, and the current plan is 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}× F_{MSY}; - if B_{pa} ≤ SSB ≤ 2×B_{pa}, then F_{tr} = F_{MSY} ; - if 2 × B_{pa} < SSB < 3 × B_{pa} , then F_{tr} = F_{MSY} × (1 + 0.5 × (SSB – 2 × B_{pa}) / B_{pa}); - if SSB ≥ 3 × B_{pa} , then F_{tr} = 1.5 × 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. In 2014, JNRFC decided that from 2015 onwards, Norway and Russia can transfer to or borrow from the following year up to 10% of the country's quota. In 2021, this was increased to 15% as an extraordinary measure for transfers between 2021 and 2022 only. ICES evaluated this harvest control rule in 2016 (ICES, 2016) and 2021 (ICES, 2021) and concluded that it is precautionary. JRN-AFWG 2025 conducted an analysis which concluded that the harvest control rule remains precautionary under current recruitment conditions (Howell et al. 2025).

Quality of the assessment

After the 2021 benchmark, the SSB has been relatively consistent from year to year, while F has been consistently revised upwards in the latest assessment. The upward revision in F is a result of a downward revision in fishable stock, resulting in at least partly from the low survey indices in 2025.

There will be work on possible model revisions prior to the 2026 assessment.

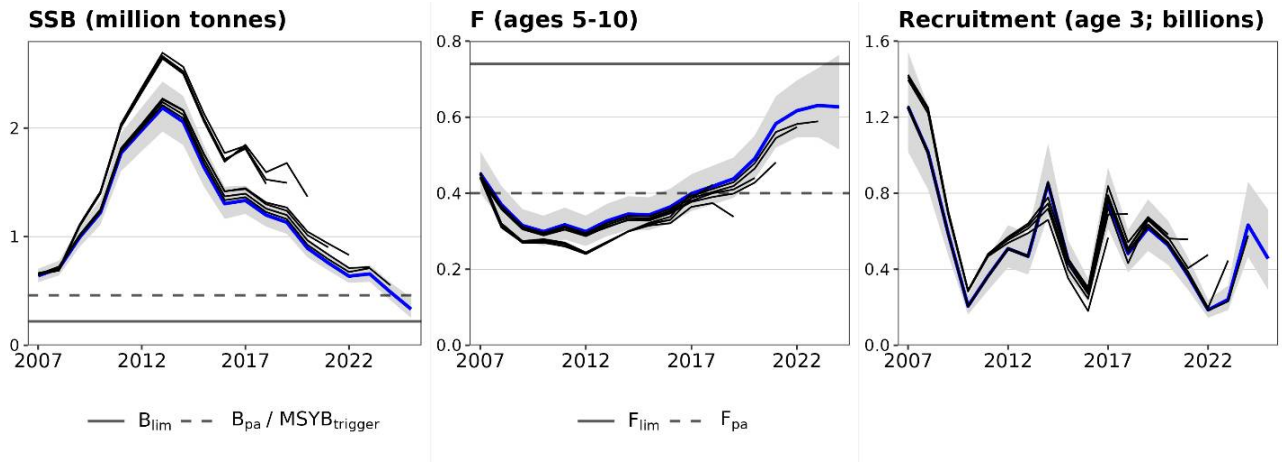

Figure 2. Cod in ICES subareas 1 and 2 (Northeast Arctic). Historical assessment results. There was a benchmark revision in 2021. The shaded areas indicate the 95% confidence intervals for the 2025 assessment.

Issues relevant for the advice

Due to the temporary suspension of Russian scientists from ICES in 2022 and the Russian decision to withdraw from ICES in 2024, this year's assessment was as in 2022-2024 conducted by a Joint Russian-Norwegian Arctic Fisheries Working Group (JRN-AFWG) consisting of scientists from VNIRO (Russia) and IMR (Norway) (Howell et al., 2025).

This advice has been conducted outside ICES and should not be considered as ICES advice. However, this assessment and advice has been produced following the methodology agreed at the ICES benchmark in 2021 (ICES, 2021).

Fisheries targeting Northeast Arctic (NEA) cod take as bycatch a considerable part of the total golden redfish (*Sebastes norvegicus)* catch, and the bycatch of the latter species is still above any sustainable catch level. Bycatch of golden redfish should be kept as low as possible . Bycatch of coastal cod should be kept as low as possible in order to avoid overfishing of the coastal cod (*Gadus morhua*) stocks (ICES, 2025).

The model for predicting recruitment was revised in 2024. The new model only uses survey data, and environmental data are no longer used (Howell et al., 2025). Estimated r ecruitment has been below the long-term average since the 2014 year class, but the 2021 year class is close to average.

The spawning stock in 2025 is estimated to be 330 000 tonnes, which is about halfway between B_{pa} and B_{lim} and the lowest since 2000. The lower 5% percentile of SSB in 2025 as estimated in the SAM assessment is 250 000 tonnes, compared to B_{lim} of 220 000 tonnes. The predicted SSB in 2026 is at the same level (325 000 tonnes), and the uncertainty of this predicted SSB in 2026 is higher than in 2025. The probability of SSB in 2026 to be below B_{lim} of 220 000 tonnes could therefore be close to 5%.

It should be noted that the actual SSB at spawning time in 2026 will depend on the TAC in 2026, as a large proportion of the fishery on spawning cod takes place before spawning time around 1 April. In the current situation with a very low SSB this could affect the SSB at spawning time in 2026 considerably. Therefore, a 2026 TAC above advice could directly result in recruitment impairment for this stock. Given the poor status of the stock, any quota over the current advice increases the risk of the spawning stock going below B_{lim}.

The TAC for 2025 was set above the scientific advice. All predictions presented here are dependent on future TACs being set equal to the scientific advice based on the agreed management plan.

The catch in 2025 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. 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 2025 of 398 000 tonnes, i. e. 58 000 tonnes above the TAC.

The predictions for 2026 and following years indicate that SSB, catches, and total stock biomass will increase slightly after 2026, but SSB will remain below B_{pa} until 2028.

Based on the HCR and the predicted SSB in 2026, $F = 0.40*SSB_{2026}/B_{pa} = 0.283$ is used as F_{target} for the advice. Applying F= 0.283 to the projected stock in 2026 would give a quota advice of 214 765 tonnes. The three-year look ahead component in the HCR results in the actual advice being higher (at 269 440tonnes) because the HCR accounts for the projection that the stock biomass is expected to increase from 2026 to 2028, assuming the catch advice is followed.

During the last decade, recruitment has been below average. The application of the 20% limit on annual TAC change in the management plan has led to fishing pressure well above the target in the HCR for several years. Maintaining the current fishing pressure will lead to a further decrease in SSB.

Exploratory analysis of one possible formulation of an HCR which is S-shaped when SSB is below B_{pa} 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 0.36, giving catches of 264 832, 317 555 and 362 712 tonnes in 2026, 2027 and 2028, respectively. The average of this is 315 033 tonnes. Note that this is not the agreed HCR and is not being suggested as the basis for 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.

Reference points

Table 4. Cod in ICES subareas 1 and 2 (Northeast Arctic). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	460 000 t	B_{pa} , and trigger point in HCR	ICES (2003, 2021)

MSY approach	F_{MSY} range	0.40 – 0.60	Long-term simulations	ICES (2003, 2021)
Precautionary approach	B_{lim}	220 000 t	Change point regression	ICES (2003, 2021)
	B_{pa}	460 000 t	The lowest SSB estimate having >90% probability of remaining above B_{lim}	ICES (2003, 2021)
	F_{lim}	0.74	F corresponding to an equilibrium stock = B_{lim}	ICES (2003, 2021)
	F_{pa}	0.40	The highest F estimate having >90% probability of remaining below F_{lim}	ICES (2003, 2021)
Management plan	SSB_{mgt}	460 000 t	Two-step (double hockey-stick) HCR, see Table 3	ICES (2017)
	F_{mgt}	0.40 – 0.60	Two-step (double hockey-stick) HCR, see Table 3	ICES (2017)

Basis of the assessment

Table 5. Cod in ICES subareas 1 and 2 (Northeast Arctic). Basis of the assessment and advice.

ICES stock data category	1
Assessment type	Age-based analytical assessment (SAM) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, ages and length frequencies from catch sampling); four survey indices (Joint bottom trawl survey Barents Sea, Jan–Mar; Joint acoustic survey Barents Sea and Lofoten, Feb–Mar; Russian bottom trawl survey, October–December; Joint Ecosystem survey); annual maturity data from the four surveys; natural mortalities from annual stomach sampling.
Discards and bycatch	Discarding is considered negligible in recent years (below 5%). Bycatch is included.
Indicators	None.
Other information	The methodology of assessment adopted by the last ICES benchmark for the stock in February 2021 (ICES, 2021) was followed, except for the recruitment predictions where the revised approach adopted in 2024 was used.
Working group	Joint Russian-Norwegian Arctic Fisheries Working Group (JRN-AFWG).

History of the advice, catch, and management

Table 6 . Cod in ICES subareas 1 and 2 (Northeast Arctic). ICES advice, agreed TACs, the official and unreported landings, and ICES catches. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official catches	Unreported landings (included in ICES catches)	ICES catches
1987	Gradual reduction in F	595000	560000	552000		523071
1988	F = 0.51; TAC (Advice November 1987, revised advice May 1988)	530000 (320000–360000)	590000 (451000)	459000		434939
1989	Large reduction in F	335000	300000	348000		332481

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official catches	Unreported landings (included in ICES catches)	ICES catches
1990	F at Flow; TAC	172000	160000	210000	25000	212000
1991	F at Flow; TAC	215000	215000	294000	50000	319158
1992	Within safe biological limits	250000	356000	421000	130000	513234
1993	Healthy stock	256000	500000	575000	50000	581611
1994	No long-term gains in increased F	649000	700000	795000	25000	771086
1995	No long-term gains in increased F	681000	700000	763000		739999
1996	No long-term gains in increased F	746000	700000	759000		732228
1997	Well below F_{med}	< 993000	850000	792000		762403
1998	F less than F_{med}	514000	654000	615000		592624
1999	Reduce F to below F_{pa}	360000	480000	506000		484910
2000	Increase B above Bpa in 2001	110000	390000			414870
2001	High probability of SSB> B_{pa} in 2003	263000	395000			426471
2002	Reduce F to well below 0.25	181000	395000		90000	535045
2003	Reduce F to below Fpa	305000	395000		115000	551990
2004	Reduce F to below Fpa	398000	486000		117000	606445
2005	Take into account coastal cod and redfish bycatches. Apply catch rule.	485000	485000		166000	641276
2006	Take into account coastal cod and redfish bycatches. Apply amended catch rule.	471000	471000		67100	537642
2007	Take into account coastal cod and redfish bycatches. F_{pa}	309000	424000		41087	486883
2008	Take into account coastal cod and redfish bycatches. Apply catch rule.	409000	430000		15000	464171
2009	Take into account coastal cod and redfish bycatches. Apply catch rule.	473000	525000		0	523431
2010	Take into account coastal cod and redfish bycatches. Apply catch rule.	577500	607000		0	609983
2011	Take into account coastal cod and redfish bycatches. Apply catch rule.	703000	703000		0	719829
2012	Take into account coastal cod and redfish bycatches. Apply catch rule.	751000	751000		0	727663
2013	Take into account coastal cod and S. marinus ^^ bycatches. Apply catch rule.	940000	1000000		0	966209
2014	Take into account coastal cod and S. marinus^^ bycatches. Apply catch rule.	993000	993000		0	986449
2015	Take into account coastal cod and S. norvegicus bycatches. Apply catch rule.	894000	894000		0	864384
2016	Take into account coastal cod and S. norvegicus bycatches. Apply catch rule.	805000	894000		0	849422

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official catches	Unreported landings (included in ICES catches)	ICES catches
2017	Take into account coastal cod and S. norvegicus bycatches. Apply management plan.	≤ 805000	890000 ^		0	868276
2018	Take into account coastal cod and S. norvegicus bycatches. Apply management plan.	712000	775000		0	778627
2019	Take into account coastal cod and S. norvegicus bycatches. Apply management plan.	674678	725000		0	692609
2020	Apply management plan	≤ 689672	738000		0	692903
2021	Apply management plan	≤ 885600	885600		0	767284^^^
2022	Apply management plan	≤ 708480	708480		0	719211^^^
2023	Apply management plan^^^	≤ 566784	566784		0	582552^^^
2024	Apply management plan^^^	≤ 453427	453427		0	453040^^^
2025	Apply management plan^^^	≤ 311587	340000			
2026	Apply management plan^^^	≤ 269440				

^ The 2017 TAC was set according to the management plan agreed by JNRFC in October 2016.

^^ Until 2014 this species was named *Sebastes marinus* , thereafter *Sebastes norvegicus* .

^^^ In 2022-2025 assessment and advice was carried out by the Joint Russian-Norwegian Arctic Fisheries working group (JRN-AFWG) which compiled catches for 2021-2024 and gave advice for 2023-2026.

History of catch and landings

Table 7. Cod in ICES subareas 1 and 2 (Northeast Arctic). History of commercial landings by country. All weights are in tonnes.

Year	Faroe Islands	France	German Dem.Rep.	Fed.Rep. Germany	Greenland	Iceland	Norway	Poland	United Kingdom	Russia**	Spain	Others	Total
1961	3934	13755	3921	8129			268377	-	158113	325780		1212	783221
1962	3109	20482	1532	6503			225615	-	175020	476760		245	909266
1963	-	18318	129	4223			205056	108	129779	417964		-	775577
1964	-	8634	297	3202			149878	-	94549	180550		585	437695
1965	-	526	91	3670			197085	-	89962	152780		816	444930
1966	-	2967	228	4284			203792	-	103012	169300		121	483704
1967	-	664	45	3632			218910	-	87008	262340		6	572605
1968	-	-	225	1073			255611	-	140387	676758		-	1074084
1969	29374	-	5907	5543			305241	7856	231066	612215		133	1197226
1970	26265	44245	12413	9451			377606	5153	181481	276632		-	933246
1971	5877	34772	4998	9726			407044	1512	80102	144802		215	689048
1972	1393	8915	1300	3405			394181	892	58382	96653		166	565287
1973	1916	17028	4684	16751			285184	843	78808	387196		276	792686
1974	5717	46028	4860	78507			287276	9898	90894	540801		38453	1102434
1975	11309	28734	9981	30037			277099	7435	101843	343580		19368	829377
1976	11511	20941	8946	24369			344502	6986	89061	343057		18090	867463
1977	9167	15414	3463	12763			388982	1084	86781	369876		17771	905301
1978	9092	9394	3029	5434			363088	566	35449	267138		5525	698715
1979	6320	3046	547	2513			294821	15	17991	105846		9439	440538
1980	9981	1705	233	1921			232242	3	10366	115194		8789	380434
1981	12825	3106	298	2228			277818		5262	83000	14500	-	399037

Year	Faroe Islands	France	German Dem.Rep.	Fed.Rep. Germany	Greenland	Iceland	Norway	Poland	United Kingdom	Russia**	Spain	Others	Total
1982	11998	761	302	1717			287525		6601	40311	14515	-	363730
1983	11106	126	473	1243			234000		5840	22975	14229	-	289992
1984	10674	11	686	1010			230743		3663	22256	8608	-	277651
1985	13418	23	1019	4395			211065		3335	62489	7846	4330	307920
1986	18667	591	1543	10092			232096		7581	150541	5497	3505	430113
1987	15036	1	986	7035			268004		10957	202314	16223	2515	523071
1988	15329	2551	605	2803			223412		8107	169365	10905	1862	434939
1989	15625	3231	326	3291			158684		7056	134593	7802	1273	332481
1990	9584	592	169	1437			88737		3412	74609	7950	510	187000
1991	8981	975		2613			126226		3981	119427***	3677	3278	269158
1992	11663	2		3911	3337		168460		6120	182315	6217	1209	383234
1993	17435	3572		5887	5389	9374	221051		11336	244860	8800	3907	531611
1994	22826	1962		8283	6882	36737	318395		15579	291925	14929	28568	746086
1995	22262	4912		7428	7462	34214	319987		16329	296158	15505	15742	739999
1996	17758	5352		8326	6529	23005	319158		16061	305317	15871	14851	732228
1997	20076	5353		6680	6426	4200	357825		18066	313344	17130	13303	762403
1998	14290	1197		3841	6388	1423	284647		14294	244115	14212	8217	592624
1999	13700	2137		3019	4093	1985	223390		11315	210379	8994	5898	484910
2000	13350	2621		3513	5787	7562	192860		9165	166202	8695	5115	414870
2001	12500	2681		4524	5727	5917	188431		8698	183572	9196	5225	426471
2002	15693	2934		4517	6419	5975	202559		8977	184072	8414	5484	445045
2003	19427	2921		4732	7026	5963	191977		8711	182160	7924	6149	436990
2004	19226	3621		6187	8196	7201	212117		14004	201525	11285	6082	489445

Year	Faroe Islands	France	German Dem.Rep.	Fed.Rep. Germany	Greenland	Iceland	Norway	Poland	United Kingdom	Russia**	Spain	Others	Total
2005	16273	3491		5848	8135	5874	207825		10744	200077	9349	7660	475276
2006	16327	4376		3837	8164	5972	201987		10594	203782	9219	6271	470527
2007	14788	3190		4619	5951	7316	199809		9298	186229	9496	5101	445796
2008	15812	3149		4955	5617	7535	196598		8287	190225	9658	7336	449171
2009	16905	3908		8585	4977	7380	224298		8632	229291	12013	7442	523431
2010	15977	4499		8442	6584	11299	264701		9091	267547	12657	9185	609983
2011	13429	1173		4621	7155	12734	331535		8210	310326	13291	17354^	719829
2012	17523	2841		8500	8520	9536	315739		11166	329943	12814	11081	727663
2013	13833	7858		8010	7885	14734	438734		12536	432314	15042	15263	966209
2014	33298	8149		6225	10864	18205	431846		14762	433479	16378	13243	986449
2015	26568	7480		6427	7055	16120	377983		11778	381778	19905	9880	864384
2016	24084	7946		6336	8607	16031	348949		13583	394107	14640	15139	849422
2017	28637	9554		5977	13638	11925	357419		16731	396180	14414	13802	868276
2018	26152	6605		9768	12743	10708	333539		11533	340364	13143	14071	778627
2019	22270	6371		8470	7553	12294	282120		11214	316813	13939	11565	692609
2020	21679	5796		9725	7391	9734	289472		12113	312683	11403	12908	692903
2021	21767	4459		6190	8246	8933	337931		5426	352064	11080	11188	767284^^
2022	21530	4988		7134	7688	6214	310145		7024	333697	12214	8577	719211^^
2023	17556	4632		5630	3994	5157	242117		5972	276923	8030	12539	582552^^
2024*	15938	4677		5632	4000	3756	171480		4832	222661	6417	13647	453040^^

* Provisional figures.

** USSR prior to 1991.

*** Includes Baltic countries.

^ Includes unspecified EU catches.

^^ In 2022-2025 assessment and advice was carried out by the Joint Russian-Norwegian Arctic Fisheries working group (JRN-AFWG) which compiled catches for 2021-2024 and gave advice for 2023-2026.

Summary of the assessment

Table 8. Cod in ICES subareas 1 and 2 (Northeast Arctic). Assessment summary. High and low refer to 95% confidence bounds.

Year	Recruitment			Spawning-stock biomass			Total catch	Fishing mortality		
	Recruitment (Age 3)	Low	High	SSB	Low	High		F (ages 5–10)	Low	High
	thousands			Tonnes			tonnes			
1946	1132096	785347	1631944	952566	798851	1135860	706000	0.249	0.21	0.296
1947	589871	414588	839262	901673	764891	1062915	882017	0.309	0.268	0.357
1948	453140	316713	648335	784027	660703	930369	774295	0.348	0.303	0.4
1949	625645	443335	882927	594525	510163	692837	800122	0.369	0.323	0.421
1950	1027105	730094	1444943	535621	470333	609971	731982	0.382	0.335	0.436
1951	2401535	1711977	3368835	495101	440478	556497	827180	0.413	0.364	0.468
1952	2324908	1670667	3235353	488885	431800	553518	876795	0.46	0.405	0.522
1953	2401079	1728785	3334816	412279	361762	469850	695546	0.411	0.362	0.468
1954	832048	599570	1154667	408274	361057	461665	826021	0.437	0.386	0.496
1955	384763	277109	534240	327990	294480	365314	1147841	0.519	0.461	0.585
1956	750267	541553	1039418	281202	253786	311579	1343068	0.571	0.506	0.643
1957	1437103	1039806	1986203	212161	191031	235628	792557	0.528	0.468	0.594
1958	926298	672476	1275922	205333	183029	230355	769313	0.525	0.467	0.591
1959	1312899	956389	1802303	434387	385656	489275	744607	0.546	0.486	0.613
1960	1476668	1075610	2027268	384713	338963	436639	622042	0.538	0.479	0.605
1961	1544416	1123882	2122304	386652	343472	435260	783221	0.634	0.569	0.706
1962	1246539	906172	1714751	315466	283877	350570	909266	0.743	0.667	0.828
1963	909759	657762	1258299	215997	194796	239505	776337	0.818	0.73	0.916
1964	474078	340404	660244	200005	179655	222660	437695	0.678	0.607	0.758
1965	879969	633733	1221879	107910	96085	121190	444930	0.577	0.514	0.649
1966	1841575	1333713	2542825	121043	109046	134360	483711	0.547	0.486	0.615
1967	1312548	950515	1812471	128802	115955	143073	572605	0.555	0.494	0.624
1968	182591	131993	252586	223126	203403	244761	1074084	0.599	0.536	0.669
1969	110956	80148	153605	149020	134555	165040	1197226	0.711	0.637	0.793
1970	206571	148988	286409	241962	218331	268151	933246	0.698	0.626	0.779
1971	407906	295599	562881	330131	294150	370513	689048	0.645	0.577	0.722
1972	1055799	770259	1447191	353264	312338	399552	565254	0.659	0.587	0.739
1973	1700630	1235098	2341630	334209	291306	383432	792685	0.627	0.56	0.702
1974	563413	414120	766527	159059	135897	186168	1102433	0.611	0.546	0.684
1975	611367	449175	832124	133590	119592	149226	829377	0.658	0.592	0.732
1976	599717	437773	821568	167156	151784	184085	867463	0.705	0.635	0.782
1977	371308	273325	504416	335912	300240	375821	905301	0.818	0.738	0.908

1978	622541	456568	848849	227783	200102	259293	698715	0.857	0.772	0.951
1979	204644	150204	278814	180283	157813	205953	440538	0.771	0.693	0.858
1980	131376	98777	174734	108445	96938	121318	380434	0.76	0.684	0.844
1981	144660	110720	189005	161401	146392	177949	399038	0.793	0.716	0.879
1982	181444	141312	232972	321579	289321	357434	363730	0.774	0.7	0.856
1983	140148	109158	179936	311707	281092	345657	289992	0.791	0.716	0.874
1984	442650	348277	562597	243746	222943	266489	277651	0.869	0.788	0.959
1985	528064	424620	656709	195409	178768	213598	307920	0.809	0.733	0.893
1986	1368715	1089057	1720187	163758	150083	178678	430113	0.874	0.795	0.962
1987	355710	282528	447848	114830	104612	126045	523071	0.93	0.844	1.025
1988	332586	264596	418047	191155	173178	210997	434939	0.887	0.796	0.989
1989	158314	127178	197074	237018	212761	264040	332481	0.669	0.596	0.751
1990	132921	105139	168044	303147	266970	344225	212000	0.422	0.367	0.486
1991	299535	237898	377140	636285	566602	714537	319158	0.407	0.358	0.464
1992	714326	574817	887693	802773	722527	891932	513234	0.487	0.434	0.545
1993	989320	796255	1229198	698689	633308	770821	581611	0.588	0.528	0.654
1994	748873	602030	931532	568482	519696	621848	771086	0.751	0.676	0.833
1995	536652	431748	667045	532011	485614	582842	739999	0.773	0.699	0.855
1996	400009	320903	498617	550682	497950	608998	732228	0.792	0.716	0.877
1997	774447	620976	965847	546271	489461	609675	762403	0.94	0.854	1.035
1998	1042448	833267	1304141	385902	346311	430019	592624	0.944	0.858	1.037
1999	623066	497517	780297	280398	252604	311251	484910	0.942	0.858	1.036
2000	745655	597893	929934	254492	233449	277433	414868	0.852	0.772	0.939
2001	589453	473090	734437	382131	346430	421512	426471	0.744	0.671	0.824
2002	374279	300990	465415	519299	470530	573123	535045	0.685	0.618	0.759
2003	758269	611452	940337	569338	517092	626864	551990	0.639	0.575	0.711
2004	242549	198452	296444	662610	602818	728333	606445	0.716	0.646	0.794
2005	693644	566111	849907	574664	524204	629981	641276	0.723	0.65	0.804
2006	538707	439666	660058	576532	526573	631231	537642	0.622	0.555	0.697
2007	1254408	1018912	1544331	639925	580917	704927	486883	0.452	0.401	0.51
2008	1015559	819894	1257918	707321	642742	778389	464171	0.37	0.326	0.419
2009	590917	476104	733418	993561	905043	1090736	523430	0.315	0.276	0.358
2010	205971	161803	262195	1220028	1109961	1341010	609983	0.299	0.262	0.341
2011	364181	288558	459622	1769171	1603137	1952400	719830	0.317	0.278	0.362
2012	508680	409451	631958	1979958	1788195	2192285	727663	0.299	0.261	0.341
2013	467710	372704	586934	2185755	1967908	2427717	966209	0.327	0.287	0.372
2014	850150	682183	1059474	2057014	1843113	2295739	986449	0.345	0.303	0.392

2015	448454	363583	553137	1639801	1461506	1839846	864384	0.343	0.303	0.389
2016	282842	227583	351517	1303470	1163391	1460415	849422	0.364	0.321	0.412
2017	756942	612674	935181	1333156	1209573	1469366	868276	0.399	0.353	0.45
2018	482707	383456	607646	1198557	1092143	1315340	778627	0.418	0.37	0.472
2019	616881	496104	767060	1131791	1026371	1248038	692609	0.438	0.388	0.494
2020	526121	422403	655304	893213	809716	985319	692903	0.491	0.438	0.552
2021	366624	292128	460117	758857	689222	835528	767284	0.583	0.52	0.655
2022	185968	144580	239204	636057	574413	704316	719211	0.617	0.547	0.697
2023	240885	185086	313506	657327	584815	738830	582552	0.631	0.547	0.729
2024	632470	465089	860088	490319	415923	578022	453040	0.627	0.515	0.764
2025	537000*			330486	250527	435964				

* Recruitment model estimate.

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