IMR/PINRO
3
2024
Joint Report Series

JOINT



REPORT

Advice on fishing opportunities for Northeast Arctic haddock in 2025 in ICES subareas 1 and 2

Institute of Marine Research – IMR

Polar branch of the FSBSI “VINRO” (“PINRO”)

Title (English and Norwegian):

Advice on fishing opportunities for Northeast Arctic haddock in 2025 in ICES subareas 1 and 2

Report series:	Year - No.:	Date:	Distribution:
IMR-PINRO	2024-3	21.06.2024	Open

Author(s):

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

Number of pages:

15

Approved by: Research Director(s): Geir Huse Program leader(s):

Content

Stock Name: Northeast Arctic haddock (ICES areas 1 and 2) 4

Advice on fishing opportunities 4

Stock development over time 4

Catch scenarios 4

Basis of the advice 6

Quality of the assessment 6

Issues relevant for the advice 6

Reference points 7

Basis of the assessment 7

History of the advice, catch, and management 7

History of catch and landings 9

Summary of the assessment 11

References 13

Stock Name: Northeast Arctic haddock (ICES areas 1 and 2)

Advice on fishing opportunities

The Joint Russian-Norwegian working group on Arctic Fisheries (JRN-AFWG) advises that when the Joint Norwegian–Russian Fisheries Commission management plan is applied, catches in 2025 should be no more than 106 912 tonnes.

Stock development over time

Fishing pressure on the stock is below F_{pa} and F_{lim} and above F_{msy}, and the spawning stock biomass is above B_{pa} and B_{lim}.

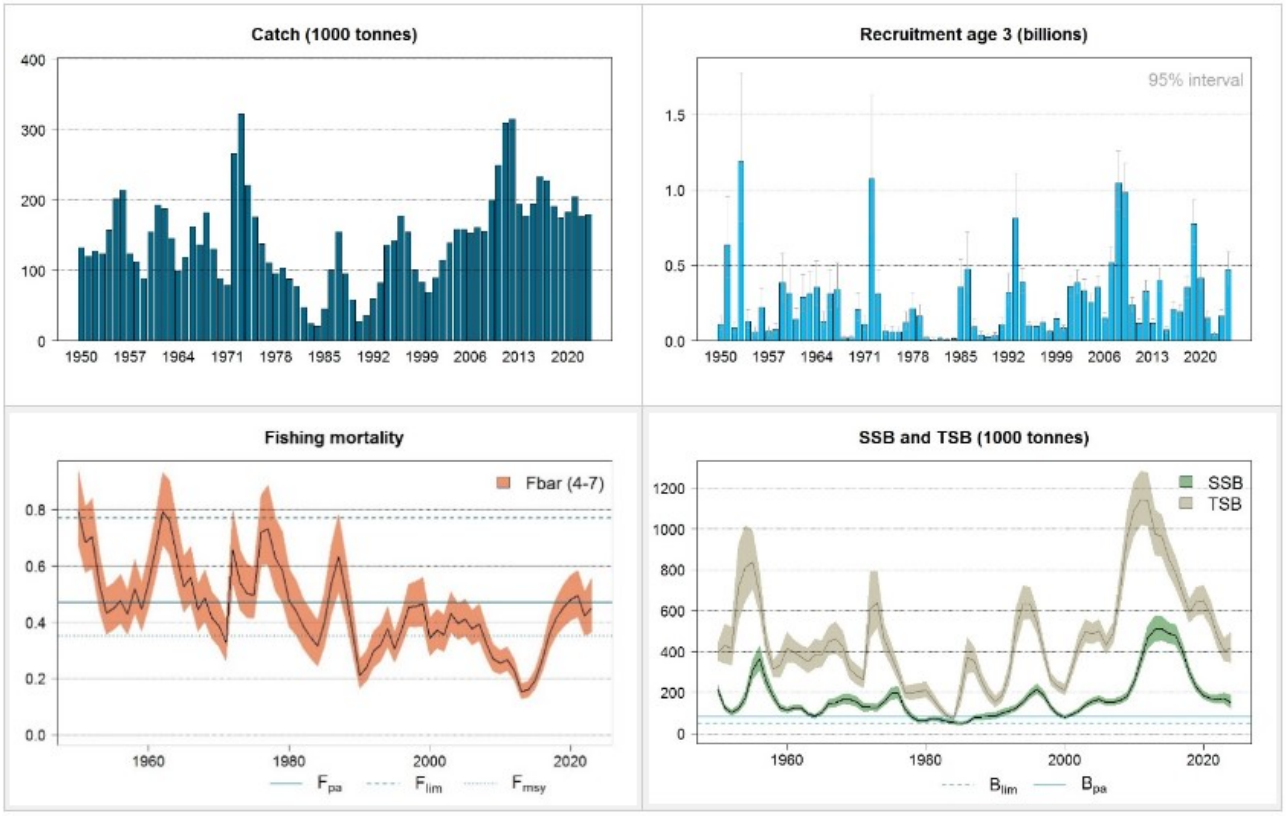


Figure 1. Haddock in ICES subareas 1 and 2 (Northeast Arctic). Catch, recruitment, F, SSB and TSB (total stock biomass, age 3+) with 95 % confidence levels. The biomass reference points relate to SSB.

The decline in catches and spawning stock is expected to continue until the 2021 year-class is fully recruited to the fishery and spawning stock after age 5 (in 2026).

Catch scenarios

Table 1. Haddock in ICES subareas 1 and 2 (Northeast Arctic). SSB, catch in tonnes and recruitment in thousands.

Variable	Value	Notes
Fages 4–7 (202 4)	0.49	TAC constraint
SSB (2025)	128 267	
Rage 3 (2024)	469 037	SAM estimates
Rage 3 (2025)	352 595	RCT3 estimates
Rage 3 (2026)	340 315	RCT3 estimates
Total catch (2024)	141 000	TAC set by 53th JRNFC

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

Basis	Total catch (2025)	F ages 4–7 (2025)	SSB (2026)	% SSB change*	% TAC change**	% Advice change***
Advice basis						
Management plan	106 912	0.35	148 477	16	-24	-16
Other scenarios						
MSY approach: F_{MSY}	106 912	0.35	148 477	16	-24	-16
F = 0	0	0.00	202 674	58	-100	-100
F = F2024	142 841	0.49	131 783	3	1	12
F_{pa}	137 261	0.47	134 320	5	-3	8
F_{lim}	202 346	0.77	106 114	-17	44	59

* SSB 2026 relative to SSB 2025.

** Catch in 2025 relative to TAC in 2024 (141 000 t)

*** Catch value for 2025 relative to advice value for 2024 (127 550 t)

The TAC advice for 2025 is 16% lower than the advice and 24% lower than the TAC for 2024 due to a declining stock trend in recent years.

Basis of the advice

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

Advice basis	Joint Norwegian-Russian Fisheries Commission management plan.
Management plan	The current harvest control rule (HCR) for haddock is as follows (see details in Protocol of the 46 th Session of the Joint Norwegian–Russian Fisheries Commission [JNRFC, 2016]): • *TAC for the next year will be set at level corresponding to FMSY.* • *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 FMSY 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.* At the 46th Session of the Joint Norwegian–Russian Fisheries Commission in 2016 it was decided to keep the existing HCR for haddock for the next five years. Quota flexibility: 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. ICES evaluated this HCR in 2016 (ICES, 2016) and rechecked it in 2020 (ICES, 2020). ICES concluded that the HCR is precautionary.

Quality of the assessment

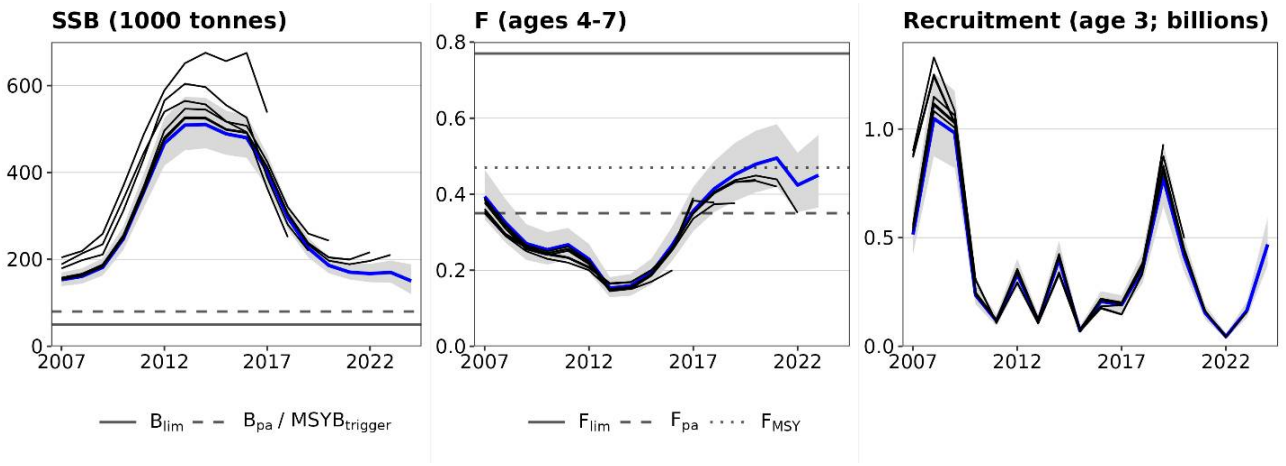


Figure 2. Haddock in ICES subareas 1 and 2 (Northeast Arctic). Historical assessment results. The shaded areas indicate the 95% confidence intervals for the 2024 assessment.

There was a downward revision of the SSB in this year's assessment.

Issues relevant for the advice

Due to the temporary suspension of Russian scientists from ICES this assessment was conducted by a Joint Russian-Norwegian working group on Arctic Fisheries (JRN-AFWG) consisting of scientists from VNIRO (Russia), and IMR (Norway) (Howell et al., 2024).

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 2020 (ICES, 2020).

The 2015-2017 year-classes that have dominated the catches are now being fished out, and the 2018-2020 year-classes are weak, so the stock is declining. Early indications are that the incoming year-classes are average or above average. For the stock to increase, it is important that these year-classes are not fished out before they mature and reach their growth potential.

Reference points

Table 4. Haddock 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 $B_{trigger}$	80 000 tonnes	B_{pa}	ICES (2020)
	F_{MSY}	0.35	Stochastic long-term simulations	ICES (2020)
Precautionary approach	B_{lim}	50 000 tonnes	B_{loss}	ICES (2020)
	B_{pa}	80 000 tonnes	$B_{lim} \times \exp(1.645 \times \sigma)$, where $\sigma = 0.3$	ICES (2020)
	F_{lim}	0.77	Determined from replacement line leading from SSB = 0 to the geometric mean recruitment at SSB = B_{lim}	ICES (2020)
	F_{pa}	0.47	$F_{lim} \times \exp(-1.645 \times \sigma)$, where $\sigma = 0.3$	ICES (2020)
Management plan	SSB_{MGT}	80 000 tonnes	B_{pa}	ICES (2020)
	F_{MGT}	0.35	F_{MSY}	ICES (2020)

Basis of the assessment

Table 5. Haddock 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.
Input data	Commercial landings (international landings, ages, and length frequencies from catch sampling); four survey indices (RU-BTr-Q4 (Btr), BS-NoRU-Q1(Aco), BS-NoRu-Q1 (BTr), and Eco-NoRu-Q3 (Btr)); annual maturity and stock weight-at-age data from surveys; from 1984, the natural mortalities are derived from the consumption of haddock (ages 3–6) by cod.
Discards and bycatch	Discarding is considered negligible in recent years.
Indicators	None.
Other information	Last benchmarked in February 2020 (ICES, 2020).
Working group	Joint Russian-Norwegian working group on Arctic Fisheries (JRN-AFWG).

History of the advice, catch, and management

Table 6. Haddock 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	No increase in F; TAC	160000	250000	154916		154916
1988	No increase in F	< 240000	240000	95255		95255
1989	Large reduction in F	69000	83000	58518		58518
1990	No directed fishery	-	25000	27182		27182
1991	No directed fishery	-	28000	36216		36216
1992	Within safe biological limits	35000	63000	59922		59922
1993	No long-term gains in increasing F	56000	72000	82379		82379
1994	No long-term gains in $F > F_{med}$	97000*	120000	135186		135186
1995	No long-term gains in $F > F_{med}$	122000*	130000	142448		142448
1996	No long-term gains in $F > F_{med}$	169000*	170000	178128		178128
1997	Well below F_{med}	< 242000	210000	154359		154359
1998	Below F_{med}	< 120000	130000	100630		100630
1999	Reduce F below F_{pa}	< 74000	78000	83195		83195
2000	Reduce F below F_{pa}	< 37000	62000	68944		68944
2001	Reduce F below F_{pa}	< 66000	85000	89640		89640
2002	Reduce F below F_{pa}	< 64000	85000	96062	18736	114798
2003	Reduce F below F_{pa}	< 101000	101000	105700	33226	138926
2004	Reduce F below F_{pa}	< 120000	130000	124502	33777	158279
2005	Reduce F below F_{pa}	< 106000	117000	118015	40283	158298
2006	Reduce F below F_{pa}	< 112000	120000	131706	21451	153157
2007	Limit catches	< 130000	150000	146972	14553	161525
2008	Limit catches to 2001–2004 average	< 130000	155000	149776	5828	155604
2009	Apply management plan	< 194000	194000	200061	0	200061
2010	Apply management plan	< 243000	243000	249200	0	249200
2011	Apply management plan	< 303000	303000	309785	0	309785
2012	Apply management plan	< 318000	318000	315627	0	315627
2013	Apply management plan	< 238000	200000	193744	0	193744
2014	Apply management plan	< 150000	178500	177522	0	177522
2015	Apply management plan	< 165000	223000	194756	0	194756
2016	Apply management plan	< 244000^	244000	233416	0	233416
2017	Apply management plan	≤ 233000	233000	227588	0	227588
2018	Apply management plan	≤ 202305	202305	191276	0	191276

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official catches	Unreported landings (included in ICES catches)	ICES catches
2019	Apply management plan	≤ 152000	172000	175402	0	175402
2020	Apply management plan	≤ 215000	215000	182468	0	182468
2021	Apply management plan	≤ 232537	232537	204843	0	204743^^
2022	Apply management plan	≤ 178532	178532	176906	0	176906^^
2023	Apply management plan	≤ 170067^^	170067	178899	0	178899^^
2024	Apply management plan	≤ 127550^^	141000			
2025	Apply management plan	≤ 106912^^				

* Predicted landings at F_{med}.

^ This advice was updated on 7 July 2015 in response to a special request (ICES, 2015) after a mid-year change in TAC in 2015 (from 178500 tonnes to 223000 tonnes).

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

History of catch and landings

Table 7. Haddock in ICES subareas 1 and 2. History of official commercial catch and landings by country. All weights are in tonnes.

Year	Faroe Islands	France	Fed. Rep. Germany.	Greenland	Norway^	Russia**	Spain	United Kingdom	Others	Unreported catches***	Total
1960	172	-	5597		46263	57025		45469	125	-	154651
1961	285	220	6304		60862	85345		39650	558	-	193224
1962	83	409	2895		54567	91910		37486	58	-	187408
1963	17	363	2554		59955	63526		19809	-	-	146224
1964	-	208	1482		38695	43870		14653	250	-	99158
1965	-	226	1568		60447	41750		14345	242	-	118578
1966	-	1072	2098		82090	48710		27723	85	-	161778
1967	-	1208	1705		51954	57346		24158	26	-	136397
1968	-	-	1867		64076	75654		40129	0	-	181726
1969	2	-	1490		67549	24211		37234	334	-	130820
1970	541	-	2119		37716	26802		20423	656	-	88257
1971	81	-	896		45715	15778		16373	62	-	78905
1972	137	-	1433		46700	196224		17166	4493	-	266153
1973	1212	3214	9534		86767	186534		32408	2557	-	322226
1974	925	3601	23409		66164	78548		37663	10847	-	221157
1975	299	5191	15930		55966	65015		28677	4680	-	175758
1976	536	4459	16660		49492	42485		16940	6692	-	137264
1977	213	1510	4798		40118	52210		10878	431	-	110158

Year	Faroe Islands	France	Fed. Rep. Germany.	Greenland	Norway^	Russia**	Spain	United Kingdom	Others	Unreported catches***	Total
1978	466	1411	1521		39955	45895		5766	408	-	95422
1979	343	1198	1948		66849	26365		6454	466	-	103623
1980	497	226	1365		66501	20706		2948	261	-	92504
1981	381	414	2402		63435	13400		1682	22	-	81736
1982	496	53	1258		43702	2900	-	827	0	-	49236
1983	428	-	729		22364	680	139	259	1	-	24600
1984	297	15	400		18813	1103	37	276	4	-	20945
1985	424	21	395		21272	22690	77	153	20	-	45052
1986	893	12	1079		52313	45738	22	431	75	-	100563
1987	464	7	3105		72419	78211	59	563	88	-	154916
1988	1113	116	1323		60823	31293	72	435	80	-	95255
1989	1217	-	171		36451	20062	1	590	26	-	58518
1990	705	-	167		20621	5190	-	494	5	-	27182
1991	1117	-	213		22178	12177	-	514	17	-	36216
1992	1093	151	387	1719	36238	19699	38	596	1	-	59922
1993	546	1215	1165	880	40978	35071	76	1802	646	-	82379
1994	2761	678	2412	770	71171	51822	22	4673	877	-	135186
1995	2833	598	2675	1097	76886	54516	14	3111	718	-	142448
1996	3743	6	942	1510	94527	74239	669	2275	217	-	178128
1997	3327	540	972	1877	103407	41228	364	2340	304	-	154359
1998	1903	241	385	854	75108	20559	257	1229	94	-	100630
1999	1913	64	641	437	48182	30520	652	694	92	-	83195
2000	631	178	880	432	42009	22738	502	747	827	-	68944
2001	1210	324	554	553	49067	34307	1497	1068	1060	-	89640
2002	1564	297	627	858	52247	37157	1505	1125	682	18736	114798
2003	1959	382	918	1363	56485	41142	1330	1018	1103	33226	138926
2004	2484	103	823	1680	62192	54347	54	1250	1569	33777	158279
2005	2138	333	996	15	60850	50012	963	1899	1262	40283	158751
2006	2390	883	989	1830	69272	53313	703	1164	1162	21451	153157
2007	2307	277	1123	1464	71244	66569	125	1351	2511	14553	161525
2008	2687	311	535	1659	72779	68792	283	971	1759	5828	155604
2009	2820	529	1957	1410	104354	85514	317	1315	1845	0	200061
2010	3173	764	3539	1970	123384	111372	379	1758	2862	0	249200
2011	1759	268	1724	2110	158202	139912	502	1379	3929	0	309785
2012	2055	322	1111	3984	159602	143886	441	833	3393	0	315627

Year	Faroe Islands	France	Fed. Rep. Germany.	Greenland	Norway^	Russia**	Spain	United Kingdom	Others	Unreported catches***	Total
2013	1886	342	500	1795	99215	85668	439	639	3260	0	193744
2014	1470	198	340	1150	91306	78725	187	355	3791	0	177522
2015	2459	145	124	1047	95094	91864	246	450	3327	0	194756
2016	2460	340	170	1401	108718	115710	200	575	3838	0	233416
2017	2776	108	170	1810	113132	106714	228	372	2279	0	227588
2018	2333	183	385	1317	93839	90486	169	453	2173	0	191276
2019	1515	143	204	1208	93860	76125	280	456	1611	0	175402
2020	1392	96	282	910	88108	89030	45	320	2286	0	182468
2021^^	1722	105	365	1101	100673	98296	131	78	2272	0	204743
2022^^	1831	164	268	1101	89044	82364	99	138	1897	0	176906
2023*^^	1993	235	296	672	91325	81751	139	112	2376	0	178899

* Provisional figures.

** USSR prior to 1991.

*** Figures based on Norwegian/Russian illegal, unreported, and unregulated fisheries (IUU) estimates.

^ Landings of coastal haddock in Norwegian statistical areas 06 and 07 (south of Lofoten) are included from 1983.

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

Summary of the assessment

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

Year	Recruitment (thousands)			SSB (tonnes)			Total catch (tonnes)	F		
	Age 3	Low	High	SSB	Low	High		Ages 4–7	Low	High
1950	110038	70318	172195	213098	190932	237837	132125	0.794	0.673	0.935
1951	633959	422176	951982	124868	110849	140660	120077	0.684	0.577	0.811
1952	83966	54059	130419	101012	88332	115513	127660	0.704	0.59	0.84
1953	1186876	792673	1777121	120410	104189	139155	123920	0.532	0.441	0.643
1954	131478	84861	203703	173385	147570	203715	156788	0.431	0.356	0.523
1955	59255	37752	93006	309421	264756	361621	202286	0.449	0.374	0.54
1956	222228	142942	345493	364154	310799	426668	213924	0.475	0.395	0.57
1957	61053	38964	95667	253086	217226	294865	123583	0.428	0.357	0.513
1958	74378	48008	115231	181370	157654	208654	112672	0.519	0.432	0.623
1959	385153	255704	580136	125441	109041	144308	88211	0.446	0.369	0.54
1960	314280	207100	476930	112870	99616	127888	154651	0.54	0.452	0.646

Year	Recruitment (thousands)			SSB (tonnes)			Total catch (tonnes)	F		
	Age 3	Low	High	SSB	Low	High		Ages 4–7	Low	High
1961	142446	93949	215978	124441	110920	139609	193224	0.664	0.563	0.784
1962	290162	192872	436527	124618	110750	140222	187408	0.794	0.675	0.933
1963	312272	209555	465339	93938	82704	106698	146224	0.76	0.639	0.905
1964	352016	234914	527494	84244	74116	95757	99158	0.634	0.527	0.761
1965	125910	82095	193108	102938	90003	117731	118578	0.526	0.436	0.634
1966	309997	204532	469842	144858	126330	166104	161778	0.559	0.467	0.67
1967	339255	223412	515165	150777	130228	174568	136397	0.444	0.367	0.535
1968	18922	11732	30517	167119	144992	192622	181726	0.486	0.402	0.587
1969	20435	12628	33068	166772	143621	193655	130820	0.416	0.341	0.509
1970	205947	133671	317302	154545	131368	181813	88257	0.387	0.313	0.477
1971	111639	72682	171479	127155	107395	150550	78905	0.329	0.264	0.41
1972	1073335	707532	1628262	128143	111460	147322	266153	0.657	0.54	0.799
1973	310663	206659	467007	125382	108183	145315	322226	0.54	0.443	0.658
1974	65039	42241	100139	153937	134375	176347	221157	0.502	0.416	0.607
1975	59149	38437	91022	194781	167105	227042	175758	0.496	0.414	0.594
1976	59157	37549	93200	195674	168190	227648	137264	0.719	0.606	0.853
1977	120692	76059	191516	118859	100310	140838	110158	0.732	0.605	0.887
1978	213186	141614	320929	80895	67101	97524	95422	0.627	0.511	0.77
1979	160795	106373	243060	62278	52461	73932	103623	0.584	0.472	0.722
1980	23618	14727	37876	62543	53210	73512	87889	0.476	0.383	0.591
1981	11101	6634	18576	72421	61374	85457	77153	0.438	0.352	0.545
1982	16377	9962	26924	68421	56732	82517	46955	0.384	0.306	0.483
1983	8039	4650	13898	58508	48149	71095	24600	0.348	0.273	0.445
1984	13082	7978	21453	53166	43434	65078	20945	0.314	0.243	0.406
1985	357657	235975	542084	49030	40833	58873	45052	0.399	0.314	0.508
1986	476527	315596	719523	54603	46371	64296	100563	0.537	0.428	0.673
1987	92051	59718	141890	77211	66119	90163	154916	0.632	0.509	0.783
1988	39771	24957	63379	79561	67118	94310	95255	0.513	0.412	0.638
1989	27846	17231	44999	84262	69611	101996	58518	0.372	0.295	0.467
1990	36089	23201	56137	86042	70285	105332	27182	0.211	0.166	0.269
1991	107694	75940	152726	100226	84352	119086	36216	0.239	0.191	0.299
1992	317850	227133	444801	110116	95315	127214	59922	0.296	0.239	0.367
1993	812363	593836	1111307	123913	109413	140334	82379	0.321	0.262	0.393
1994	389416	316627	478938	154765	138530	172902	135186	0.376	0.311	0.454
1995	99474	78314	126352	190437	170166	213122	142448	0.305	0.257	0.363

Year	Recruitment (thousands)			SSB (tonnes)			Total catch (tonnes)	F		
	Age 3	Low	High	SSB	Low	High		Ages 4–7	Low	High
1996	98946	78328	124993	216671	193990	242004	178128	0.374	0.319	0.438
1997	118812	94279	149730	186707	166912	208851	154359	0.454	0.385	0.535
1998	63028	49180	80776	129431	114942	145745	100630	0.457	0.384	0.544
1999	147657	118952	183289	94302	83762	106169	83195	0.465	0.387	0.56
2000	83270	65838	105318	78990	70062	89054	68944	0.342	0.281	0.417
2001	359701	296740	436021	92264	82413	103292	89640	0.371	0.309	0.446
2002	386866	318438	469997	109407	97831	122354	114798	0.355	0.296	0.426
2003	332712	270243	409620	138630	124677	154143	138926	0.43	0.364	0.507
2004	255646	210593	310337	156676	140945	174163	158279	0.396	0.337	0.465
2005	354171	293454	427450	166277	149640	184763	158298	0.412	0.351	0.482
2006	153663	125409	188283	151767	136561	168666	153157	0.376	0.319	0.443
2007	514191	423913	623695	153081	138058	169738	161525	0.394	0.334	0.465
2008	1048186	874520	1256339	161015	144262	179714	155604	0.325	0.273	0.387
2009	982329	820791	1175658	181636	162878	202555	200061	0.27	0.227	0.321
2010	235386	192881	287259	246977	221307	275624	249200	0.254	0.215	0.3
2011	117342	93736	146894	356055	319054	397348	309785	0.267	0.228	0.311
2012	331422	272529	403041	467020	415602	524800	315627	0.229	0.195	0.269
2013	117064	93785	146122	509013	451179	574260	193744	0.153	0.129	0.182
2014	399947	330282	484305	510434	455625	571837	177522	0.159	0.133	0.19
2015	71899	56805	91002	488941	440830	542304	194756	0.194	0.163	0.231
2016	206289	167949	253382	479940	433696	531114	233183	0.267	0.226	0.315
2017	191476	156175	234757	402555	365961	442809	227588	0.356	0.303	0.419
2018	353237	288706	432191	296733	269095	327210	191276	0.414	0.353	0.487
2019	774629	643003	933201	225698	204447	249158	175402	0.452	0.382	0.535
2020	414489	341742	502721	186017	168034	205924	182468	0.479	0.405	0.567
2021	153939	123568	191774	170620	153632	189487	204743	0.495	0.419	0.584
2022	44626	33640	59199	167259	147656	189465	176906	0.424	0.353	0.509
2023	164015	130651	205900	170118	146693	197283	178899	0.45	0.365	0.556
2024	469037	372117	591201	150433	120071	188471				

References

Howell et al. 2024. Report of the Joint Russian-Norwegian Working Group on Arctic Fisheries (JRN-AFWG). IMR PINRO 2024-7. https://www.hi.no/hi/nettrapporter/imr-pinro-en-2024-7

ICES. 2015. Norway and Russia request to ICES for revised advice for Haddock in Subareas I and II. *In* Report of the ICES Advisory Committee, 2015. ICES Advice 2015, Book 3, Section 3.2.3.1. 9 pp.

http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2015/Special_Requests/Norway_Russia_had-arct_update.pdf .

ICES 2016. Report of the second Workshop on Management Plan Evaluation on Northeast Arctic cod and haddock and Barents Sea capelin (WKNEAMP-2), 25-28 January 2016, Kirkenes, Norway. ICES CM 2016/ACOM:47, 76 pp.

JNRFC. 2016. Protocol of the 46th Session of the Joint Norwegian–Russian Fisheries Commission, 17–20 October 2016 (In Russian). 117 pp. Available at: http://www.jointfish.com/rus/content/download/502/6357/file/46-russisk.pdf .

ICES. 2020. Benchmark Workshop for Demersal Species (WKDEM). ICES Scientific Reports, 2:31. 136 pp. http://doi.org/10.17895/ices.pub.5548 .



Institute of Marine Research – IMR

Polar branch of the FSBSI “VINRO” (“PINRO”)