

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

ICES stock advice

Please note: The present advice replaces the advice given in June 2018 for catches in 2019.

ICES advises that when the MSY approach is applied, total catches in 2019 should be no more than 33 956 tonnes.

Stock development over time

Fishing mortality (F) has been fluctuating above F_{MSY} for most of the time-series and is above F_{MSY} in 2017. Spawningstock biomass (SSB) has been above MSY B_{trigger} in most of the years since 2002. Recruitment since 2000 has been characterized by a low average level with occasional larger year classes, the size of which is diminishing.

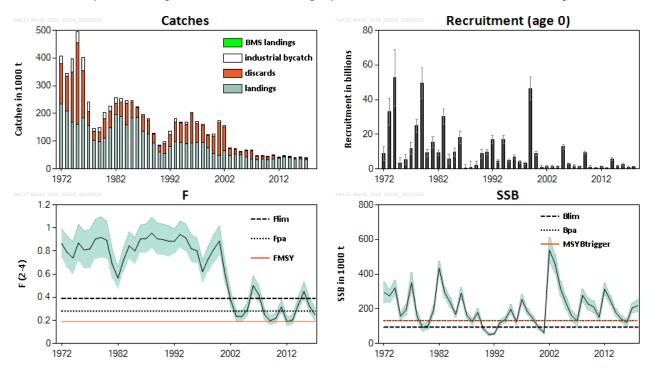


Figure 1 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Summary of the stock assessment. Shaded areas (F, SSB) and error bars (R) indicate ±2 standard error (approximate 95% confidence intervals).

Stock and exploitation status

ICES assessed that fishing pressure on the stock is above F_{MSY} and below F_{pa} and F_{lim} ; SSB is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

Table 1	Haddock in Subarea 4, Division 6.a, and Subdivision 20. State of the stock and fishery relative to reference points.
---------	--

	Fishing pressure						Stock size				
		2015	2016		2017			2016	2017	2018	
Maximum sustainable yield	F _{MSY}	8	⊗	₿	Above		MSY B _{trigger}	8	0	Above trigger	
Precautionary approach	F _{pa} ,F _{lim}	8	0	⊘	Harvested sustainably		B _{pa} ,B _{lim}	0	0	Full reproductive capacity	
Management plan	F _{MGT}	_	_	_	Not applicable		B _{MGT}	_	-	 Not applicable 	

Catch options

 Table 2
 Haddock in Subarea 4, Division 6.a, and Subdivision 20. The basis for the catch options.

Table 2 Haddock III St											
Variable	Value	Notes									
F ages 2–4 (2018)	0.227	F based on TAC for 2018 of 48 990 tonnes.									
SSB (2019)	228 145 tonnes	Short-term forecast (STF)									
R _{age 0} (2018)	1 231 000 thousands	RCT3									
R _{age 0} (2019)	3 529 010 thousands	Assessment model forecast									
Total catch, excl. industrial bycatch (2018)	48 990 tonnes	TAC 2018									
Wanted catch (2018)	44 049 tonnes	STF, relative contribution to total catch by age = average 2015–2017									
Unwanted catch (2018)	4 941 tonnes	STF, relative contribution to total catch by age = average 2015–2017									
Industrial bycatch (2018)	41 tonnes	STF, relative contribution to total catch by age = average 2015–2017									

Table 3	Haddock in Subarea 4, Division 6.a, and Subdivision 20. Annual catch options. All weights are in tonnes.
---------	--

			,	,						0			
Basis	Total catch (2019)	Wanted catch * (2019)	catch *	IBC ** (2019)	HC ** catch (2019)	F _{total} (2019)	F _{wanted} (2019)	F _{unwanted} (2019)	F _{IBC} (2019)	SSB (2020)	% SSB change ***	% TAC change ^	% Advice change
ICES advice basis	()	()	()	II	()	1	I						
MSY approach: F _{MSY}	33956	31120	2799	38	33918	0.194	0.165	0.029	0.00020	202799	-11.1%	-31%	-31%
Other scenarios													
F = MAP^^^ F _{MSY lower}	29532	27069	2425	38	29494	0.167	0.142	0.025	0.00020	207715	-9.0%	-40%	-40%
F = MAP F _{MSY upper} #	33956	31120	2799	38	33918	0.194	0.165	0.029	0.00020	202799	-11.1%	-31%	-31%
F = 0##	41	0	0	41	0	0	0	0	0.00020	240935	5.6%	-100%	-100%
F _{pa}	46493	42579	3877	36	46456	0.274	0.23	0.041	0.00020	188923	-17.2%	-5.2%	-5.1%
Flim	62334	57013	5286	35	62299	0.384	0.33	0.058	0.00020	171531	-25%	27%	27%
SSB (2020) = B _{lim}	122118	110341	11751	26	12209 1	1.02	0.86	0.153	0.00020	94000	-59%	151%	149%
SSB (2020) = B _{pa} = MSY B _{trigger}	97084	88381	8672	30	97054	0.68	0.58	0.103	0.00020	132000	-42%	98%	98%
F ₂₀₁₈	39199	35916	3246	37	39162	0.23	0.193	0.034	0.00020	196985	-13.7%	-20%	-20%
Rollover TAC	49026	44891	4099	36	48990	0.29	0.25	0.044	0.00020	186130	-18.4%	0%	0.074%
Mixed-fisheries sce	narios												
A: Max.	78136					0.522				149569	-34	59	59
B: Min.	21849					0.124				211384	-7	-55	-55
C: COD	21923					0.124				211301	-7	-55	-55
D: SQ effort	39100					0.232				192158	-16	-20	-20
E: Value	39073					0.232				192187	-16	-20	-20
F: range	34046					0.193				203667	-11	-31	-31
* "Wanted" and "	unwanted	" catch a	re used to	descri	he fish th	at wou	ld he l	anded a	nd discarde	d in the a	absence c	f the Fl	Llanding

* "Wanted" and "unwanted" catch are used to describe fish that would be landed and discarded in the absence of the EU landing obligation, based on discard rate estimates for 2015–2017. Unwanted catch includes discards and below minimum size (BMS) landings. ** IBC = Industrial bycatch, HC = Human Consumption.

*** SSB 2020 relative to SSB 2019.

^ Human Consumption catch in 2019 relative to TAC in 2018: Subdivision 20 (2 569 t) + Subarea 4 (41 767 t) + Division 6.a (4 654 t) = 48 990 t.

^^ Total catch 2019 relative to advice value 2018 (48 990 t).

^^^ Proposed EU multiannual plan (MAP) for the North Sea (EU, 2016).

[#] For this stock, F_{MSY upper} = F_{MSY}.

Mixed-fisheries assumptions (note: "fleet's stock share" is used to describe the share of the fishing opportunities for each particular fleet, which has been calculated based on the single-stock advice for 2018 and the historical proportion of the stock landings taken by the fleet):

A. Maximum scenario: Each fleet stops fishing when its last stock share is exhausted.

B. Minimum scenario: Each fleet stops fishing when its first stock share is exhausted.

C. COD-NS: Each fleet stops fishing when its individual cod share is exhausted.

D. SQ (status quo) effort scenario: The effort of each fleet in 2018 and 2019 is as in 2017.

E. Value scenario: The effort of each fleet is equal to the weighted average of the efforts required to catch the fleet's quota share of each of the stocks, where the weights are the relative catch values of each stock in the fleet's portfolio.

F. Range scenario: where the potential for TAC mismatches in 2018 are minimized within the F_{MSY} range, for the demersal fish stocks for which such a range is available (cod.27.47d20, had.27.46a20, pok.27.3a46, ple.27.420, ple.27.7d, sol.27.7d, sol.27.7d, whg.27.47d).

The change in advice (-31%) is due to a combination of a reduction in the F needed to reach F_{MSY} and continued low recruitment.

Table 4 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 proposed for this stock (EU, 2016). This plan is not adopted by Norway, thus, not used as the basis of the advice for this shared stock. ICES was requested by the EC to provide advice based on the MSY approach and to include the MAP as a catch option.

Quality of the assessment

Basis of the advice

The assessment is based on the North Sea (Subarea 4 and Subdivision 20) survey indices, which are considered to be sufficiently representative of the whole stock. No combined survey index for the whole area is available. The differences from the 2017 assessment arise due to a new key run for natural mortality estimates, and the addition of data for 2017.

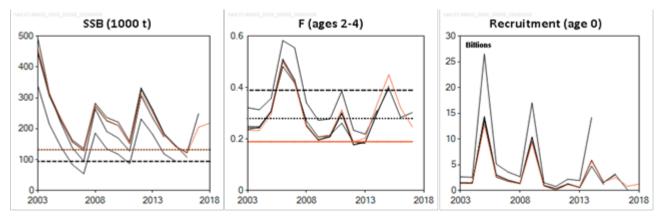


Figure 2 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Historical assessment results.

Issues relevant for the advice

Based on the survey information (IBTS Q3) that has become available in summer 2018, the advice has been updated from that released in June 2018.

More abundant year classes were produced prior to 2000; however, recruitment has tended to be consistently lower since then. Because of the larger 2014 year class, the SSB remains above MSY B_{trigger}. The principal driver of the stock is the occasional larger year classes, which results in strongly fluctuating advice. The magnitude of these strong year classes is decreasing.

Landings of fish below the minimum conservation reference size (MCRS) are very low and discarding still takes place despite the fact that the landing obligation has been in place since 2016. The estimated discard amount is 7029 tonnes in

2017 (approximately 17.6%), based on observer data. ICES understands this to be not in accordance with the current regulations.

Mixed-fisheries considerations

Results from a North Sea mixed-fisheries analysis are presented in the ICES mixed-fisheries advice (ICES, 2018b). The analysis has been updated, taking into account the latest changes made to the assessments and forecasts for stocks with reopened advice.

After years of positive development, North Sea cod is again estimated to be the most limiting stock in the Greater North Sea mixed-fisheries model. For 2019, assuming a strictly implemented landing obligation (corresponding to the "Minimum" scenario in Table 3), cod is estimated to constrain 24 out of 40 fleet segments. Whiting is the second most limiting stock, constraining twelve fleet segments. Conversely, in the "Maximum" scenario, saithe and both plaice stocks (North Sea and Eastern Channel) would be the least limiting for 17, 9, and three fleet segments, respectively. Finally, if Norway lobster were managed by separate TACs, Norway lobster in FU 7 would be the least limiting for seven fleet segments (ICES, 2018a). Haddock is not limiting in mixed-fisheries scenarios (ICES, 2018b).

For those demersal fish stocks for which the F_{MSY} range is available, a "range" scenario is presented that minimizes the potential for TAC mismatches in 2019 within the F_{MSY} range. This scenario returns a fishing mortality by stock which, if used for setting single-stock fishing opportunities for 2019, may reduce the gap between the most and the least restrictive TACs, thus reducing the potential for quota over- and undershoots. This "range" scenario suggests that the potential for mixed-fisheries mismatch would be lowered with a 2019 TAC in the lower part of the F_{MSY} range for North Sea plaice and North Sea saithe, and at the highest possible value for cod in accordance with the MSY approach and the EU MAP (EU, 2016).

		1	and Subdivision 20. Reference points, values, and their technical k	
Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B _{trigger}	132 000 t	B _{pa}	ICES (2016)
	F _{MSY}	0.194	EQsim analysis based on the recruitment period 2000–2015	ICES (2017)
.	B _{lim}	Lowest estimated SSB that resulted in high recruitment (1979)	ICES (2016)	
Precautionary	B _{pa}	132 000 t	$B_{lim} \times exp(1.645 \times 0.2) \approx 1.4 \times B_{lim}$	ICES (2016)
approach	F _{lim}	0.384	EQsim analysis based on recruitment period 2000–2015	ICES (2016)
	F _{pa}	0.274	$F_{lim} \times exp(-1.645 \times 0.2) \approx F_{lim} / 1.4$	ICES (2016)
	MAP MSY B _{trigger}	132 000 t	MSY B _{trigger}	
	MAP Blim	94 000 t	B _{lim}	
	MAP F _{MSY}	0.194	F _{MSY}	ICES (2017)
Management plan*	MAP range F _{lower}	0.167	Consistent with ranges provided by ICES (2017), resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2017)
	MAP range F _{upper}	0.194	Consistent with ranges provided by ICES (2017), resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2017)

Reference points

*Proposed EU multiannual plan (MAP) for the North Sea (EU, 2016).

Basis of the assessment

Table 6Haddock in	Table 6 Haddock in Subarea 4, Division 6.a, and Subdivision 20. Basis of the assessment and advice.									
ICES stock data category	1 (<u>ICES, 2018c</u>).									
Assessment type	Age-based analytical assessment (TSA; ICES, 2018d) that uses catches in the model and in the forecast.									
Input data	Commercial catches (international landings, ages from catch sampling), two survey indices: IBTS Q1, IBTS Q3. Maturity data are assumed fixed over time and knife-edged at age 3, while natural mortality data vary with age and over time (estimates updated ICES, 2018b.									
Discards, BMS landings and bycatch	Included in the assessment, dataseries from the main fleets (covering around 90% of the landings). BMS landings, where reported, are included with discards as unwanted catch in the assessment from 2016 onwards.									
Indicators	None									
Other information	Last benchmarked in 2014 (ICES, 2014), at which it was decided that the previously separate stocks in the North Sea and Skagerrak, and West of Scotland, should be assessed as one stock. WKHAD (ICES, 2014) also updated biological parameters and selected a new assessment model. The 2016 inter-benchmark protocol (ICES, 2016) corrected an error in the computer code and derived a model configuration that reduced the retrospective basis in the extant assessment model, and re-estimated the reference points accordingly.									
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)									

Information from stakeholders

The amount and coverage of input data for the assessment has increased since 2012 through extended sampling programmes such as fully documented fishery (FDF) and the Scottish Industry/Science observer sampling scheme.

History of the advice, catch, and management

Table 7aHaddock in 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	Wanted catch corresp. to advice	Total catch corresp. to advice	Agreed TAC	Official landings	ICES landings	ICES discards	ICES indust. bycatch	ICES total
1987	80% of F(85)	105000		140000	109000	108000	59000	4000	172000
1988	77% of F(86); TAC	185000		185000	105000	105000	62000	4000	171000
1989	Reduce decline in SSB; TAC; protect juveniles	68000		68000	64000	76000	26000	2000	104000
1990	80% of F(88); TAC	50000		50000	43000	51000	33000	3000	87000
1991	70% of effort (89)			50000	45000	45000	40000	5000	90000
1992	70% of effort (89)			60000	51000	70000	48000	11000	129000
1993	70% of effort (89)			133000	80000	80000	80000	11000	170000
1994	Significant reduction in effort; mixed fishery			160000	87000	81000	65000	4000	150000
1995	Significant reduction in effort; mixed fishery			120000	75000	75000	57000	8000	140000
1996	Mixed fishery to be taken into account			120000	75000	76000	73000	5000	154000
1997	Mixed fishery to be taken into account			114000	73000	79000	52000	7000	138000
1998	No increase in F	100300		115000	72000	77000	45000	5000	128000
1999	Reduction of 10% F(95–97)	72000		88600	64000	64000	43000	4000	111000
2000	F less than F _{pa}	< 51700		73000	47000	45000	47000	8000	100000
2001	F less than F _{pa}	< 58000		61000	40000	39000	118000	8000	165000
2002	F less than F _{pa}	< 94000		104000	54000	53000	45000	4000	101000
2003	No cod catches	-		52000	42000	42000	23000	1000	76000
2004	Mixed-fisheries considerations / F should be below F _{pa}	No forecast *		85000	48000	47000	17000	1000	65000

Year	ICES advice	Wanted catch corresp. to advice	Total catch corresp. to advice	Agreed TAC	Official landings	ICES landings	ICES discards	ICES indust. bycatch	ICES total
2005	Mixed-fisheries considerations / F should be below F _{pa}	92 000*		66000	31000	48000	10000	0	57000
2006	Mixed-fisheries considerations / F < 0.3	39 000*		52000	36000	36000	17000	0	55000
2007	Mixed-fisheries considerations / F < 0.3	554 00*		55000	31000	31000	30000	0	61000
2008	Mixed-fisheries considerations / 15% TAC reduction	49300 *,**		46000	30000	29000	13000	0	42000
2009	Mixed-fisheries considerations / Apply management plan	44700 *,**		42000	31000	31000	10000	0	41000
2010	Mixed-fisheries considerations / Apply management plan	38000 *,**		36000	28000	28000	10000	0	38000
2011	See scenarios	-		34000	26000	34000	11000	0	46000
2012	Apply management plan	41575 *,**		39000	30000	30000	4000	1000	35000
2013	Apply management plan	47811 *,**		45041	37000 ***	39000 ***	2000 ***	0 ***	41000 ***
2014	Apply management plan	38201 *		38284	35000	35000	4000	65 ***	39000
2015	(November update) MSY approach		68690	40711	35520	30165	4151	18	34334
2016	MSY approach		≤ 59945	61933	30061	29687	6099^^	29	36006
2017	MSY approach		≤ 39461	33643	29765	29182	5246^^	18	34539
2018	MSY approach		≤ 48990	41767					
2019	MSY approach		≤ 33956						

* 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 given for Subarea 4, Division 6.a, and Subdivision 20.

^^ Since 2016 discards correspond to unwanted catch (including BMS landings).

Table 7b

Haddock in 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	s, discards, and Predicted landings corresp. to advice	Predicted catch corresp. to advice **	Agreed TAC	Official landings	ICES	ICES discards	ICES Indust. bycatch	ICES total catch
1987	Precautionary TAC	-		11500		3800		1400	5300
1988	Precautionary TAC	-		10000		2900		1500	4300
1989	Precautionary TAC	-		10000		4100		400	4500
1990	Precautionary TAC	-		10000		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	-		10000		1800		2200	4000
1995	If required, precautionary TAC; link to North Sea	-		10000		2200		2200	4400
1996	If required, precautionary TAC; link to North Sea	-		10000		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		1400	600	0	2000
2009	Combined advice with North Sea / Apply management plan	-		2600		1500	600	0	2100
2010	Combined advice with North Sea / Apply management plan	-		2200		1300	600	0	1900
2011	See scenarios	-		2100		9900	1700	0	11600
2012	Apply management plan North Sea	-		2095	2500	2600	700	0	3300

Year	ICES advice	Predicted landings corresp. to advice	Predicted catch corresp. to advice **	Agreed TAC	Official landings	ICES landings	ICES discards	ICES Indust. bycatch	ICES total catch
2013	Apply management plan North Sea	-		2770	200	*	*	*	*
2014	Apply management plan North Sea	2438		2355	2100	2300	100	*	2400
2015	(November update) MSY approach		68690	2504	1429	1419	86	3	1508
2016	MSY approach		≤ 59945	3926	1300	1212	97^	7	1316
2017	MSY approach		≤ 39461	2069	1101	1101	105^	1	1207
2018	(November update) MSY approach		≤ 48990	2569					
2019	MSY approach		≤ 33956						

* Combined in Table 7a.

** Catch advice since 2015 is given for Subarea 4, Division 6.a, and Subdivision 20.

^ Since 2016 discards correspond to unwanted catch (including BMS landings).

Table 7cHaddock in Division 6.a. ICES advice, TAC, official landings, and ICES catch estimates. All weights are in tonnes.
Values for the period 1987 to 2014 are presented to the nearest thousand (official landings) or nearest hundred
(ICES landings, discards, and total) tonnes.

	(TEES Iditalings, dised		,						
Year	ICES advice/ Single-stock exploitation boundaries from 2004 onwards *	Predicted landings corresp. to advice	Predicted catch corresp. to advice^^	Agreed TAC	Official landings	ICES landings	ICES discards	ICES indust. bycatch	ICES total catch
1987	Reduce F towards F _{max}	20000		32000	27000	27000	16200		43200
1988	No increase in F; TAC	25000		35000	21000	21200	9500		30700
1989	80% of F(87); TAC	15000		35000	24000	16700	3000		19700
1990	80% of F(88); TAC	14000		24000	13000	10100	5400		15500
1991	70% of effort (89)	-		15200	10000	10600	8700		19200
1992	70% of effort (89)	-		12500	7000	11400 **	9300 **		20500 **
1993	70% of effort (89)	-		17600	13000	19100 **	16800 **		35900 **
1994	30% reduction in effort	-		16000	9000	14200 **	11100 **		25000 **
1995	Significant reduction in effort	-		21000	13000	12400	8600		20900
1996	Significant reduction in effort	-		22900	13000	13500	11400		24800
1997	Significant reduction in effort	-		20000	13000	12900	6500		19300
1998	No increase in F	20800 ***		25700	14000	14400	5500		19900
1999	F reduced to F _{pa}	14300 ***		19000	11000	10500	4900		15300
2000	Maintain F below F _{pa}	< 14900 ***		19000	7000	7000	7900		14900
2001	Reduce F below F _{pa}	< 11200 ***		13900	7000	6870	6600		13400
2002	Reduce F below F _{pa}	< 14100 ***		14100	7000	7100	8900		16000
2003	No cod catches	-		8700	4900	5300	4100		9400
2004	F _{pa} *	12200		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		10900
2007	0.87 × F _{pa} *	7200		7200	3700	3800	4000		7700
2008	SSB > B _{pa} *	4200		6120	2800	2800	1200		4100
2009	No fishing and recovery plan*	0		3520	2800	2900	1600		4500
2010	No fishing and recovery plan	0		2670	2900	3000	2800		5800

Year	ICES advice/ Single-stock exploitation boundaries from 2004 onwards *	Predicted landings corresp. to advice	Predicted catch corresp. to advice^^	Agreed TAC	Official landings	ICES landings	ICES discards	ICES indust. bycatch	ICES total catch
2011	See scenarios	0		2005	1700	1700	1500		3300
2012	MSY framework	5600		6015	5000	5100	500		5600
2013	MSY framework	3100		4211	4700	4600	1000		5600
2014	MSY approach	6432^		3988	4000	4000	800		4800
2015	(November update) MSY approach		68690	4536	3876	3888	1347		5235
2016	MSY approach		≤ 59945	6462	4253	4247	1553#	0	5809
2017	MSY approach		≤ 39461	3697	3262	3255	1583#	0	4838
2018	(November update) MSY approach		≤ 48990	4654					
2019	MSY approach		≤ 33956						

* 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) refers to total catch, including discards. Therefore, it is not directly comparable to the value advised for 2013 (3100), which referred only to landings.

^^ Catch advice since 2015 is given for Subarea 4, Division 6.a, and Subdivision 20.

[#] Since 2016 discards correspond to unwanted catch (including BMS landings).

History of the catch and landings

Table 8	Had	dock in Subarea 4, Division 6.a, and Subd	tion by fleet in 201	.7 as estimated b	y ICES.	
Catch (2017)		Want	Unwanted	Industrial		
Catch (2017)		Wallt	catch	bycatch		
		Demersal trawl and seine > 100 mm	Trawl 70–99 mm	Others		
39 875 tonnes		96%	< 1%	4%	7029 tonnes	19 tonnes
		32 82				

Тэ	h		Q
10	2	C	-

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

	ICES estimates for individual areas. All weights are in tonnes. Subdivision 20									
Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Germany	87	105	65	102	120	90	114	103	125	0
Denmark	1052	1263	1139	1661	1916	1456	1763	1057	973	852
Netherlands	0	0	1155	0	0	5	6	4	2	20
Norway	170	121	81	125	239	223	81	63	70	65
Portugal	0	0	0	0	239	0	0	0	70 0	0
Sweden	276	166	126	198	210	217	219	202	129	103
UK	278	0	0	198	210	3	0	202	0	103
	0	0	0	0	0	5	0	0	0	
BMS landings				Sub	roa A					< 1
Country	2008	2009	2010	2011	area 4 2012	2013	2014	2015	2016	2017
Country Belgium	112	108	78	106	78	78	98	45	53	30
U U	393	657	634	575	548	677	677	599	554	534
Germany										
Denmark	501	552	725	697	947	1283	1079	1426	1213	1185
Spain	0	0	0	0	0	0	0	0	0	0
Faroes	3	32	5	0	0	0	0	0	0	0
France	448	135	276	320	175	177	209	101	121	140
Greenland	0	4	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0	0
Iceland	0	0	0	0	0	0	0	0	0	0
Netherlands	29	24	41	71	191	172	99	43	146	75
Norway	1482	1278	1126	1195	1069	1661	2705	2004	1484	2164
Poland	16	0	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0	0
Sweden	83	141	90	128	103	113	154	135	117	179
UK	27365	28393	24983	23343	0	32993	29758	25852	26374	25376
BMS landings										< 1
-					ion 6.a					
Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Germany	1	0	1	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0	2	2
Spain	10	21	28	36	15	0	19	9	33	28
Faroes	0	0	0	0	0	0	0	0	0	0
France	151	136	89	73	32	51	67	41	62	68
Ireland	879	297	396	290	845	746	653	768	1033	641
Netherlands	0	0	0	0	0	0	0	0	28	31
Norway	28	18	9	4	0	6	15	7	5	1
UK	1776	2380	2415	1364	0	3878	3230	3051	3090	2492
BMS landings										0
				1	ern shelf					
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Official landings	34862	35831	32308	30288	6488	43830	40945	35520	35614	32290
ICES landings	33058	35590	31940	36570	38162	43681	41143	35316	35058	32827
ICES discards	14503	12326	13071	13067	5032	3038	5090	6255	7749^	6936^
ICES IBC	199	52	431	24	1	54	65	21	37	19
ICES total catch	47760	47968	45442	49661	43195	46773	46298	41592	43045	39875
TAC 4	46444	42110	35794	34057	39000	45041	38284	40711	61933	33643
TAC 3.a 20	2856	2590	2201	2100	2095	2770	2355	2504	3926	2069
TAC 6.a	6120	3520	2670	2005	6015	4211	3988	4536	6462	3697
Total TAC	55420	48220	40665	38162	47110	52022	44627	47751	72321	46538

^ Since 2016 discards correspond to unwanted catch (including BMS landings).

Summary of the assessment

Table 10

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

Vess Age 0 High Low SS8 High Low Age 3.2 High Low 1972 29843270 12938190 4048550 295770 233210 237200 121555 1155 0.79 0.93 0.86 0.90 0.93 0.86 0.93 0.86 0.93 0.86 0.93 0.86 0.93 0.93 0.85 0.93 0.93 0.85 0.93 0.93 0.93 0.85 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.91 0.97 0.93 0.94 0.93 0.94 0.93<			Recruitment	Thigh and lo	Wielers to .	SSB							
Age 0 High Low Stable High Low Cath Cath Opt Cath Opt Cath High Low 1972 39231300 4043850 234700 232300 230490 144365 0.79 0.93 0.96 0.93 0.95 0.44 0.95 0.47 0.98 0.65 1974 5327420 6495100 337800 17750 116271 12971 143250 0.93 0.97 0.93 0.97 0.95 0.97 0.95 0.97 0.95 0.97 0.95 0.97 0.95 0.97 0.99 0.07 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97	Year							Wanted	Unwanted	Industrial	Δσος 2_	F	
1974 32231300 40747600 2511500 317280 237230 207489 112605 11267 0.78 0.98 0.68 1974 522630 6809160 337860 157330 178700 156271 129321 41487 0.87 0.88 0.66 1975 543260 8317500 258200 13970 156270 150270 150270 32860 10093 0.09 1.67 1977 11174670 1253710 2912070 157300 118400 70102 32860 10093 0.09 1.67 1978 42784880 2863770 20912070 157100 124060 111371 68631 22472 0.80 1.06 0.73 1980 1515490 1115440 7044850 125020 110740 17406 616831 22472 0.80 1.06 0.73 1981 595390 1264470 1393742 155340 10741 0.86 0.81 0.55 1982		Age 0	High	Low	SSB	High	Low	catch*	catch**	bycatch		High	Low
1976 5322330 6890530 3543330 220420 353700 277.40 115728 118802 47505 0.74 0.88 0.68 1975 333740 640150 337500 177700 123271 10271 291321 41487 0.87 1.03 0.71 1976 5452360 8315500 258920 19370 124240 16310 184421 169076 41863 0.81 0.97 0.65 1977 1187670 15272150 847710 2012070 15711 18400 10303 112970 22860 106030 112771 683350 12472 0.80 1.06 0.73 1980 910630 115282 925300 167870 147806 66183 17041 0.68 0.81 0.55 1982 925440 1023400 74570 39310 195456 11297 19333 0.56 0.67 0.33 0.427 0.83 0.27 0.83 0.27 0.83 0.	1972	8943270	12938190	4948350	294770	353310	236230	234019	144366	29585	0.86	0.99	0.74
1976 3374400 6409160 337800 15730 15730 160271 293321 64487 0.87 1.03 0.71 1976 545240 4831500 258220 19377 224230 163310 16633 44732 64631 0.81 0.97 0.65 1977 11874670 1527150 247100 136300 103630 116410 0.97 10.6 0.71 73 1037 10.70 1037 1037 1037 1036 0.16 0.17 103 0.66 0.61 0.71 1038 1064164 10531 10380 10380 10380 10380 1148076 10580 126370 126370 126370 126370 126370 126370 1263	1973	32931300	40747600	25115000	275070	312910	237230	207489	126105	11267	0.79	0.93	0.65
1976 5452360 831500 258920 193770 112421 16310 164421 1169776 148163 0.81 0.97 0.65 1977 1147670 152710 347900 102300 102300 102370 32860 10603 0.92 1.00 0.77 1978 44566390 58340290 40792400 102201 124060 71120 97896 35054 116240 0.92 1.10 0.77 1980 9101630 11158410 7044550 102701 124060 81360 111371 66831 71938 0.82 0.83 0.65 0.66 0.47 1981 5527690 8460530 324840 2230710 155205 73012 11080 0.83 0.92 0.92 1985 115050 1202340 7163280 126700 128020 15030 12024 58373 595874 4410 0.91 1.03 0.78 1986 11201500 273500 126700	1974	52623630	68905930	36341330	320420	363700	277140	167528	181802	47505	0.74	0.88	0.60
1977 11374670 15272150 9477120 349260 208140 29080 156639 44772 95022 0.02 0.09 0.05 1978 24248490 2650710 201200 15730 130530	1975	3373420	6409160	337680	157530	178790	136270	160271	293321	41487	0.87	1.03	0.71
1978 24784890 28657710 2091070 157310 184090 102370 32860 10903 0.90 1.07 0.73 1979 4456630 55340020 407240 12280 114101 76886 5534 16240 0.92 1.08 0.73 1981 15386900 1862353 12165450 193950 220301 167870 147806 66831 12047 0.88 0.55 1982 9254480 1023800 7575850 434790 439301 15555 41727 1338 0.56 0.67 133910 1185205 121080 0.68 0.67 0.73 1984 552760 856090 324480 126507 126300 16310 184270 155205 7912 1000 0.80 0.97 0.73 1985 181050 126270 126307 16317 184270 155205 13502 15544 4410 0.91 1.03 0.78 1986 184160 <td< td=""><td>1976</td><td>5452360</td><td>8315500</td><td>2589220</td><td>193770</td><td>224230</td><td></td><td>184421</td><td>169776</td><td>48163</td><td>0.81</td><td>0.97</td><td>0.65</td></td<>	1976	5452360	8315500	2589220	193770	224230		184421	169776	48163	0.81	0.97	0.65
1979 49566390 5840290 40792490 92580 11400 7120 7786 33554 16240 0.92 1.10 0.74 1980 191030 1115811 70486 11371 16831 22.42 0.83 0.51 0.4170 0.83 0.51 0.4170 0.83 0.51 0.4170 0.83 0.51 0.4170 0.83 0.52 0.417 0.83 0.52 0.64 0.477 1981 30169940 3444176 256370 266330 188740 18874 51584 11080 0.85 0.97 0.73 1985 953500 1202440 716320 16743 182200 185245 5263 22644 0.03 1.03 0.78 1986 155507 2244910 0 112600 143160 118240 13243 32433 4001 0.91 1.03 0.78 1988 1044190 4473870 0 122600 145560 32470 122548 <	1977	11874670	15272150	8477190	349260	408140	290380		48732	35022	0.82	0.99	
1980 1911830 1115841 7044850 102720 124080 81360 11137 66883 22472 0.89 1.06 0.73 1981 15398990 18622350 12165450 139350 126570 147806 61683 17041 0.68 0.66 0.47 1982 3254400 10923380 757580 434790 475670 339310 129456 41297 1983 0.56 0.66 0.47 1984 5527690 6666930 3048450 226700 265370 18525 57932 10080 0.85 0.97 0.73 1986 181050 1125340 1452100 185137 30663 2643 0.91 1.03 0.78 1988 1044150 4473870 0 113600 145250 135022 55674 4410 0.91 1.04 0.77 1989 170420 1130520 215400 132620 13550 5237 138316 126657 13830 <t< td=""><td>1978</td><td>24784890</td><td>28657710</td><td>20912070</td><td>157310</td><td>184090</td><td>130530</td><td>102970</td><td>32860</td><td>10903</td><td>0.90</td><td>1.07</td><td>0.73</td></t<>	1978	24784890	28657710	20912070	157310	184090	130530	102970	32860	10903	0.90	1.07	0.73
1981 15398900 1663230 1216450 12900 167870 147806 61683 17041 0.68 0.81 0.55 1982 2254480 10929380 7579580 443790 475670 393910 195456 41297 19383 0.56 0.67 0.83 0.62 1984 5827690 8666930 3044450 226370 126320 15740 184274 15559 12829 0.72 0.83 0.62 1985 953360 1202440 715620 1821050 182946 55873 30603 2643 0.91 1.03 0.78 1986 1044190 4473870 0 126000 143160 108840 126227 49833 4002 0.96 1.09 0.82 1989 1978730 4520910 0 175520 201440 15560 22484 22489 0.99 1.04 0.77 1990 87.0720 1136150 8275505 5110 5970 44270	1979	49566390	58340290	40792490	92580	114040	71120	97896	35054	16240	0.92	1.10	0.74
1982 925480 1092930 757580 934700 975670 939310 19565 41207 19383 0.56 0.66 0.47 1983 3016940 34461760 25878120 224300 226630 207610 158205 79012 10080 0.85 0.97 0.73 1985 5593360 1202440 7163280 167430 184270 150590 182946 58373 5998 0.80 0.92 0.69 1986 1811050 2159400 1420701 150500 218137 30603 22613 0.73 0.73 1987 255070 2544310 0 163170 18109 145250 135022 55674 4410 0.91 1.03 0.78 1988 104190 4473870 0 126207 47833 0402 0.90 1.03 0.77 1990 8710820 11305820 614707 55030 44277 1027 0.88 0.99 0.78	1980	9101630	11158410	7044850	102720	124080	81360	111371	68831	22472	0.89	1.06	0.73
1983 30169940 34461760 25878120 294330 263970 18874 518244 12884 12893 0.72 0.83 0.62 1984 5827690 8606930 162320 126340 7163280 167430 184270 150590 18296 58373 59598 0.80 0.92 0.69 1986 18110550 21593490 14627610 280960 322000 256120 181317 36063 2643 0.91 1.03 0.78 1987 255070 2544910 0 126000 143160 108840 222247 49833 4002 0.91 1.04 0.77 1980 170820 11305820 6115820 85070 96830 73310 61605 22548 2589 0.00 1.03 0.77 1991 9170330 11361550 8273550 51110 59595 44270 55584 64017 10823 38661 5386 0.88 0.99 0.78 1097	1981	15398990	18632530	12165450	193950	220030	167870	147806	61683	17041	0.68	0.81	0.55
1984 5827690 8606930 3048450 236970 266330 207610 15205 79012 10080 0.85 0.97 0.73 1985 9593360 12023440 7163280 167430 184270 150590 182045 58373 5998 0.80 0.92 0.69 1987 255070 2544910 0 163170 181090 145250 135022 55674 4410 0.91 1.03 0.78 1988 1044190 4473870 0 126000 143160 108840 126227 55674 4410 0.91 1.04 0.77 1990 917802 1130520 6115820 8070 96330 73310 61605 22484 2589 0.90 1.03 0.77 1991 981750 11361550 827350 525200 11470 13330 103610 98631 70748 1032 0.88 0.90 0.75 1992 1703330 1952550 142470	1982	9254480	10929380	7579580	434790	475670	393910	195456	41297	19383	0.56	0.66	0.47
1985 9593360 12023400 7163280 167430 184270 150590 182946 58373 5998 0.80 0.92 0.69 1986 18110550 21593490 14627610 280060 322000 256120 185137 36663 26431 0.91 1.03 0.78 1987 265070 2544910 0 126000 143160 108840 126227 49833 4002 0.96 1.09 0.82 1989 1978730 4520910 0 178520 201440 155600 22644 2589 0.90 1.03 0.77 1990 8710820 1136580 8273550 52110 59950 44270 55208 36610 5386 0.89 1.02 0.75 1992 1703330 19525050 14541730 55850 61470 150810 70748 10766 0.94 1.06 0.83 1994 17004120 1930840 1470400 138020 157300 <t< td=""><td>1983</td><td>30169940</td><td>34461760</td><td>25878120</td><td>294330</td><td>324690</td><td>263970</td><td>188754</td><td>51584</td><td>12898</td><td>0.72</td><td>0.83</td><td>0.62</td></t<>	1983	30169940	34461760	25878120	294330	324690	263970	188754	51584	12898	0.72	0.83	0.62
1986 18110550 21593490 14627610 289060 322000 256120 185137 336033 2643 0.91 1.03 0.78 1987 265070 2544910 0 163170 181090 145250 135022 55674 4410 0.91 1.03 0.78 1988 1044190 4473870 0 126000 143160 108840 126227 49833 4002 0.96 1.09 0.82 1989 1978730 4520910 0 178520 201440 155600 92840 32453 2549 0.99 1.04 0.77 1990 981750 11361950 8273550 52110 59950 44270 55208 36610 5386 0.89 1.02 0.75 1992 1703330 19525505 1454173 55850 61470 50230 81566 42747 10976 0.94 1.06 0.83 1993 4304560 586500 137300 118740	1984	5827690	8606930	3048450	236970	266330	207610	158205	79012	10080	0.85	0.97	0.73
1987 265070 2544910 0 163170 181090 145200 135022 55674 4440 0.91 1.03 0.78 1988 1044190 4473870 0 126000 143160 108840 126227 49833 4000 0.96 1.09 0.82 1989 1978730 4520910 0 178520 201440 155600 92240 32435 2410 0.91 1.04 0.77 1991 9817550 11361950 8273550 55100 56164 42477 10927 0.88 0.99 0.78 1993 4705450 55680 157300 118740 95831 70748 10766 0.94 1.06 0.83 1994 17004120 1933840 14704400 19830 10760 8985 71422 7695 0.82 0.94 0.70 1996 6890100 8049980 573020 124570 188910 110230 92615 107207 5000	1985	9593360	12023440	7163280	167430	184270	150590	182946	58373	5998	0.80	0.92	0.69
1988 1044190 4473870 0 126000 143160 108840 126227 49833 4002 0.96 1.09 0.82 1989 1377870 450910 0 17820 201440 155600 32453 2440 0.91 1.04 0.77 1991 9817750 11361950 8273550 52110 59950 44270 55208 36610 5386 0.89 1.02 0.75 1992 17033390 19525050 14541730 55850 61470 50238 36610 5386 0.89 1.02 0.75 1993 4304560 5086300 3522820 118370 118740 95141 70668 3576 0.92 1.04 0.80 1995 4796300 557420 4017680 128570 128570 128570 128570 107207 5000 0.80 0.92 0.69 1997 4149970 4941190 3358750 252820 223270 25350 66184 </td <td>1986</td> <td>18110550</td> <td>21593490</td> <td>14627610</td> <td>289060</td> <td>322000</td> <td>256120</td> <td>185137</td> <td>36063</td> <td>2643</td> <td>0.91</td> <td>1.03</td> <td>0.78</td>	1986	18110550	21593490	14627610	289060	322000	256120	185137	36063	2643	0.91	1.03	0.78
1989 197830 4520910 0 178520 201440 155600 92840 32453 2410 0.91 1.04 0.77 1990 8710820 11361950 6115820 85070 96830 73310 61605 22548 2589 0.90 1.03 0.77 1991 9817750 11361950 8273550 14541730 55850 61470 50230 81566 42477 10927 0.88 0.99 0.78 1993 4304560 5086300 325220 118740 13330 103610 98631 70748 10766 0.94 1.06 0.83 1995 4796300 5574920 4017680 198670 225170 168570 89859 71262 7665 0.82 0.94 0.70 1996 6890100 8049980 5730220 128270 188130 202620 16440 95472 61399 5101 0.73 0.44 0.62 1997 4149970 493850	1987	265070	2544910	0	163170	181090		135022		4410	0.91	1.03	0.78
1990 8710820 11305820 6115820 85070 96830 73310 61605 22548 2589 0.90 1.03 0.77 1991 9817750 11361950 8273550 52110 59950 44270 55208 36610 5386 0.88 1.02 0.75 1992 17033300 19525055 14541730 55850 61470 50230 81566 42477 10927 0.88 0.99 0.78 1993 4304560 5086300 3522820 118470 13330 103610 98631 70748 10766 0.94 1.06 0.83 1994 17004120 1930340 1470400 198670 225170 168570 89859 71262 7695 0.82 0.92 0.69 1997 4149970 4941190 3358750 252820 22240 23450 16399 5101 0.73 0.44 0.69 1997 4149870 49430 2562670 183380 <td< td=""><td>1988</td><td>1044190</td><td>4473870</td><td>0</td><td>126000</td><td>143160</td><td>108840</td><td>126227</td><td>49833</td><td>4002</td><td>0.96</td><td>1.09</td><td>0.82</td></td<>	1988	1044190	4473870	0	126000	143160	108840	126227	49833	4002	0.96	1.09	0.82
1991 9817750 11361950 8273550 52110 59950 44270 55208 36610 5386 0.89 1.02 0.75 1992 1703330 19525050 14541730 55850 61470 50230 81566 42477 10927 0.88 0.99 0.78 1993 4304560 5086300 3522820 118470 133330 103610 98631 70748 10766 0.94 1.06 0.83 1994 17004120 19303840 1470400 138020 157300 11870 95141 70668 3576 0.92 1.04 0.80 1995 4796300 5574920 4017680 252170 168570 98859 71222 7695 0.82 0.94 0.02 1.02 0.75 1997 4149970 4941190 335875 25280 2223420 95391 67879 6664 0.62 0.72 0.52 1997 44368080 5305240 3972100 <t< td=""><td>1989</td><td>1978730</td><td>4520910</td><td>0</td><td>178520</td><td>201440</td><td>155600</td><td>92840</td><td>32453</td><td>2410</td><td>0.91</td><td>1.04</td><td>0.77</td></t<>	1989	1978730	4520910	0	178520	201440	155600	92840	32453	2410	0.91	1.04	0.77
19921703339019525050145417305585061470502308156642477109270.880.990.78199343045605086300352220118470133330105109961170748107660.941.060.831994170041201393084014704040013802015730011874099514170668835760.921.040.8819954479630055749204017680196870225170168570898597126276950.820.940.701996689010080499805330201245701389101102309261510720750000.800.920.69199741499704941190338570252820223420953916787966840.620.720.52199831262703688870256267018338020262164140954726139951010.730.840.62200090587701028261078349309266010536077960545046418581340.891.020.75200191449022337006271071450539704759211788278790.600.710.49200412229501883370562305378606110404646806605137170.330.450.33200517734018430232014016040019550012783021289	1990	8710820	11305820	6115820	85070	96830	73310	61605	22548	2589	0.90	1.03	0.77
1993430456050863003522820118470133301036109863170748107660.941.060.83199417004120193034014704400138020157300118740951417066835760.921.040.801995479630055749204017680196870225170168570898597126276950.820.940.70199666890100804998057302201245701383101102309261510720750000.800.920.691997444997049411903358750252820223420953916787966840.620.720.521998312627036898702562670183380202620164140954726139951010.730.840.69200090587701028261078349309266010536079960545046418581340.891.020.772011914490223357006271071450539704759211788278790.600.710.4920021222550188337056233537860611040464680654058605137170.370.450.3020041336720171340096184031555035933027257051896200205540.230.280.18420052727501141900223070223702783013265143	1991	9817750	11361950	8273550	52110	59950	44270	55208	36610	5386	0.89	1.02	0.75
1994170041201930384014704400138020157300118740951417066835760.921.040.801995479630055749204017680196870225170168570898597126276950.820.940.701996689010080499805730220124570138910110209261510720750000.800.920.691997414997049411903358750252802282202234209539167879666840.620.720.521998312627036898702562670183380202620164140954726139951010.730.840.62199946386980530523603971600142890160430125350760094356238350.820.940.69200090587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450537604759211788278790.600.710.49200212229501883370562530537860611040464680654058605137170.370.450.3020031362610189919082603046041051545040370472822597511500.230.280.1832004133762017140096184031595035930 <td< td=""><td>1992</td><td>17033390</td><td>19525050</td><td>14541730</td><td>55850</td><td>61470</td><td>50230</td><td>81566</td><td>42477</td><td>10927</td><td>0.88</td><td>0.99</td><td>0.78</td></td<>	1992	17033390	19525050	14541730	55850	61470	50230	81566	42477	10927	0.88	0.99	0.78
1995479630055749204017680196870225170168570898597126276950.820.940.7019966890100804998057302201245701389101102309261510720750000.800.920.691997414997049411903358750252820282220223420953916787966840.620.720.52199831627036898702562670183380202620164140954726139951010.730.840.621999463869805305236039721600142890160430125350760094356238350.820.940.69200090587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450539704759211788278790.600.710.492002122250188370562530537860611040464680654058605137170.370.450.30200313626101899190826030460410515450405370472822597511500.230.280.1832004137620171340096184031595035930027257051896200205540.230.260.13200512754031349402320140160040190500129	1993	4304560	5086300	3522820	118470	133330	103610	98631	70748	10766	0.94	1.06	0.83
19966890100804998057302201245701389101102309261510720750000.800.920.691997414997049411903358750252820228220223420953916787966840.620.720.521998312627036898702562670183380202620164140954726139951010.730.840.621999463869805305236039721600142890160430125350760094356238350.820.820.75200090587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450539704759211788278790.600.710.4920021222501883370562530537860611040464680654058605137170.370.450.302004133620171340096184031595035933027257051896200205540.230.280.1832005127636014107201141990023297027083019511051528123891680.300.360.2420071813230247115013156016040019050012958043334230945350.500.590.4120071813230247115011551013160010160346	1994	17004120	19303840	14704400	138020	157300	118740	95141	70668	3576	0.92	1.04	0.80
1997414997049411903358750252820282220223420953916787966840.620.720.521998312627036898702562670183380202620164140954726139951010.730.840.621999463869805305236039721600142890160430125350760094356238350.820.940.692000990587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450539704759211788278790.600.710.49200212229501883370562530537860611040464680654058605137170.370.450.30200313626101899190826030460410515450405370472822597511500.230.280.1842004133762017134009618403159503593027275051896200205540.300.360.2420051276356014107201141990023297027083019511051528123891680.300.60.2420071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024	1995	4796300	5574920	4017680	196870	225170	168570	89859	71262	7695	0.82	0.94	0.70
1998312627036898702562670183380202620164140954726139951010.730.840.621999463869805305236039721600142890160430125350760094356238350.820.940.69200090587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450539704759211788278790.600.710.49200212229501883370562530537860611040464680654058605137170.370.450.30200313626101899190826030460410515450405370472822597511500.230.280.18420041337620171340096184031595035933027257051896200205540.230.280.184200527275403134940232014016004019050012958043334230945350.500.590.412007181323024711501153101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.196201085728021194000213770242370193570 <td>1996</td> <td>6890100</td> <td>8049980</td> <td>5730220</td> <td>124570</td> <td>138910</td> <td>110230</td> <td>92615</td> <td>107207</td> <td>5000</td> <td>0.80</td> <td>0.92</td> <td>0.69</td>	1996	6890100	8049980	5730220	124570	138910	110230	92615	107207	5000	0.80	0.92	0.69
1999463869805305236039721600142890160430125350760094356238350.820.940.69200090587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450539704759211788278790.600.710.49200212229501883370562530537860611040464680654058605137170.370.450.30200313626101899190826030460410515450405370472822597511500.230.280.18420041337620171340096184031595035933027257051896200205540.300.360.24200627275403134940232014016004019050012958043334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.352008126931017914707471502775203138024118033058145031990.250.300.16620099369401028340839040227970262370135501326513067240.310.380.252010857280211940002113702446501780903	1997	4149970	4941190	3358750	252820	282220	223420	95391	67879	6684	0.62	0.72	0.52
200090587701028261078349309266010536079960545046418581340.891.020.752001914490223357006271071450539704759211788278790.600.710.49200212229501883370562530537860611040464680654058605137170.370.450.3020031362610189919082603046041051540405370472822597511500.230.280.18320041337620171340096184031595035930027257051896200205540.230.280.18320051276356014107201141990023297027083019511051528123891680.300.360.24200627275403134940232014016004019050012958043334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.16620108572802119400021137024465017809031540130714310.220.260.1702011649001033660015164017376012952036570	1998	3126270	3689870	2562670	183380	202620	164140	95472	61399	5101	0.73	0.84	0.62
2001914490223357006271071450539704759211788278790.600.710.49200212229501883370562530537860611040464680654058605137170.370.450.30200313626101899190826030460410515450405370472822597511500.230.280.18420041337620171340096184031595035933027257051896200205540.230.280.18320051276356014107201141990023297027083019511051528123891680.300.360.24200627275403134940232014016004019050012958043334230945350.500.590.41200718132302471150115531013126016136010116034672326514480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.16620108572802119400021137024465017809031940130714310.220.260.1702011649001033060015164017376012952036570130672440.310.380.25201211369601585720682003135103481302789038162<	1999	46386980	53052360	39721600	142890	160430	125350	76009	43562	3835	0.82	0.94	0.69
200212229501883370562530537860611040464680654058605137170.370.450.302003136261018991908260304604105154504053704728225975111500.230.280.18420041337620171340096184031595035933027257051896200205540.230.280.18320051276356014107201141990023297027083019511051528123891680.300.360.24200627775403134940232014016004019050012958044334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.19620099336940102838408390402279702623701935703559012326520.1980.240.562010857280211940002113702446501789031940130714310.220.260.1702011649001033060015164017376012952036570130672440.310.380.2520121136960158572068200313510348130278890 <t< td=""><td>2000</td><td>9058770</td><td>10282610</td><td>7834930</td><td>92660</td><td>105360</td><td>79960</td><td>54504</td><td>64185</td><td>8134</td><td>0.89</td><td>1.02</td><td>0.75</td></t<>	2000	9058770	10282610	7834930	92660	105360	79960	54504	64185	8134	0.89	1.02	0.75
200313626101899190826030460410515450405370472822597511500.230.280.18420041337620171340096184031595035933027257051896200205540.230.280.183200512763560141072201141990023297027083019511051528123891680.300.360.24200627275403134940232014016004019050012958043334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.19620099336940102838408390402279702623701935703559012326520.1980.240.5620108572802119400021137024465017809031940130714310.220.260.170201164900103306001516401737601255203657013067240.310.380.25201211369601587206882003135103481302789038162503210.1880.230.1622013607300997360217240250330277190223470437	2001	914490	2233570	0	62710	71450	53970	47592	117882	7879	0.60	0.71	0.49
20041337620171340096184031595035933027257051896200205540.230.280.18320051276356014107201141990023297027083019511051528123891680.300.360.24200627275403134940232014016004019050012958044334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.19620099336940102838408390402279702623701935703559012326520.1980.240.5620108572802119400021137024465017809031940130714310.220.260.170201164900103306001516401737601295203657013067240.310.380.252012113690158572068820031351034813027889038162503210.1880.230.16201360730099736021724025030277190223470437343305540.200.250.162201457116106533390488983017949020219015679041143 </td <td>2002</td> <td>1222950</td> <td>1883370</td> <td>562530</td> <td>537860</td> <td>611040</td> <td>464680</td> <td>65405</td> <td>86051</td> <td>3717</td> <td>0.37</td> <td>0.45</td> <td>0.30</td>	2002	1222950	1883370	562530	537860	611040	464680	65405	86051	3717	0.37	0.45	0.30
200512763560141072201141990023297027083019511051528123891680.300.360.24200627275403134940232014016004019050012958043334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.19620099336940102838408390402279702623701935703559012326520.1980.240.5620108572802119400021137024465017809031940130714310.220.260.170201164900103306001516401737601295203657013067240.310.380.25201211369015857206882003135103481302789038162503210.1880.230.162013607300997360217240250330277190223470437343305540.000.250.162201457116106533390488930179490202190156790411435090650.340.400.2720151663010203445012915701415016214012090035295	2003		1899190	826030	460410	515450	405370	47282	25975	1150	0.23	0.28	0.184
200627275403134940232014016004019050012958043334230945350.500.590.4120071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.196200993369401028384083900402279702623701935703559012326520.1980.240.15620108572802119400021137024465017809031940130714310.220.260.170201164900103306001516401737601295203657013067240.310.380.2520121136960158572068820031351034813027889038162503210.1880.230.1462013607300997360217240250330277190223470437343305540.200.250.1622014571161065333904889830179490202190156790411435090650.340.400.272015166301020344501291570144520162140120900352956255210.450.530.3720162490960329876016831601207301415109995035058 <td>2004</td> <td>1337620</td> <td>1713400</td> <td>961840</td> <td>315950</td> <td>359330</td> <td>272570</td> <td>51896</td> <td>20020</td> <td>554</td> <td>0.23</td> <td>0.28</td> <td>0.183</td>	2004	1337620	1713400	961840	315950	359330	272570	51896	20020	554	0.23	0.28	0.183
20071813230247115011553101312601613601011603467232651480.420.500.3520081269310179147074715027752031386024118033058145031990.250.300.196200993369401028384083900402279702623701935703559012326520.1980.240.15620108572802119400021137024465017809031940130714310.220.260.170201164900103306001516401737601295203657013067240.310.380.2520121136960158572068820031351034813027889038162503210.1880.230.1462013607300997360217240250330277190223470437343305540.200.250.1272014571161065333904889830179490202190156790411435090650.340.400.272015166301020344501291570141520162140120900352956255210.450.530.37201624909603298760168316012073014151099950350587749370.320.390.25201781611016688300205170233590176750328276936	2005												
20081269310179147074715027752031386024118033058145031990.250.300.196200993369401028384083900402279702623701935703559012326520.1980.240.15620108572802119400021137024465017809031940130714310.220.260.170201164900103306001516401737601295203657013067240.310.380.2520121136960158572068820031351034813027889038162503210.1880.230.1462013607300997360217240250330277190223470437343305540.200.250.122014571161065333904889830179490202190156790411435090650.340.400.272015166301020344501291570141520162140120900352956255210.450.530.37201624909603298760168316012073014151099950350587749370.320.390.25201781611016688300205170233590176750328276936190.250.310.187	2006	2727540		2320140	160040	190500	129580	43334	23094	535	0.50	0.59	0.41
200993369401028384083900402279702623701935703559012326520.1980.240.15620108572802119400021137024465017809031940130714310.220.260.1702011649001033060015164017376012952036570130672440.310.380.2520121136960158572068820031351034813027889038162503210.1880.230.1462013607300997360217240250330277190222470437343305540.200.250.1622014571161065333904889830179490202190156790411435090650.340.400.272015166301020344501291570141520162140120900352956255210.450.530.372016249960329876016831601207301415109950350587749370.320.390.25201781611016688300205170233590176750328276936190.250.310.187	2007												
2010 857280 2119400 0 211370 244650 178090 31940 13071 431 0.22 0.26 0.170 2011 64900 1033060 0 151640 173760 129520 36570 13067 24 0.31 0.38 0.25 2012 1136960 1585720 688200 313510 348130 278890 38162 5032 1 0.188 0.23 0.146 2013 607300 997360 217240 250330 277190 223470 43734 3305 54 0.20 0.25 0.162 2014 5711610 6533390 4889830 179490 202190 156790 41143 5090 655 0.34 0.40 0.27 2015 1663010 2034450 1291570 14150 162140 120900 35295 6255 21 0.45 0.53 0.37 2016 2490960 3298760 1683160 120730 1	2008	1269310	1791470	747150	277520	313860	241180	33058	14503	199	0.25	0.30	0.196
2011 64900 1033060 0 151640 173760 129520 36570 13067 24 0.31 0.38 0.25 2012 1136960 1585720 688200 313510 348130 278890 38162 5032 1 0.188 0.23 0.146 2013 607300 997360 217240 250330 277190 223470 443734 3305 54 0.20 0.25 0.162 2014 5711610 6533390 4889830 179490 202190 156790 41143 5090 655 0.34 0.40 0.27 2015 1663010 2034450 1291570 141520 162140 120900 35295 6255 21 0.45 0.53 0.37 2016 2490960 3298760 1683160 120730 141510 99950 35058 7749 37 0.32 0.39 0.25 2017 816110 1668830 0 205170 235	2009	9336940	10283840	8390040	227970	262370	193570	35590	12326	52	0.198	0.24	0.156
2012 1136960 1585720 688200 313510 348130 278890 38162 5032 1 0.188 0.23 0.146 2013 607300 997360 217240 250330 277190 223470 43734 3305 54 0.20 0.25 0.162 2014 5711610 6533390 4889830 179490 202190 156790 41143 5090 65 0.34 0.40 0.27 2015 1663010 2034450 1291570 141520 162140 120900 35295 6255 21 0.45 0.53 0.37 2016 2490960 3298760 1683160 120730 141510 99950 35058 7749 37 0.32 0.39 0.25 2017 816110 1668830 0 205170 233590 176750 32827 6936 19 0.25 0.31 0.187	2010	857280	2119400	0	211370	244650	178090	31940	13071	431	0.22	0.26	0.170
2013 607300 997360 217240 250330 277190 223470 43734 3305 54 0.20 0.25 0.162 2014 5711610 6533390 4889830 179490 202190 156790 41143 5090 65 0.34 0.40 0.27 2015 1663010 203450 1291570 14150 162100 35295 6255 21 0.45 0.33 0.37 2016 2490960 3298760 1683160 120730 141510 99950 35058 7749 373 0.32 0.39 0.25 2017 816110 1668830 0 205170 233590 176750 32827 6936 19 0.25 0.31 0.187	2011			-		173760			13067		0.31	0.38	
2014 5711610 6533390 4889830 179490 202190 156790 41143 5090 655 0.34 0.40 0.27 2015 1663010 2034450 1291570 141520 162140 120900 35295 6255 21 0.45 0.53 0.37 2016 2490960 3298760 1683160 120730 141510 99950 35058 7749 37 0.32 0.39 0.25 2017 816110 1668830 0 205170 233590 176750 32827 6936 19 0.25 0.31 0.187	2012												
2015 1663010 2034450 1291570 141520 162140 120900 35295 6255 21 0.45 0.53 0.37 2016 2490960 3298760 1683160 120730 141510 99950 35058 7749 37 0.32 0.39 0.25 2017 816110 1668830 0 205170 233590 176750 32827 6936 19 0.25 0.31 0.187	2013	607300	997360	217240					3305	54	0.20	0.25	0.162
2016 2490960 3298760 1683160 120730 141510 99950 35058 7749 37 0.32 0.39 0.25 2017 816110 1668830 0 205170 233590 176750 32827 6936 19 0.25 0.31 0.187													
2017 816110 1668830 0 205170 233590 176750 32827 6936 19 0.25 0.31 0.187													
	2016	2490960	3298760	1683160	120730	141510			7749				
2018 1231000*** 218270 252470 184070	2017		1668830	0	205170	233590	176750	32827	6936	19	0.25	0.31	0.187
	2018	1231000***			218270	252470	184070						

* ICES estimates of catch.

** Unwanted catch values include discards and BMS landings from 2016.

***RCT3 estimate.

Sources and references

EU. 2016. Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on establishing a multiannual plan for demersal stocks in the North Sea and the fisheries exploiting those stocks and repealing Council Regulation (EC) 676/2007 and Council Regulation (EC) 1342/2008. COM(2016) 493 final. 23 pp. <u>https://eurlex.europa.eu/resource.html?uri=cellar:9aa2aaae-5956-11e6-89bd-01aa75ed71a1.0008.02/DOC 1&format=PDF.</u>

ICES. 2014. Report of the ICES Benchmark Meeting on Northern Haddock Stocks (WKHAD), 27–29 January 2014, Aberdeen, Scotland, and 24–28 February 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:41. 150 pp.

ICES. 2016. Report of the Inter-benchmark Protocol on Haddock (*Melanogrammus aeglefinus*) in Subarea 4, Division 6.a and Subdivision 3.a.20 (North Sea, West of Scotland, Skagerrak) (IBPHaddock), 29 June–29 September 2016, by correspondence. ICES CM 2016/ACOM:58. 65 pp.

ICES. 2017. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 26 April–5 May 2017, ICES Headquarters, Copenhagen, Denmark. ICES CM 2017/ACOM:21. 1232 pp.

ICES. 2018a. Report of the Working Group on Mixed-Fisheries Advice (WGMIXFISH-ADVICE), 21–26 May 2018, ICES Headquarters, Copenhagen, Denmark. ICES CM 2018/ACOM:19. *In preparation*.

ICES. 2018b. Report of the Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), 24 April–3 May 2018, Ostend, Belgium. ICES CM 2018/ACOM:22.

ICES. 2018b. Mixed-fisheries advice for Subarea 4, Division 7.d, and Subdivision 3.a.20 (North Sea, eastern English Channel, Skagerrak). *In* Report of the ICES Advisory Committee, 2018. ICES Advice 2018, mix-ns. 16 pp. <u>https://doi.org/10.17895/ices.pub.4612</u>.