Haddock (*Melanogrammus aeglefinus*) in Subarea 4, Division 6.a, and Subdivision 20 (North Sea, West of Scotland, Skagerrak)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, total catches in 2023 should be no more than 137 058 tonnes.

ICES notes the existence of a precautionary management plan, developed and adopted by one of the relevant management authorities for this stock.

Stock development over time

Fishing pressure on the stock is below F_{MSY} and spawning-stock size is above MSY $B_{trigger}$, B_{pa}, and B_{lim}.

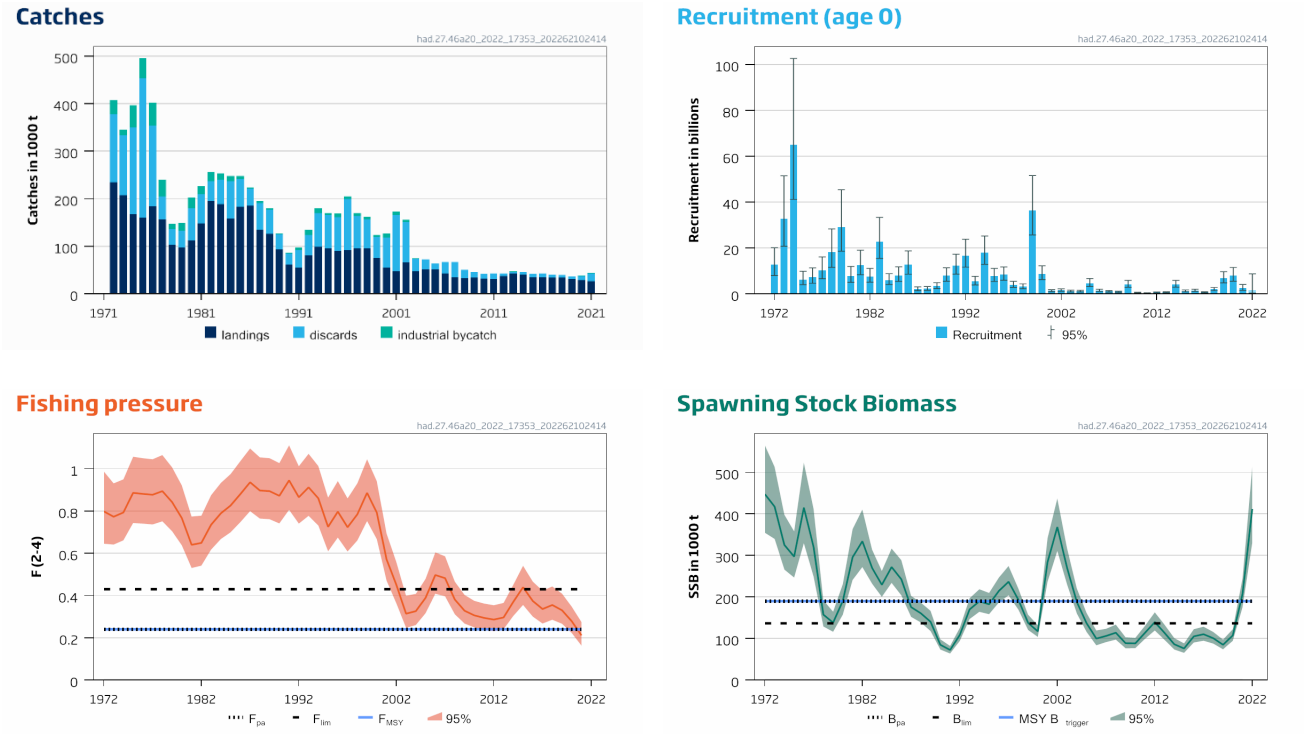

Figure 1 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Summary of the stock assessment. The assumed recruitment value for 2022 is shaded in a lighter colour. Discards include BMS landings.

Catch scenarios

Table 1 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 2–4}$ (2022)	0.111	Based on a catch constraint for 2022. Average exploitation pattern (2019–2021)
SSB (2023)	494 778	Short-term forecast (STF); tonnes
$R_{age\ 0}$ (2022, 2023)	1 623 040	Geometric mean of recruitment resampled from the years 2000–2021; thousands
Total catch (2022)	52 692	TAC for 2022; tonnes
Projected landings (2022)	40 425	STF; assuming average landings ratio by age 2019–2021; tonnes
Projected discards and IBC (2022)	12 267	STF; assuming average discards (including IBC) ratio by age 2019–2021; tonnes

Table 2 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Annual catch scenarios. All weights are in tonnes (t).

Basis	Total catch (2023)	Projected landings (2023)	Projected discards and IBC* (2023)	F_{total} (ages 2–4) (2023)	$F_{projected\ landings}$ (ages 2–4) (2023)	$F_{projected\ discards\ and\ IBC}$ (ages 2–4) (2023)	SSB (2024)	% SSB change ^	% TAC change ^^	% advice change ^^^
ICES advice basis										
MSY approach: F_{MSY}	137 058	118 373	18 685	0.24	0.19	0.05	438 042	−11.50	160	6.50
Other scenarios										
$F = F_{MSY\ lower}$	109 157	94 391	14 766	0.19	0.15	0.04	461 609	−6.70	107	−15.20
$F = F_{MSY\ upper}$#	137 058	118 373	18 685	0.24	0.19	0.05	438 042	−11.50	160	6.50
F = 0	0	0	0	0	0	0	556 373	12.40	−100	−100
F_{pa}	137 058	118 373	18 685	0.24	0.19	0.05	438 042	−11.50	160	6.50
F_{lim}	223 464	192 501	30 963	0.43	0.35	0.09	363 491	−27	324	74
SSB (2024) = B_{lim}	496 564	419 677	76 887	1.54	1.24	0.31	136 540	−72	842	286
SSB (2024) = B_{pa} = MSY $B_{trigger}$	429 169	363 631	65 538	1.13	0.91	0.22	189 733	−62	715	233
$F = F_{2022}$	67 653	58 557	9096	0.11	0.09	0.02	498 369	0.73	28	−47
Rollover TAC	52 690	45 652	7038	0.09	0.07	0.02	511 261	3.30	0	−59

* Including below minimum size (BMS) landings, assuming recent discard rate.

^ SSB 2024 relative to SSB 2023.

^^ Human consumption fishery (HCF) catch in 2023 relative to TAC in 2022: Subdivision 20 (2761 t) + Subarea 4 (44 924 t) + Division 6.a (5006 t) = 52 691 t.

^^^ Total catch 2023 relative to the advice value 2022 (128 708 t).

For this stock, $F_{MSY\ upper} = F_{MSY}$.

Basis of the advice

Table 3 Haddock in Subarea 4, Division 6.a, and Subdivision 20. The basis of the advice.

Advice basis	MSY approach
Management plan	An EU multiannual management plan (MAP) has been agreed by the EU for this stock (EU, 2018). There is no agreement with Norway and UK regarding this plan, and it is not used as the basis of the advice for this shared stock. ICES was requested by the EC and UK to provide advice based on the MSY approach, and to include F_{MSY} ranges in the catch scenarios.

Quality of the assessment

A benchmark was conducted for Northern Shelf haddock in 2022 (WKNSCS; ICES, 2022a). The primary changes consist of a change to a new assessment model (SAM) and the re-estimation of the reference points. Several input datasets were also updated, the most significant being changes to the maturity ogives and survey indices. These changes does not affect the perception of the stock but largely revised the estimates.

Scottish observer sampling was not possible during Q1 of 2021 because of the COVID-19 disruption. Sampling proceeded at a reduced level for the rest of 2021, but this reduced coverage is not thought to have had a significant impact on the quality of catch data for Scotland, which has the main fleets catching haddock.

A combination of several major storms and mechanical issues with some vessels resulted in a reduction in the sampling coverage across the NS-IBTS and SCOWCGFS Q1 surveys in 2022. This increased the uncertainty on the Q1 survey indices, which is now accounted for in the assessment model.

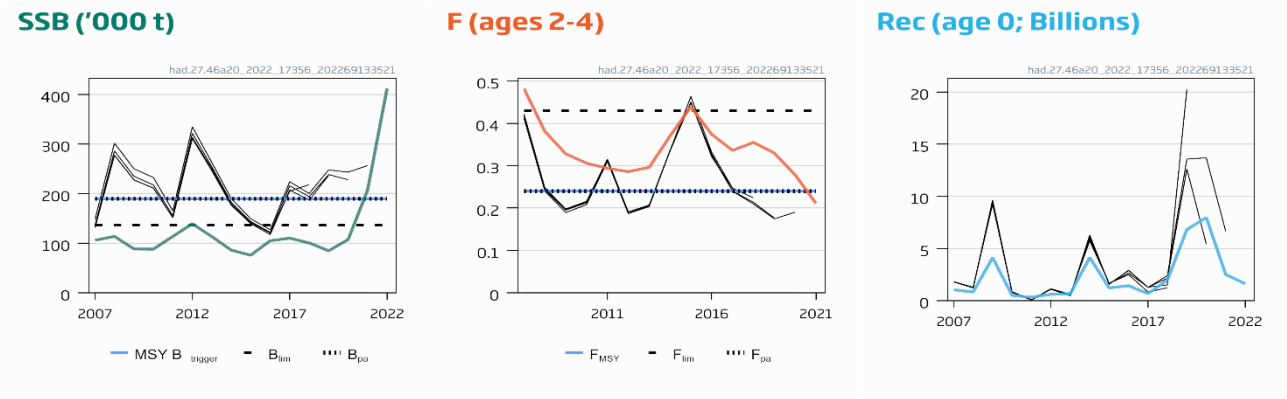

Figure 2 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Historical assessment results (final-year SSB and recruitment included for each line, corresponding respectively to the estimated survivors at the start of the interim year, and the forecast recruitment in the interim year). The reference points were revised in 2022 following a benchmark, and only assessment results from the final year should be compared to the reference points indicated.

Issues relevant to the advice

The new benchmark assessment has resulted in substantial revisions to the absolute levels of historic stock development, fishing mortality and recruitment as well as the reference points. However, all the differences together lead to a catch advice that is only 6.4% different to that given last year for 2022.

More abundant year classes were produced prior to 2000; recruitment since then has tended to be consistently lower. However, the 2019 and 2020 year classes are estimated to be the largest since 2000, which produced a sharp increase in SSB and continues to impact the catch advice.

Haddock on the Northern Shelf is under EU landing obligation and Norway and UK national legislation regulating discards. Landings of fish below the minimum size (BMS) reported to ICES are very low and discarding still takes place. The estimated discards in 2021 were 37% of the total catch by weight, based on observer data.

Reference points

Table 4 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	189 734	B_{pa}; in tonnes.	ICES (2022a)
	F_{MSY}	0.24	Stochastic simulations (EqSim) based on the recruitment period 2000–2020 with segmented regression fixed at B_{lim}.	ICES (2022a)
Precautionary approach	B_{lim}	136 541	Lowest estimated SSB that resulted in high recruitment (1999); in tonnes.	ICES (2022a)
	B_{pa}	189 734	$B_{lim} \times \exp(1.645 \times \sigma)$, $\sigma = 0.20$; in tonnes.	ICES (2022a)
	F_{lim}	0.43	The F that on average leads to B_{lim} from EqSim.	ICES (2022a)
	F_{pa}	0.24	$F_{P.05}$; the F that leads to SSB ≥ B_{lim} with 95% probability.	ICES (2022a)
EU Management Plan (MAP)*	MAP MSY $B_{trigger}$	189 734	MSY $B_{trigger}$; in tonnes.	ICES (2022a)
	MAP B_{lim}	136 541	B_{lim}; in tonnes.	ICES (2022a)
	MAP F_{MSY}	0.24	F_{MSY}	ICES (2022a)
	MAP range F_{lower}	0.186–0.24	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022a)
	MAP range F_{upper}**	0.24–0.24	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022a)

* EU multiannual plan (MAP) for the North Sea (EU, 2018).
** For this stock, $F_{MSY\ upper} = F_{MSY}$.

Basis of the assessment

Table 5 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022b)
Assessment type	Age-based analytical assessment (SAM; Nielsen and Berg, 2014; ICES, 2022c) that uses catches and surveys in the model and in the forecast
Input data	Commercial catches (international catches, ages from catch sampling), two survey indices derived through a delta-GAM approach: "Q1" (combining NS-IBTS [G1022], SWC-IBTS [G1179], SCOWCGFS [G4748]), "Q3+Q4" (combining NS-IBTS Q3 [G2829], Q4 SWC-IBTS [G4299], Q4 SCOWCGFS [G4815], and Q4 IGFS [G7212]). Annually varying maturity data from Q1 NS-IBTS [G1022], Q1 SWC-IBTS [G1179], and Q1 SCOWCGFS [G4748] (1991–2022). Annually varying natural mortalities from the North Sea multispecies model (1974–2020)(ICES, 2021b).
Discards, BMS landings and bycatch	Included in the assessment, data from the main fleets (covering around 86% of the landings in 2021). BMS landings, where reported, are included with discards and industrial bycatch in the assessment from 2016 onwards.
Indicators	None
Other information	Last benchmarked in 2022 during ICES Benchmark Meeting on North Sea and Celtic Sea Stocks (WKNSCS; ICES, 2022a), where several updates were made to biological parameters and a new assessment model was selected.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

History of the advice, catch, and management

Table 6a Haddock in Subarea 4, Division 6.a, and Subdivision 20. **North Sea (Subarea 4).** ICES advice, TAC, official landings, and ICES catch estimates. All weights are in tonnes. Values of landings, discards, and catches for the period 1987 to 2014 are presented to the nearest thousand tonnes.

Year	ICES advice	Landings corresp. to advice	Total catch corresp. to advice^	Agreed TAC	Official landings	ICES landings	ICES discards^^	ICES industrial bycatch	ICES total
1987	80% of F(85)	105 000		140 000	109 000	108 000	59 000	4000	172 000
1988	77% of F(86); TAC	185 000		185 000	105 000	105 000	62 000	4000	171 000
1989	Reduce decline in SSB; TAC; protect juveniles	68 000		68 000	64 000	76 000	26 000	2000	104 000
1990	80% of F (88); TAC	50 000		50 000	43 000	51 000	33 000	3000	87 000
1991	70% of effort (89)			50 000	45 000	45 000	40 000	5000	90 000
1992	70% of effort (89)			60 000	51 000	70 000	48 000	11 000	129 000
1993	70% of effort (89)			133 000	80 000	80 000	80 000	11 000	170 000
1994	Significant reduction in effort; mixed fishery			160 000	87 000	81 000	65 000	4000	150 000
1995	Significant reduction in effort; mixed fishery			120 000	75 000	75 000	57 000	8000	140 000
1996	Mixed fishery to be taken into account			120 000	75 000	76 000	73 000	5000	154 000
1997	Mixed fishery to be taken into account			114 000	73 000	79 000	52 000	7000	138 000
1998	No increase in F	100 300		115 000	72 000	77 000	45 000	5000	128 000
1999	Reduction of 10% F (95–97)	72 000		88 600	64 000	64 000	43 000	4000	111 000
2000	F less than F_{pa}	< 51 700		73 000	47 000	45 000	47 000	8000	100 000
2001	F less than F_{pa}	< 58 000		61 000	40 000	39 000	118 000	8000	165 000
2002	F less than F_{pa}	< 94 000		104 000	54 000	53 000	45 000	4000	101 000
2003	No cod catches	-		52 000	42 000	42 000	23 000	1000	76 000
2004	Mixed-fisheries considerations; F should be below F_{pa}	No forecast*		85 000	48 000	47 000	17 000	1000	65 000
2005	Mixed-fisheries considerations/F should be below F_{pa}	92 000*		66 000	31 000	48 000	10 000	0	57 000
2006	Mixed-fisheries considerations/F < 0.3	39 000*		52 000	36 000	36 000	17 000	0	55 000
2007	Mixed-fisheries considerations/F < 0.3	55 400*		55 000	31 000	31 000	30 000	0	61 000
2008	Mixed-fisheries considerations/15% TAC reduction	49 300*,**		46 000	30 000	29 000	15 000	0	45 000
2009	Mixed-fisheries considerations/apply management plan	44 700*,**		42 000	31 000	30 000	10 000	0	40 000
2010	Mixed-fisheries considerations/apply management plan	38 000*,**		36 000	28 000	28 000	7000	0	35 000
2011	See scenarios	-		34 000	26 000	27 000	10 000	0	37 000
2012	Apply management plan	41 575*,**		39 000	30 000	30 000	4000	0	34 000
2013	Apply management plan	47 811*,**		45 041	37 000***	39 000***	2000***	0	39 000***
2014	Apply management plan	38 201*		38 284	35 000	35 000	4000	65	39 000
2015	(November update) MSY approach		68 690	40 711	30 276	30 013	4676	18	34 707

Year	ICES advice	Landings corresp. to advice	Total catch corresp. to advice^	Agreed TAC	Official landings	ICES landings	ICES discards^^	ICES industrial bycatch	ICES total
2016	MSY approach		≤ 59 945	61 933	30 162	29 713	6106	29	35 848
2017	MSY approach		≤ 39 461	33 643	30 051	29 318	5322	8	34 648
2018	MSY approach		≤ 48 990	41 767	29 417	29 333	3767	30	33 130
2019	MSY approach		≤ 33 956	28 950	25 542	26 697	3570	184	30 451
2020	MSY approach		≤ 41 818	35 653	26 243	26 023	8106	930	35 060
2021	MSY approach		≤ 69 280	42 785	22 402	21 019	11 450	1266	33 735
2022	MSY approach		≤ 128 708	44 924					
2023	MSY approach		≤ 137 058						

* The exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.
** Including industrial bycatch.
*** Subarea 4 and Subdivision 20 combined.
^ Catch advice since 2015 is provided for Subarea 4, Division 6.a, and Subdivision 20.
^^ Since 2016 discards estimated by ICES include BMS landings.
^^^ Due to an InterCatch issue when generating area-specific catch estimates, these values do not sum to the catch-component totals in tables 7, 8, and 9 when added across areas. The latter are used in the assessment.

Table 6b Haddock in Subarea 4, Division 6.a, and Subdivision 20. **Skagerrak (Subdivision 20).** ICES advice, TAC, official landings, and ICES catch estimates. All weights are in tonnes. Values of landings, discards, and catches for the period 1987 to 2014 are presented to the nearest hundred tonnes.

Year	ICES advice	Landings corresp. to advice	Catch corresp. to advice**	Agreed TAC	Official landings	ICES landings	ICES discards^	ICES industrial bycatch	ICES total catch
1987	Precautionary TAC	-		11 500		3800		1400	5300
1988	Precautionary TAC	-		10 000		2900		1500	4300
1989	Precautionary TAC	-		10 000		4100		400	4500
1990	Precautionary TAC	-		10 000		4100		2000	6100
1991	Precautionary TAC	4600		4600		4100		2600	6700
1992	TAC	4600		4600		4400		4600	9000
1993	Precautionary TAC	-		4600		2000		2400	4400
1994	Precautionary TAC	-		10 000		1800		2200	4000
1995	If required, precautionary TAC; link to North Sea	-		10 000		2200		2200	4400
1996	If required, precautionary TAC; link to North Sea	-		10 000		3100		2900	6100
1997	Combined advice with North Sea	-		7000		3400		600	4000
1998	Combined advice with North Sea	4700		7000		3800		300	4000
1999	Combined advice with North Sea	3400		5400		1400		300	1700
2000	Combined advice with North Sea	< 1800		4500		1500		600	2100
2001	Combined advice with North Sea	< 2000		4000		1900		200	2100
2002	Combined advice with North Sea	< 3000		6300		4100		60	4100
2003	Combined advice with North Sea	-		3200		1800	200	n/a	1800
2004	Combined advice with North Sea/ F should be below F_{pa}	No forecast		4900		1400	100	n/a	1400
2005	Combined advice with North Sea/F should be below F_{pa}	-		4000		800	200	0	800
2006	Combined advice with North Sea/F < 0.3	-		3200		1500	1000	0	1500
2007	Combined advice with North Sea/F < 0.3	-		3400		1600	800	0	2500
2008	Combined advice with North Sea/15% TAC reduction	2900		2900		1300	400	0	1800
2009	Combined advice with North Sea/apply management plan	-		2600		1500	400	0	1900
2010	Combined advice with North Sea/apply management plan	-		2200		1400	600	0	2000
2011	See scenarios	-		2100		2100	1300	0	3400

Year	ICES advice	Landings corresp. to advice	Catch corresp. to advice**	Agreed TAC	Official landings	ICES landings	ICES discards^	ICES industrial bycatch	ICES total catch
2012	Apply North Sea management plan	-		2095	2500	2600	800	0	3400
2013	Apply North Sea management plan	-		2770	2000	*	*	*	*
2014	Apply North Sea management plan	2438		2355	2200	2300	200	0	2400
2015	(November update) MSY approach		68 690	2504	1432	1421	163	3	1586
2016	MSY approach		≤ 59 945	3926	1215	1221	93	7	1321
2017	MSY approach		≤ 39 461	2069	1032	1111	134	0	1245
2018	(November update) MSY approach		≤ 48 990	2569	717	797	68	0	865
2019	MSY approach		≤ 33 956	1780	584	628	75	3	706
2020	MSY approach		≤ 41 818	2193	532	402	247	147	796
2021	MSY approach		≤ 69 280	2630	2005	1988	614	93	2695
2022	MSY approach		≤ 128 708	2761					
2023	MSY approach		≤ 137 058						

* Subarea 4 and Subdivision 20 combined (see Table 4a).
** Catch advice since 2015 is given for Subarea 4, Division 6.a, and Subdivision 20.
^ Since 2016, discards estimated by ICES include BMS landings.
^^^ Due to an InterCatch issue when generating area-specific catch estimates, these values do not sum to the catch-component totals in Tables 7, 8, and 9 when added across areas. The latter are used in the assessment.

Table 6c Haddock in Subarea 4, Division 6.a, and Subdivision 20. **West of Scotland (Division 6.a.).** ICES advice, TAC, official landings, and ICES catch estimates. All weights are in tonnes. Values for the period from 1987 to 2014 are presented to the nearest thousand (official landings) or nearest hundred (ICES landings, discards, and total) tonnes.

Year	ICES advice/Single-stock exploitation boundaries from 2004 onwards *	Landings corresp. to advice	Catch corresp. to advice^^	Agreed TAC	Official landings	ICES landings	ICES discards#	ICES industrial bycatch	ICES total catch
1987	Reduce F towards F_{max}	20 000		32 000	27 000	27 000	16 200		43 200
1988	No increase in F; TAC	25 000		35 000	21 000	21 200	9500		30 700
1989	80% of F (87); TAC	15 000		35 000	24 000	16 700	3000		19 700
1990	80% of F (88); TAC	14 000		24 000	13 000	10 100	5400		15 500
1991	70% of effort (89)	-		15 200	10 000	10 600	8700		19 200
1992	70% of effort (89)	-		12 500	7000	11 400**	9300**		20 500**
1993	70% of effort (89)	-		17 600	13 000	19 100**	16 800**		35 900**
1994	30% reduction in effort	-		16 000	9000	14 200**	11 100**		25 000**
1995	Significant reduction in effort	-		21 000	13 000	12 400	8600		20 900
1996	Significant reduction in effort	-		22 900	13 000	13 500	11 400		24 800
1997	Significant reduction in effort	-		20 000	13 000	12 900	6500		19 300
1998	No increase in F	20 800***		25 700	14 000	14 400	5500		19 900
1999	F reduced to F_{pa}	14 300***		19 000	11 000	10 500	4900		15 300
2000	Maintain F below F_{pa}	< 14 900***		19 000	7000	7000	7900		14 900
2001	Reduce F below F_{pa}	< 11 200***		13 900	7000	6870	6600		13 400
2002	Reduce F below F_{pa}	< 14 100***		14 100	7000	7100	8900		16 000
2003	No cod catches	-		8700	4900	5300	4100		9400
2004	F_{pa}*	12 200		6500	3000	3900	3700		7600
2005	0.75 × F_{pa}*	7600		7600	3200	3800	2900		6700
2006	0.7 × F_{pa}*	8000		7810	5700	6300	4600		10 900
2007	0.87 × F_{pa}*	7200		7200	3700	3800	4000		7700
2008	SSB > B_{pa}*	4200		6120	2800	2800	1600		4400
2009	No fishing and recovery plan*	0		3520	2800	2800	1800		4600
2010	No fishing and recovery plan	0		2670	2900	2900	1600		4500
2011	See scenarios	0		2005	1700	1800	1300		3100
2012	MSY framework	5600		6015	5000	5100	500		5600
2013	MSY framework	3100		4211	4700	4800	1000		5800

Year	ICES advice/Single-stock exploitation boundaries from 2004 onwards *	Landings corresp. to advice	Catch corresp. to advice^^	Agreed TAC	Official landings	ICES landings	ICES discards#	ICES industrial bycatch	ICES total catch
2014	MSY approach	6432^		3988	4000	4100	800		4900
2015	(November update) MSY approach		68 690	4536	3889	39 625	1425		5387
2016	MSY approach		≤ 59 945	6462	4265	4346	1626		5972
2017	MSY approach		≤ 39 461	3697	3251	34 564	1615		5071
2018	(November update) MSY approach		≤ 48 990	4654	4318	4380	1391		5771
2019	MSY approach		≤ 33 956	3226	3511	3588	2090		5679
2020	MSY approach		≤ 41 818	3973	2653	2695	619		3314
2021	MSY approach		≤ 69 280	4767	3559	3660	4370		8030
2022	MSY approach		≤ 128 708	5006					
2023	MSY approach		≤ 137 058						

* Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.
** Adjusted for misreporting.
*** For Division 6.a only.
^ This value (6432 t) refers to total catch, including discards. Therefore, it is not directly comparable to the value advised for 2013 (3100 t), which referred only to landings.
^^ Catch advice since 2015 is given for Subarea 4, Division 6.a, and Subdivision 20.
^^^ Due to an InterCatch issue when generating area-specific catch estimates, these values do not sum to the catch-component totals in tables 7, 8, and 9 when added across areas. The latter are used in the assessment.
# Since 2016, discards estimated by ICES include BMS landings.

History of the catch and landings

Table 7 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Catch distribution by fleet in 2021 as used in the assessment model.

Catch	Landings*			Discards**	IBC
44 122 tonnes	Demersal trawl and seine > 100 mm 92%	Trawl 70–99 mm 1.38%	Others 6.8%	16 308 tonnes	1357 tonnes
	26 457 tonnes				

*****Landings include the Norwegian component of BMS landings.
**Discards include BMS landings from EU and UK fleets.

Table 8 Haddock in Subarea 4, Division 6.a, and Subdivision 20. History of official commercial landings, along with ICES estimates for individual areas. All weights are in tonnes.

Subdivision 20														
Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Germany	87	105	65	102	120	90	114	103	125	56	31	30	12	21
Denmark	1052	1263	1139	1661	1916	1456	1764	1059	908	852	542	457	448	1841
Netherlands	0	0	1	0	0	5	6	4	2	20	4	4	1	11
Norway	170	121	81	125	303	223	86	63	70	0	0	0	0	8
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	15	0
Sweden	276	166	126	198	210	217	219	203	110	104	140	93	56	124
UK	0	0	0	0	0	3	0	0	0	0	0	0	0	0
BMS landings										< 1	< 1	0	1	74
Subarea 4														
Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Belgium	112	108	78	106	78	78	98	47	53	30	29	29	40	150
Germany	393	657	634	575	548	677	677	599	554	609	348	313	331	369
Denmark	501	552	725	697	947	1283	1079	1442	1244	1185	1117	1174	1683	1892
Spain	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Faroes	3	32	5	0	0	0	0	0	0	0	0	1	2	0
France	448	135	276	320	175	177	209	100	121	140	201	188	144	219
Greenland	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	130	0
Netherlands	29	24	41	71	191	172	99	44	146	75	102	166	175	291
Norway	1482	1278	1126	1195	1006	1662	2743	2003	1499	2164	1428	1516	3171	2215
Poland	16	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	83	141	90	128	103	113	154	136	118	181	100	111	114	142
UK	27 365	28 393	24 983	23 343	27 378	33 013	29 851	25 905	26 427	25 667	26 091	22 044	20 452	17 123
BMS landings										< 1	15	160	287	208

Division 6.a														
Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Germany	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0	2	2	1	9	4	18
Spain	10	21	28	36	15	14	19	9	33	28	28	64	26	24
Faroes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France	151	136	89	73	32	51	67	41	62	68	66	57	86	92
Ireland	879	297	396	290	845	746	667	768	1034	641	758	562	441	587
Netherlands	0	0	0	0	0	0	0	11	28	31	17	54	13	0
Norway	28	18	9	4	0	6	2	7	5	1	7	10	2	0
UK	1776	2380	2415	1364	4123	3878	3261	3052	3101	2480	3441	2755	2081	2838
BMS landings										0	2	15	26	30
Subarea 4, Division 6.a, and Subdivision 20														
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020*	2021*
Official landings	34 862	35 831	32 308	30 288	37 990	43 864	41 115	35 596	35 642	34 334	34 451	29 637	29 427	27 965
ICES landings	32 692	34 361	31 926	30 273	37 839	43 230	40 589	35 215	35 111	33 799	34 441	30 747	28 942	26 457
ICES discards and IBC^	17 235	12 159	9417	12 609	5073	3473	5336	6262	7819	7061	5245	5702	9987	17 665
ICES total catch	49 927	46 519	41 344	42 882	42 912	46 703	45 926	41 477	42 930	40 860	39 687	36 449	38 928	44 122
TAC 4	46 444	42 110	35 794	34 057	39 000	45 041	38 284	40 711	61 933	33 643	41 767	28 950	35 653	44 924
TAC 3.a 20	2856	2590	2201	2100	2095	2770	2355	2504	3926	2069	2569	1780	2193	2630
TAC 6.a	6120	3520	2670	2005	6015	4211	3988	4536	6462	3697	4654	3226	3973	4767
Total TAC	55 420	48 220	40 665	38 162	47 110	52 022	44 627	47 751	72 321	39 409	48 990	33 956	41 819	50 182

* Preliminary.

^ ICES discards included since 2016 BMS landings from EU and UK fleets.

Summary of the assessment

Table 9 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Assessment summary. Recruitment is in thousands, weights are in tonnes. High and low refers to 95% confidence intervals.

Year	Recruitment (Age 0)			Spawning stock biomass			Landings*	Discards ***	IBC	Fishing pressure (Ages 2–4)		
	R	High	Low	SSB	High	Low				F	High	Low
	thousands			tonnes			tonnes					
1972	12 649 827	20 113 092	7 955 919	447 664	565 255	354 535	234 019	144 366	29 585	0.80	0.99	0.65
1973	32 687 783	51 475 117	20 757 431	417 535	513 277	339 652	207 489	126 105	11 267	0.77	0.93	0.64
1974	64 979 645	102 606 259	41 151 040	325 315	398 085	265 847	167 528	181 802	47 505	0.79	0.95	0.66
1975	6 249 833	9 833 292	3 972 261	297 219	358 137	246 663	160 271	293 321	41 487	0.89	1.06	0.74
1976	7 216 914	11 340 999	4 592 527	415 182	523 568	329 234	184 421	169 776	48 163	0.88	1.05	0.74
1977	10 302 559	16 105 854	6 590 319	320 170	412 156	248 714	156 639	48 732	35 022	0.88	1.04	0.74
1978	18 077 321	28 282 709	11 554 393	157 491	192 402	128 915	102 970	32 860	10 903	0.89	1.06	0.75
1979	29 049 767	45 377 445	18 597 102	138 197	164 641	116 000	97 896	35 054	16 240	0.84	1.01	0.70
1980	7 730 850	11 952 788	5 000 176	190 866	231 481	157 376	111 371	68 831	22 472	0.77	0.92	0.64
1981	12 568 912	19 030 232	8 301 399	295 790	363 448	240 726	147 806	61 683	17 041	0.64	0.77	0.53
1982	7 520 588	11 110 874	5 090 440	334 187	410 793	271 866	195 456	41 297	19 383	0.65	0.78	0.54
1983	22 651 401	33 335 912	15 391 389	269 887	314 169	231 847	188 754	51 584	12 898	0.74	0.88	0.62
1984	5 967 728	8 788 517	4 052 308	229 279	262 782	200 048	158 205	79 012	10 080	0.79	0.93	0.67
1985	7 974 824	11 756 222	5 409 715	272 109	316 718	233 784	182 946	58 373	5998	0.83	0.98	0.70
1986	12 651 223	18 691 287	8 562 998	242 521	288 707	203 724	185 137	36 063	2643	0.88	1.04	0.75
1987	2 068 253	3 046 503	1 404 125	175 563	202 834	151 959	135 022	55 674	4410	0.94	1.10	0.80
1988	2 182 966	3 209 442	1 484 788	160 702	186 494	138 476	126 227	49 833	4002	0.90	1.05	0.76
1989	3 331 710	4 876 122	2 276 460	140 052	166 724	117 647	92 840	32 453	2410	0.89	1.05	0.76
1990	7 883 152	11 353 356	5 473 632	84 855	98 167	73 348	61 605	22 548	2589	0.87	1.03	0.74
1991	12 172 282	17 287 476	8 570 623	72 369	82 189	63 722	55 208	36 610	5386	0.95	1.11	0.81
1992	16 645 721	23 823 591	11 630 490	108 819	125 922	94 038	81 566	42 477	10 927	0.87	1.01	0.74
1993	5 458 651	7 632 031	3 904 186	169 965	196 921	146 699	98 631	70 748	10 766	0.91	1.07	0.78
1994	18 014 805	25 226 697	12 864 673	189 463	218 673	164 156	95 141	70 668	3576	0.86	1.01	0.73
1995	7 732 879	11 098 636	5 387 816	182 341	209 790	158 483	89 859	71 262	7695	0.73	0.86	0.61
1996	8 352 530	11 729 542	5 947 782	214 411	246 633	186 398	92 615	107 207	5000	0.80	0.94	0.67
1997	3 918 301	5 474 646	2 804 398	236 707	274 753	203 930	95 391	67 879	6684	0.72	0.86	0.61
1998	3 125 460	4 363 147	2 238 865	193 454	220 720	169 556	95 472	61 399	5101	0.78	0.93	0.66
1999	36 390 173	51 550 735	25 688 182	137 730	157 492	120 449	76 009	43 562	3835	0.89	1.04	0.75
2000	8 706 721	12 203 038	6 212 142	117 042	132 124	103 682	54 504	64 185	8134	0.79	0.94	0.67
2001	1 297 496	1 831 910	918 984	284 289	341 924	236 369	47 592	117 882	7879	0.57	0.69	0.47
2002	1 559 523	2 182 575	1 114 332	368 458	437 244	310 493	65 405	86 051	3717	0.45	0.56	0.36
2003	1 136 921	1 597 872	808 945	270 109	317 446	229 831	47 282	25 975	1150	0.31	0.40	0.25

Year	Recruitment (Age 0)			Spawning stock biomass			Landings*	Discards ***	IBC	Fishing pressure (Ages 2–4)		
	R	High	Low	SSB	High	Low				F	High	Low
	thousands			tonnes			tonnes					
2004	1 113 678	1 556 649	796 762	188 026	220 738	160 161	51 896	20 020	554	0.33	0.41	0.26
2005	4 611 225	6 667 834	3 188 951	136 860	161 868	115 716	51 528	12 389	168	0.39	0.48	0.32
2006	1 424 468	1 995 510	1 016 837	99 835	119 359	83 504	43 334	23 094	535	0.50	0.60	0.41
2007	1 038 390	1 458 304	739 388	106 115	123 465	91 202	34 672	32 651	48	0.48	0.59	0.40
2008	822 127	1 164 693	580 319	113 882	133 503	97 145	32 692	17 234	1	0.38	0.47	0.31
2009	4 116 082	5 888 324	2 877 242	88 656	103 020	76 294	34 361	12 159	-	0.33	0.40	0.27
2010	499 120	707 224	352 251	88 234	101 620	76 611	31 926	9417	-	0.31	0.38	0.25
2011	329 439	461 757	235 037	113 933	130 890	99 173	30 273	12 609	-	0.29	0.36	0.24
2012	600 032	843 918	426 627	139 435	163 163	119 157	37 839	5054	19	0.29	0.35	0.23
2013	657 116	918 034	470 354	113 522	133 414	96 595	43 230	3305	168	0.30	0.37	0.24
2014	4 126 647	5 877 875	2 897 172	86 111	101 084	73 355	40 589	5271	65	0.37	0.45	0.30
2015	1 214 108	1 696 366	868 951	75 981	88 345	65 347	35 215	6241	21	0.44	0.54	0.36
2016	1 426 828	1 997 470	1 019 209	105 109	122 449	90 223	35 111	7782	37	0.37	0.47	0.30
2017	662 496	926 763	473 585	110 232	128 495	94 565	33 799	7053	8	0.34	0.42	0.27
2018	1 980 231	2 777 843	1 411 641	100 671	115 781	87 532	34 441	5215	30	0.36	0.44	0.28
2019	6 810 487	9 689 090	4 787 109	84 858	97 448	73 895	30 747	5516	186	0.33	0.41	0.27
2020	7 955 652	11 520 390	5 493 946	107 457	122 494	94 265	28 942	8910	1077	0.28	0.35	0.22
2021	2 499 031	4 117 484	1 516 741	207 210	245 324	175 018	26 457	16 308	1357	0.21	0.27	0.162
2022	1 623 040	8 706 721	329 439	412 059	513 977	330 351						

* ICES estimates, presented as the sum of product (SOP) values from the catch and weight-at-age used in the assessment model.
** Discards include since 2016, BMS landings from EU and UK fleets.
*** Recruitment in 2022 is the geometric mean of resampled assessment recruitment estimates from 2000 to 2021.

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