

Greenland halibut (*Reinhardtius hippoglossoides*) in subareas 1 and 2 (Northeast Arctic)

ICES stock advice

ICES advises that when the precautionary approach is applied, catches in the year 2022 should be no more than 19 094 tonnes and catches in the year 2023 should be no more than 18 494 tonnes.

Stock development over time

Fishing pressure on the stock is above HR_{pa} ; fishable biomass is above B_{pa} .



Figure 1 Greenland halibut in subareas 1 and 2. Summary of the stock assessment. Harvest rate is defined as catch in a year divided by fishable biomass at the start of the year. Fishable biomass refers to fish of length ≥ 45 cm.

Catch scenarios

Table 1 Greenland halibut in subareas 1 and 2. The basis for the catch scenarios.

Variable	Value	Notes
Harvest rate (2022)	0.050	Based on a <i>status quo</i> catch of 28 713 for 2021; tonnes
Biomass ≥ 45 cm (2021)	561 423	At 1 January 2022; tonnes
R (2021)	NA	R (2021) does not influence the short-term forecast
Expected catch (2021)	28713	Based on catch in 2020; tonnes

Table 2a Greenland halibut in subareas 1 and 2. Annual catch scenarios for 2022. All weights are in tonnes.

Basis	Total catch (2022)	HR _{total} (2022)	Biomass 45 cm+ (2023)	% Biomass 45 cm+ change *	% TAC change **	% Advice change ***
ICES advice basis						
HR _{pa} = 0.035	19094	0.035	535251	-5%	-29%	-17%
Other scenarios						
HR = 0	0	0	553559	-1%	-100%	-100%
HR = 0.025	13873	0.025	540256	-4%	-49%	-40%
Catch ₂₀₂₁	28713	0.052	526032	-6%	6%	25%

* Biomass 45 cm+ 2023 relative to 2022 (561423 tonnes).

** Advice in 2022 relative to TAC in 2021.

*** Advice value for 2022 relative to the advice value for 2021.

The advice for 2022 is 17% lower than the advice for 2021 because of a decline in the stock size and a revision of HR_{pa}.

Table 2b Greenland halibut in subareas 1 and 2. Annual catch scenarios for 2023. All weights are in tonnes.

Basis	Total catch (2023)	HR _{total} (2023)	Biomass 45 cm+ (2024)	% Biomass 45 cm+ change *	% Advice change **
ICES advice basis					
HR _{pa} = 0.035	18494	0.035	523307	-2%	-3%
Other scenarios					
HR = 0	0	0	558282	4%	-100%
HR = 0.025	13590	0.025	532723	0%	-29%
Catch ₂₀₂₁	28713	0.055	504831	-6%	50%

* Biomass 45cm+ 2024 relative to 2023.

** Advice value for 2023 relative to the advice value in 2022.

Basis of the advice

Table 3 Greenland halibut in subareas 1 and 2. The basis of the advice.

Advice basis	Precautionary approach
Management plan	ICES is not aware of any agreed precautionary management plan for Greenland halibut in this area

Quality of the assessment

The assessment uses an age-length-structured Gadget model (ICES, 2015). However, there is no agreement on age-reading methodology between Norway and Russia, and the model is tuned using only length data. This gives uncertainty on the absolute levels of modelled biomass and harvest rate (HR) as well as on the recruitment pattern. The peaks of recruitment identified by the model are corroborated by survey length distributions, but the weaker year classes may be poorly modelled.

None of the surveys individually covers the complete stock distribution, and there are discrepancies between the surveys that lead to high uncertainty.

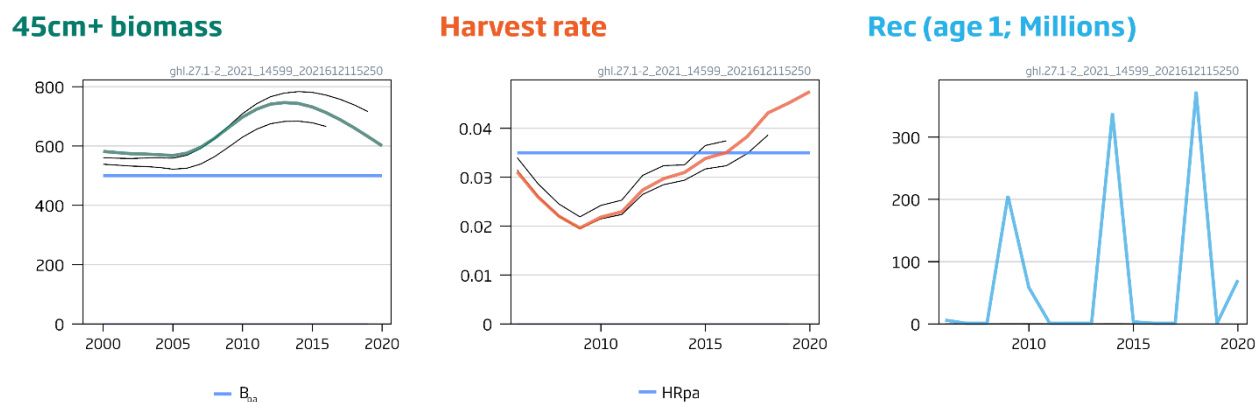


Figure 2 Greenland halibut in subareas 1 and 2. Historical assessment results.

Issues relevant for the advice

In the absence of a harvest control rule or MSY reference points, the advice is based on a precautionary approach where priority is given to keeping the HR below HR_{pa} and the stock biomass above B_{pa} . This HR_{pa} is a interim measure. Evaluation of reference points and an appropriate longer-term advice rule will take place at and following the next planned benchmark. The fishery has a history of both quotas being set at levels above those provided in scientific advice and catches being above the quota; this is not precautionary. Greenland halibut is a long-lived, low productivity species which requires low fishing pressure – and the stock is currently declining.

EU has set a joint TAC for Union waters of Division 2.a and Subarea 4 and for Union and international waters of Division 5.b and Subarea 6. For 2020 this TAC was 2500 tonnes, of which 1250 tonnes were allocated to Norway in subareas 2 and 6. Quotas should be set to apply only to subareas 1 and 2, as Greenland halibut in these subareas is a separate stock.

Reference points

HR_{pa} was introduced in this year's advice.

Table 4 Greenland halibut in subareas 1 and 2. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	Not defined		
	F_{MSY}	Not defined		
Precautionary approach	B_{lim}	Not defined		
	B_{pa}	500 000 t	Fishable biomass (length ≥ 45 cm) in 1995, based on the lowest observed stock size for which good recruitment has been observed	ICES (2015)
	F_{lim}	Not defined		
	HR_{pa}	0.035	HR_{pa} has been defined based on long-term simulations	ICES (2021a)
Management plan	SSB_{mgt}	Not defined		
	F_{mgt}	Not defined		

Basis of the assessment

Table 5 Greenland halibut in subareas 1 and 2. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2021b).
Assessment type	Age-length-structured (Gadget model) but with only length data used for tuning (ICES, 2021a).
Input data	Trends in biomass and length distributions for four survey indices: the Norwegian slope survey (G1165), the Russian autumn bottom trawl survey (G5348), and the newly derived EcoSouth and EcoJuv indices; catch-in-tonnes and length distributions from four aggregated commercial fleets (Norwegian trawl and seine, Russian trawl and seine, Norwegian gillnet and longline, Russian gillnet and longline); and maturity-at-length data from the Norwegian slope survey (G1165).
Discards and bycatch	Not included, considered negligible.
Indicators	None.
Other information	Inter-benchmark process May–August 2015 (ICES, 2015).
Working group	Arctic Fisheries Working Group (AFWG).

History of the advice, catch, and management

Table 6 Greenland halibut in subareas 1 and 2. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC – Norway/JNRF	TAC to Norway–EU zone in ICES subareas 2 and 6 ^	Official catches
1987	Precautionary TAC	-	-		19112
1988	No decrease in SSB	19000	-		19587
1989	F = F(87); TAC	21000	-		20138
1990	F = F(89); TAC	15000	-		23183
1991	F at F _{med} ; TAC; improved expl. pattern	9000	-		33320
1992	Rebuild SSB(1991)	6000	7000*		8602
1993	TAC	7000	7000*		11933
1994	F < 0.1	< 12000	11000*		9226
1995	No fishing	0	2500**		11734
1996	No fishing	0	2500**		14347
1997	No fishing	0	2500**		9410
1998	No fishing	0	2500**		11893
1999	No fishing	0	2500**		19517
2000	No fishing	0	2500**		14297
2001	Reduce catch to rebuild stock	< 11000	2500**		16365
2002	Reduce F substantially	< 11000	2500**		13293
2003	Reduce catch to increase stock	< 13000	2500**		13447
2004	Do not exceed recent low catches	< 13000	2500**		18899
2005	Do not exceed recent low catches	< 13000	2500**		18834
2006	Do not exceed recent low catches	< 13000	2500**		17904
2007	Reduce catch to increase stock	< 13000	2500**		15453
2008	Reduce catch to increase stock	< 13000	2500**		13792
2009	Same advice as previous year	< 13000	2500**		12990
2010	Same advice as previous year	< 13000	15000***	350	15229
2011	Same advice as previous year	< 13000	15000***	350	16606
2012	No increase in catches	< 15000	18000***	350	20288
2013	No increase in catches	< 15000	19000***	824	22167
2014	No new advice, same as for 2013	< 15000	19000***	1000	23025
2015	Same as for 2014	< 15000	19000***	1000	24748
2016	Precautionary approach	< 19800	22000***	1100	24948

Year	ICES advice	Catch corresponding to advice	Agreed TAC – Norway/JNRFC	TAC to Norway–EU zone in ICES subareas 2 and 6 [^]	Official catches
2017	Same advice as previous year	< 19800	24000***	1100	26380
2018	Precautionary approach	< 23000	27000***	1100	28438
2019	Same advice as previous year	< 23000	27000***	1250	28832
2020	Precautionary considerations	< 23000	27000***	1250	28713
2021	Same advice as previous year	< 23000	27000***	^{^^}	
2022	Precautionary approach	≤ 19094			
2023	Precautionary approach	≤ 18494			

* Set by Norwegian authorities.

** Set by Norwegian authorities for the non-trawl fishery; allowable bycatch in the trawl fishery is additional to this.

*** Set by the Joint Norwegian–Russian Fisheries Commission (JNRFC).

[^] UK after 2020

^{^^} Not available at the time of publication.

History of the catch and landings

Table 7 Greenland halibut in subareas 1 and 2. Catch distribution by fleet in 2020 as estimated by ICES.

Catch (2020)	Landings				Discards
28713 tonnes	Trawl 62%	Longline 24%	Gillnet 10%	Others 4%	Discarding is considered negligible
	28713 tonnes				

Table 8a Greenland halibut in subareas 1 and 2. History of commercial catch.

Year	Catch	Year	Catch	Year	Catch
1935	1534	1965	34682	1995	11734
1936	830	1966	26321	1996	14347
1937	616	1967	24267	1997	9410
1938	329	1968	26168	1998	11893
1939	459	1969	43789	1999	19517
1940	846	1970	89484	2000	14297
1941	1663	1971	79034	2001	16365
1942	955	1972	43048	2002	13293
1943	824	1973	29899	2003	13447
1944	678	1974	37721	2004	18899
1945	1148	1975	38144	2005	18834
1946	1362	1976	36054	2006	17904
1947	1437	1977	28875	2007	15453
1948	1987	1978	24617	2008	13792
1949	375	1979	17242	2009	12990
1950	2074	1980	13284	2010	15229
1951	2861	1981	15018	2011	16606
1952	2953	1982	16789	2012	20288
1953	2601	1983	22147	2013	22167
1954	4090	1984	21883	2014	23025
1955	3300	1985	19945	2015	24748
1956	3939	1986	22875	2016	24948
1957	4635	1987	19112	2017	26380
1958	4192	1988	19587	2018	28438
1959	7939	1989	20138	2019	28831
1960	10961	1990	23183	2020	28713
1961	11813	1991	33320		
1962	13360	1992	8602		
1963	14540	1993	11933		
1964	40391	1994	9226		

Table 8b Greenland halibut in subareas 1 and 2. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	Denmark	Estonia	Faroe Isl.	France	Germany	Greenland	Iceland	Ireland	Latvia	Lithuania	Norway	Poland	Portugal	Russia*	Spain	UK	UK (Engl. & Wales)	UK (Scotland)	Total
1984	0	0	0	138	2165	0	0	0	0	0	4376	0	0	15181	0		23	0	21883
1985	0	0	0	239	4000	0	0	0	0	0	5464	0	0	10237	0		5	0	19945
1986	0	0	42	13	2718	0	0	0	0	0	7890	0	0	12200	0		10	2	22875
1987	0	0	0	13	2024	0	0	0	0	0	7261	0	0	9733	0		61	20	19112
1988	0	0	186	67	744	0	0	0	0	0	9076	0	0	9430	0		82	2	19587
1989	0	0	67	31	600	0	0	0	0	0	10622	0	0	8812	0		6	0	20138
1990	0	0	163	49	954	0	0	0	0	0	17243	0	0	4764	0		10	0	23183
1991	11	2564	314	119	101	0	0	0	0	0	27587	0	0	2490	132		0	2	33320
1992	0	0	16	111	13	13	0	0	0	0	7667	0	31	718	23		10	0	8602
1993	2	0	61	80	22	8	56	0	0	30	10380	0	43	1235	0		16	0	11933
1994	4	0	18	55	296	3	15	5	0	4	8428	0	36	283	1		76	2	9226
1995	0	0	12	174	35	12	25	2	0	0	9368	0	84	794	1106		115	7	11734
1996	0	0	2	219	81	123	70	0	0	0	11623	0	79	1576	200		317	57	14347
1997	0	0	27	253	56	0	62	2	0	0	7661	12	50	1038	157		67	25	9410
1998	0	0	57	67	34	0	23	2	0	0	8435	31	99	2659	259		182	45	11893
1999	0	0	94	0	34	38	7	2	0	0	15004	8	49	3823	319		94	45	19517
2000	0	0	0	45	15	0	16	1	0	0	9083	3	37	4568	375		111	43	14297
2001	0	0	0	122	58	0	9	1	0	0	10896	2	35	4694	418		100	30	16365
2002	0	219	0	7	42	22	4	6	0	0	7143	5	14	5584	178		41	28	13293
2003	0	0	459	2	18	14	0	1	0	0	8216	5	19	4384	230		41	58	13447
2004	0	0	0	0	9	0	9	0	0	0	13939	1	50	4662	186		43	0	18899
2005	0	170	0	32	8	0	0	0	0	0	13011	0	23	4883	660		29	18	18834
2006	0	0	204	46	8	0	8	0	0	196	11119	201	26	6055	29		10	2	17904
2007	0	0	203	41	8	198	15	0	0	0	8230	200	47	6484	8		11	8	15453
2008	0	0	663	42	5	0	28	0	0	0	7393	201	46	5294	94		16	10	13792
2009	0	0	422	16	19	16	15	2	0	0	8446	204	237	3335	210		9	60	12990
2010	0	0	272	102	14	15	16	0	0	0	7700	3	11	6888	182		4	22	15229
2011	0	0	538	46	80	4	7	0	0	234	8270	169	21	7053	144		36	4	16606
2012	0	0	564	40	40	12	13	0	0	0	9331	22	1	10041	190		21	14	20288
2013	0	0	783	168	49	22	106	1	0	0	10403	30	7	10310	196		17	75	22167
2014	0	0	887	269	33	20	86	0	0	0	11232	19	0	10061	206		28	184	23025
2015	0	0	312	227	33	14	53	0	0	5	10874	13	1	12953	159		25	79	24748
2016	0	359	483	229	9	17	79	0	0	0	12932	8	19	10576	198		20	19	24948
2017	0	523	917	177	21	26	10	0	1	72	13741	27	13	10714	56		83	0	26381
2018	2	574	401	150	50	20	24	0	0	206	14712	27	6	12072	60	1348			28438
2019	0	588	350	105	44	23	9	0	32	377	14813	122	8	12198	87	75			28831
2020	1	578	514	49	72	41	19	0	149	226	14532	97	28	12266	96	45			28713

* USSR prior to 1991.

Summary of the assessment

Table 9 Greenland halibut in subareas 1 and 2. Assessment summary.

Year	Recruitment (age 1; [thousands])	45 cm+ biomass (tonnes)	Catches (tonnes)	Harvest rate (45+ cm)
1992	16232	407375	8602	0.021
1993	127091	486187	11933	0.025
1994	350737	539826	9226	0.0171
1995	190065	575750	11734	0.020
1996	1000	590956	14347	0.024
1997	23973	592839	9410	0.0159
1998	33509	593552	11893	0.020
1999	1000	588809	19517	0.033
2000	333032	581706	14297	0.025
2001	1000	577731	16365	0.028
2002	891169	573993	13293	0.023
2003	211030	572750	13447	0.024
2004	1000	570608	18899	0.033
2005	1000	567654	18834	0.033
2006	6117	575714	17904	0.031
2007	1000	595837	15453	0.026
2008	1000	626392	13792	0.022
2009	205562	662443	12990	0.0196
2010	58527	697684	15229	0.022
2011	1000	724038	16606	0.023
2012	1000	741178	20288	0.027
2013	1000	746489	22167	0.030
2014	338364	743391	23025	0.031
2015	3308	731558	24748	0.034
2016	1000	712230	24948	0.035
2017	1000	688517	26380	0.038
2018	373227	661242	28438	0.043
2019	1000	631439	28831	0.045
2020	70311	600806	28713	0.048

Sources and references

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[Download the stock assessment data and figures.](#)

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