

6.3.10 Haddock (*Melanogrammus aeglefinus*) in Subarea IV and Divisions VIa and IIIa West (North Sea, West of Scotland, Skagerrak)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2016 should be no more than 59 945 tonnes. If this stock is not under the EU landing obligation in 2016 and discard rates do not change from the average (2012–2014), this implies landings of no more than 48 621 tonnes.

Stock development over time

Fishing mortality (F) has been below F_{MSY} since 2008 and spawning-stock biomass (SSB) has been above $MSY B_{trigger}$ since 2008. Recruitment is characterized by occasional large year classes, the last of which was the strong 1999 year class. The 2014 recruitment estimate is higher than recent poor recruitment years, but is still below the long-term average.

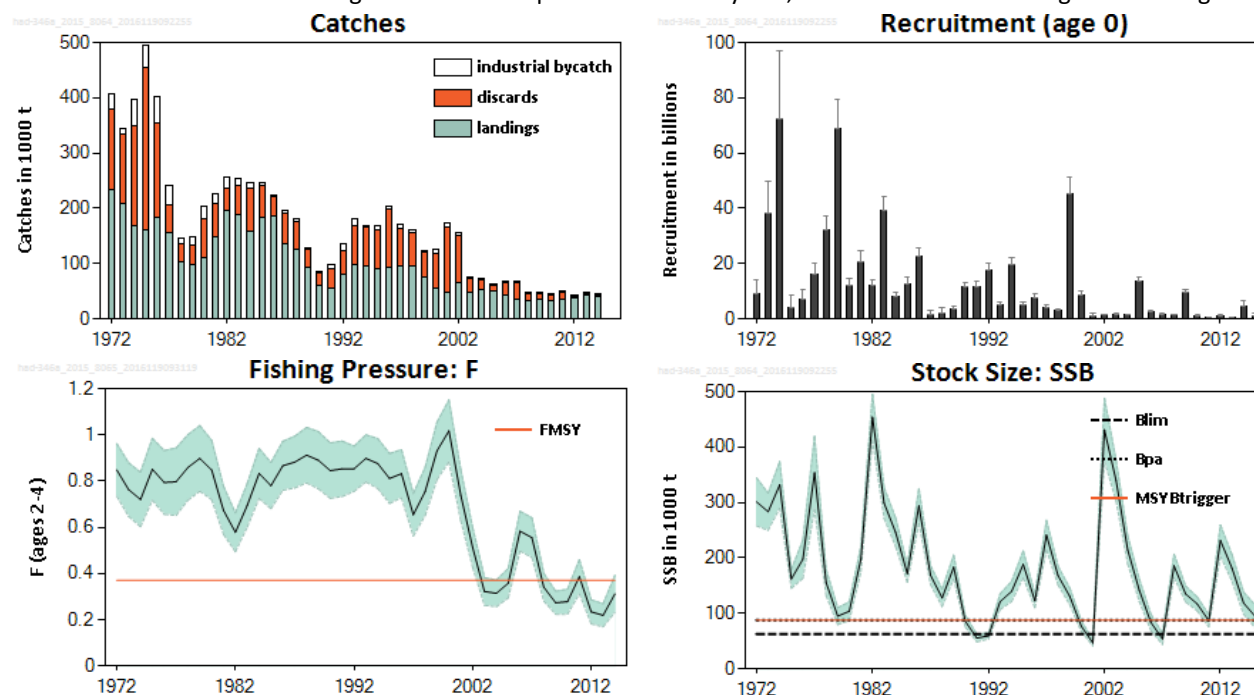


Figure 6.3.10.1* Haddock in Subarea IV and Divisions VIa and IIIa West. Summary of stock assessment (weights in thousand tonnes), last year's recruitment estimate is shaded.

Stock and exploitation status

Table 6.3.10.1 Haddock in Subarea IV and Divisions VIa and IIIa West. State of the stock and fishery, relative to reference points.

		Fishing pressure			Stock size				
		2012	2013	2014	2013	2014	2015		
Maximum Sustainable Yield	F_{MSY}	✓	✓	✓	MSY	✓	✓	✓	Above trigger
Precautionary approach	F_{pa} , F_{lim}	✓	✓	✓	B_{pa} , B_{lim}	✓	✓	✓	Full reproductive capacity
Management plan	F_{MGT}	-	-	-	SSB_{MGT}	-	-	-	Not applicable

* Version 2: Summary of stocks assessment figures updated

Catch options

Table 6.3.10.2[†] Haddock in Subarea IV and Divisions VIa and IIIa West. The basis for the catch options.

Variable	Value	Source	Notes
F ages 2–4 (2015)	0.288	ICES (2015a)	Assessment model forecast
SSB (2016)	80519 t	ICES (2015a)	Short term forecast (STF)
R _{age0} (2015–2016)	1156 million	ICES (2015a)	Assessment model forecast
Total catch (2015)	37121 t	ICES (2015a)	STF
Commercial landings (2015)	29327 t	ICES (2015a)	STF, Relative contribution to total catch = average 2012–2014
Discards (2015)	7794 t	ICES (2015a)	STF, Relative contribution to total catch = average 2012–2014
Industrial bycatch (2015)	0 t	ICES (2015a)	STF, Relative contribution to total catch = average 2012–2014

[†] Version 2: Values updated

Table 6.3.10.3[‡] Haddock in Subarea IV and Divisions VIa and IIIa West. The catch options. All weights in thousand tonnes.

Rationale	Total catch 2016	Wanted catch* 2016	Unwanted catch* 2016	IBC** 2016	Basis	Total F 2016	F(wanted) 2016	F(unwanted) 2016	F(IBC) 2016	SSB 2017	% SSB change***	% TAC Change wanted catch^
MSY approach	59.945	48.621	11.324	0.000	F _{MSY}	0.37	0.31	0.06	0	162.811	102	2
Previous management strategy ^^	49.254	39.991	9.262	0.000	F _{MGT} from previous MS	0.3	0.251	0.049	0	173.242	115	-16
IBC only	0.000	0.000	0.000	0.000	No HC fishery	0.000	0.000	0.000	0.000	221.973	176	-100
Other options	36.424	29.636	6.788	0.000	0.75 × F(2015)	0.216	0.181	0.035	0	185.76	131	-38
	49.302	40.156	9.146	0.000	F(2015)	0.288	0.241	0.047	0	172.836	115	-16
	58.418	47.388	11.03	0.000	1.25 × F(2015)	0.36	0.301	0.059	0	164.301	104	-1
	49.992	40.588	9.404	0.000	15% TAC decrease	0.305	0.255	0.05	0	172.519	114	-15
	58.864	47.751	11.113	0.000	Rollover TAC	0.363	0.303	0.059	0	163.856	104	0
	67.735	54.914	12.821	0.000	15% TAC increase	0.42	0.352	0.069	0	155.194	93	15
<i>Mixed-fisheries options – minor differences with calculation above can occur because of the different methodology used (ICES, 2015b). Not updated in the current version</i>												
Maximum	102.907				A	0.55				164.911	35	
Minimum	23.760				B	0.11				243.610	100	
Cod	42.903				C	0.20				224.129	84	
SQ effort	51.330				D	0.24				215.637	77	
Value	60.086				E	0.29				206.868	70	
Effort_Mgt	40.751				F	0.19				226.307	86	

* “Wanted” and “unwanted” catch are used to described fish that would be landed and discarded in the absence of the EU landing obligation based on discard rates estimates for 2012–2014.

** Industrial bycatch (IBC) also based on average proportion of the total catch for 2012–2014.

*** SSB 2017 relative to SSB 2016.

^ Wanted catch 2016 relative to the combined TACs 2015 (TAC IV = 40.711; TAC IIIa = 2.504; TAC VIa = 4.536; Total = 47.751).

^^ EU–Norway management strategy for Subarea IV and Division IIIa–West applied to whole stock area.

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 2016 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 scenario: Each fleet stops fishing when its cod stock share is exhausted.
- D. SQ (*status quo*) effort scenario: The effort of each fleet in 2015 and 2016 is as in 2014.
- 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. Effort management scenario: Effort reductions according to cod and flatfish management plans.

[‡] Version 2: Catch options updated

Basis of the advice

Table 6.3.10.4 Haddock in Subarea IV and Divisions VIa and IIIa West. The basis of the advice.

Advice basis	MSY approach
Management plan	There is currently no agreed management plan for haddock for the stock area.

Quality of the assessment

The overall reporting of catch data provided to ICES has improved during 2012–2014 through such aspects as the fully documented fisheries (FDF) programme and increased coverage by the Scottish industry/science observer sampling scheme.

The assessment is based on the North Sea (Subarea IV and Division IIIaW) survey indices which are considered to be sufficiently representative of the whole stock. No combined survey index for the whole area is available. Some of the differences from the previous assessment are due to changes in the estimates of natural mortality used in the assessment (ICES, 2014a).

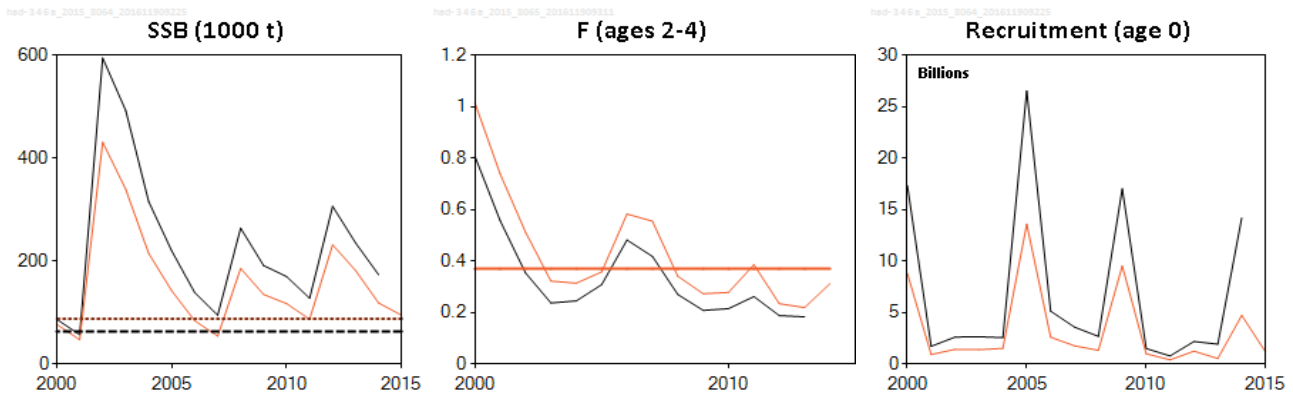


Figure 6.3.10.2[§] Haddock in Subarea IV and Divisions VIa and IIIa West. Historical assessment results (final-year recruitment estimates included). Horizontal lines show F_{MSY} (solid), B_{lim} (dashed), and the $MSY B_{trigger}$ (dotted).

Issues relevant for the advice

This is the second year in which advice has been provided for the haddock stock in Subarea IV, Division IIIaW, and Division VIa. Up to and including 2013, separate advice was provided for haddock in the North Sea and Skagerrak (Subarea IV and Division IIIaW) and West of Scotland (Division VIa). For this reason the EU–Norway management strategy is no longer considered appropriate.

Results from a North Sea mixed-fisheries analysis are presented in ICES (2015c). Assuming fishing patterns and catchability in 2015 and 2016 are unchanged from those in 2014, and in the case of a strictly implemented discard ban, North Sea whiting and *Nephrops* FU 6 (if it was managed with an own TAC for the FU) would be the most limiting stocks, constraining 46% and 34% of the 2014 effort, respectively. Results for the haddock stock are also included as additional rows in the catch options table of this advice sheet.

[§] Version 2: Historical assessment figures updated

Reference points

Table 6.3.10.5 Haddock in Subarea IV and Divisions VIa and IIIa West. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	88000 t	B_{pa}	ICES (2014b)
	F_{MSY}	0.37	Estimated by application of EqSIM evaluation.	ICES (2014b)
Precautionary approach	B_{lim}	63000 t	Segmented regression changepoint estimate.	ICES (2014c)
	B_{pa}	88000 t	$B_{pa} \sim 1.4 \times B_{lim}$.	ICES (2014c)
	F_{lim}	Not defined.		
	F_{pa}	Not defined.		
Previous IV and IIIaW management strategy	F_{MGT}	0.3	Management strategy evaluation.	EU–Norway management strategy
	SSB_{MGT}	100000 t, 140000 t	Trigger values B_{lim} and B_{pa} .	EU–Norway management strategy

Basis of the assessment

Table 6.3.10.6 Haddock in Subarea IV and Divisions VIa and IIIa West. The basis of the assessment.

ICES stock data category	1. (ICES, 2015d).
Assessment type	Age-based analytical assessment (TSA; ICES, 2015a) 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, 2015a).
Discards and bycatch	Included in the assessment, data series from the main fleets (covering around 90% of the landings).
Indicators	None.
Other information	Last benchmarked in 2014 (ICES, 2014d), 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, 2014d) also updated biological parameters and selected a new assessment model.
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), Working Group on Mixed Fisheries Advice (WGMIXFISH-NS).

Information from stakeholders

The proportions reporting a greater abundance of haddock tended to be highest in the northern part of the North Sea (including areas 1, 2, 3, 8, and 9; Figure 6.3.10.3). The highest proportion reporting a lower abundance was in the west (area 4) while no change was most commonly reported in the south (Napier, 2014).

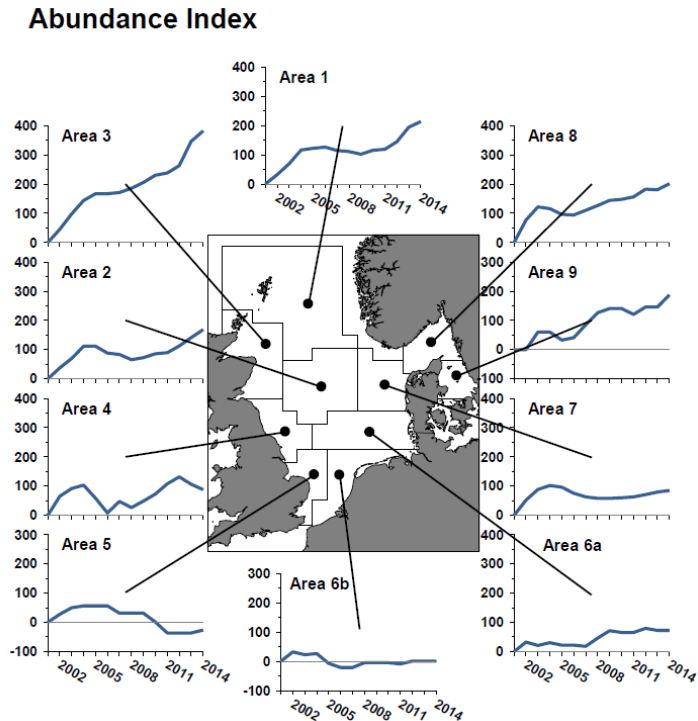


Figure 6.3.10.3 Cumulative time-series of index of perceptions of abundance of haddock, by area (see page 14 of Napier (2014) for an explanation of the index).

History of advice, catch, and management

Table 6.3.10.7a Haddock in Subarea IV. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights in thousand tonnes.

Year	ICES advice	Predicted landings corresp. to advice	Predicted catch corresponding to advice ^	Agreed TAC	Off. Indgs.	Hum. cons.	Disc. Slip.	Indust. bycatch	Total
1987	80% of F(85)	105		140	109	108	59	4	172
1988	77% of F(86); TAC	185		185	105	105	62	4	171
1989	Reduce decline in SSB; TAC; protect juveniles	68		68	64	76	26	2	104
1990	80% of F(88); TAC	50		50	43	51	33	3	87
1991	70% of effort (89)			50	45	45	40	5	90
1992	70% of effort (89)			60	51	70	48	11	129
1993	70% of effort (89)			133	80	80	80	11	170
1994	Significant reduction in effort; mixed fishery			160	87	81	65	4	150
1995	Significant reduction in effort; mixed fishery			120	75	75	57	8	140
1996	Mixed fishery to be taken into account			120	75	76	73	5	154
1997	Mixed fishery to be taken into account			114	73	79	52	7	138
1998	No increase in F	100.3		115	72	77	45	5	128
1999	Reduction of 10% F(95–97)	72		88.6	64	64	43	4	111
2000	F less than F_{pa}	< 51.7		73.0	47	45	47	8	100
2001	F less than F_{pa}	< 58.0		61	40	39	118	8	165
2002	F less than F_{pa}	< 94.0		104.0	54	53	45	4	101
2003	No cod catches	-		52	42	42	23	1	76
2004	Mixed-fisheries considerations / F should be below F_{pa}	No forecast *		85	48	47	17	1	65
2005	Mixed-fisheries considerations / F should be below F_{pa}	92 *		66	31	48	10	0	57
2006	Mixed-fisheries considerations / $F < 0.3$	39 *		52	36	36	17	0	55
2007	Mixed-fisheries considerations / $F < 0.3$	55.4 *		55	31	31	30	0	61
2008	Mixed-fisheries considerations / 15% TAC reduction	49.3 **		46	30	29	13	0	42
2009	Mixed-fisheries considerations / Apply management plan	44.7 **		42	31	31	10	0	41
2010	Mixed-fisheries considerations / Apply management plan	38 **		36	28	28	10	0	38
2011	See scenarios	-		34	26	34	11	0	46
2012	Apply management plan	41.575 **		39	30	30	4	1	35
2013	Apply management plan	47.811 **		45.041	37 ***	39 ***	2 ***	0 ***	41 ***
2014	Apply management plan	38.201 *		38.284	35	35	4	0.065 ***	39
2015	(November update) MSY approach		68.690	40.711					
2016	MSY approach		≤ 59.945 **						

* The exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.

** Including industrial bycatch.

*** Subarea IV and Division IIIaW combined.

^ Catch advice since 2015 corresponds to Subarea IV and Divisions IIIa-West and VIa.

** Version 2: Predicted catch value updated

Table 6.3.10.7b Haddock in Division IIIa West. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights in thousand tonnes.

Year	ICES advice	Predicted landings corresp. to advice	Predicted catch corresp. to advice **	Agreed TAC	Official landings	ICES estimates			
						Hum. cons.	Disc. Slip.	Indust. bycatch	Total
1987	Precautionary TAC	-		11.5		3.8		1.4	5.3
1988	Precautionary TAC	-		10.0		2.9		1.5	4.3
1989	Precautionary TAC	-		10.0		4.1		0.4	4.5
1990	Precautionary TAC	-		10.0		4.1		2.0	6.1
1991	Precautionary TAC	4.6		4.6		4.1		2.6	6.7
1992	TAC	4.6		4.6		4.4		4.6	9.0
1993	Precautionary TAC	-		4.6		2.0		2.4	4.4
1994	Precautionary TAC	-		10.0		1.8		2.2	4.0
1995	If required, precautionary TAC; link to North Sea	-		10.0		2.2		2.2	4.4
1996	If required, precautionary TAC; link to North Sea	-		10.0		3.1		2.9	6.1
1997	Combined advice with North Sea	-		7.0		3.4		0.6	4.0
1998	Combined advice with North Sea	4.7		7.0		3.8		0.3	4.0
1999	Combined advice with North Sea	3.4		5.4		1.4		0.3	1.7
2000	Combined advice with North Sea	< 1.8		4.5		1.5		0.6	2.1
2001	Combined advice with North Sea	< 2.0		4.0		1.9		0.2	2.1
2002	Combined advice with North Sea	< 3.0		6.3		4.1		0.06	4.1
2003	Combined advice with North Sea	-		3.2		1.8	0.2	n/a	1.8
2004	Combined advice with North Sea / F should be below F_{pa}	No forecast		4.9		1.4	0.1	n/a	1.4
2005	Combined advice with North Sea / F should be below F_{pa}	-		4.0		0.8	0.2	0	0.8
2006	Combined advice with North Sea / F < 0.3	-		3.2		1.5	1.0	0	1.5
2007	Combined advice with North Sea / F < 0.3	-		3.4		1.6	0.8	0	2.5
2008	Combined advice with North Sea / 15% TAC reduction	2.9		2.9		1.4	0.6	0	2.0
2009	Combined advice with North Sea / Apply management plan	-		2.6		1.5	0.6	0	2.1
2010	Combined advice with North Sea / Apply management plan	-		2.2		1.3	0.6	0	1.9
2011	See scenarios	-		2.1		9.9	1.7	0	11.6
2012	Apply management plan North Sea	-		2.095	2.5	2.6	0.7	0	3.3
2013	Apply management plan North Sea	-		2.770	2	*	*	*	*
2014	Apply management plan North Sea	2.438		2.355	2.1	2.3	0.1	*	2.4
2015	(November update) MSY approach		68.690	2.504					
2016	MSY approach		\leq 59.945 **						

* Combined in Table 6.3.7.2.

** Catch advice since 2015 corresponds to Subarea IV and Divisions IIIa-West and VIa.

** Version 2: Predicted catch value updated

Table 6.3.10.7c Haddock in Division VIa. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights in thousand tonnes.

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 estimates		
						Hum. cons.	Disc. Slip.	Total
1987	Reduce F towards F_{max}	20.0		32.0	27	27.0	16.2	43.2
1988	No increase in F; TAC	25.0		35.0	21	21.2	9.5	30.7
1989	80% of F(87); TAC	15.0		35.0	24	16.7	3.0	19.7
1990	80% of F(88); TAC	14.0		24.0	13	10.1	5.4	15.5
1991	70% of effort (89)	-		15.2	10	10.6	8.7	19.2
1992	70% of effort (89)	-		12.5	7	11.4 **	9.3 **	20.5 **
1993	70% of effort (89)	-		17.6	13	19.1 **	16.8 **	35.9 **
1994	30% reduction in effort	-		16.0	9	14.2 **	11.1 **	25.3 **
1995	Significant reduction in effort	-		21.0	13	12.4	8.6	20.9
1996	Significant reduction in effort	-		22.9	13	13.5	11.4	24.8
1997	Significant reduction in effort	-		20.0	13	12.9	6.5	19.3
1998	No increase in F	20.8 ***		25.7	14	14.4	5.5	19.9
1999	F reduced to F_{pa}	14.3 ***		19.0	11	10.5	4.9	15.3
2000	Maintain F below F_{pa}	< 14.9 ***		19.0	7	7.0	7.9	14.9
2001	Reduce F below F_{pa}	< 11.2 ***		13.9	7	6.87	6.6	13.4
2002	Reduce F below F_{pa}	< 14.1 ***		14.1	7	7.1	8.9	16.0
2003	No cod catches	-		8.7	4.9	5.3	4.1	9.4
2004	F_{pa} *	12.2		6.5	3.0	3.9	3.7	7.6
2005	$\frac{3}{4} \times F_{pa}$ *	7.6		7.6	3.2	3.8	2.9	6.7
2006	$0.7 \times F_{pa}$ *	8.0		7.81	5.7	6.3	4.6	10.9
2007	$0.87 \times F_{pa}$ *	7.2		7.2	3.7	3.8	4.0	7.7
2008	$SSB > B_{pa}$ *	4.2		6.12	2.8	2.8	1.2	4.1
2009	No fishing and recovery plan*	0		3.52	2.8	2.9	1.6	4.5
2010	No fishing and recovery plan	0		2.67	2.9	3.0	2.8	5.8
2011	See scenarios	0		2.005	1.7	1.7	1.5	3.3
2012	MSY framework ^^	5.6 ^		6.015	5.0	5.1	0.5	5.6
2013	MSY framework	3.1		4.211	4.7	4.6	1.0	5.6
2014	MSY approach	6.432 ^^		3.988	4.0	4.0	0.8	4.8
2015	(November update) MSY approach		68.690	4.536				
2016	MSY approach		≤ 59.945 ††					

* 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 VIa only.

^ An error in this advice was detected in 2012 (the previous value of 10.2 thousand tonnes was incorrect).

^^ This value (6.432) refers to total catch, including discards. Therefore, it is not directly comparable to the value advised for 2013 (3.1), which referred only to landings.

^^^ Catch advice since 2015 corresponds to Subarea IV and Divisions IIIa-West and VIa.

†† Version 2: Predicted catch value updated

History of catch and landings

Table 6.3.10.8 Haddock in Subarea IV and Divisions VIa and IIIa West. Catch distribution by fleet in 2014 as estimated by ICES.

Catch (2014)	Landings			Discards	Industrial bycatch
46.298 kt	96% demersal trawl and seine >100 mm	2% trawl 70–99 mm	2% others	5.090 kt discards	0.065 kt
	41.143 kt				

Table 6.3.10.9 Haddock in Subarea IV and Divisions VIa and IIIa West. 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 in tonnes.

Division IIIa									
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
DE	186	206	87	105	65	102	120	90	114
DK	1001	1054	1052	1263	1139	1661	1916	1456	1763
NL	0	0	0	0	1	0	0	5	6
NO	113	152	170	121	81	125	239	223	81
PT	30	37	0	0	0	0	0	0	0
SE	246	278	276	166	126	198	210	217	219
UK	0	0	0	0	0	0	0	3	0
Subarea IV									
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
BE	106	178	112	108	78	106	78	78	98
DE	726	727	393	657	634	575	548	677	677
DK	759	645	501	552	725	697	947	1283	1079
ES	0	0	0	0	0	0	0	0	0
FO	4	0	3	32	5	0	0	0	0
FR	444	498	448	135	276	320	175	177	209
GL	5	8	0	4	0	0	0	0	0
IE	0	0	0	0	0	0	0	0	0
IS	0	0	0	0	0	0	0	0	0
NL	33	55	29	24	41	71	191	172	99
NO	1798	1706	1482	1278	1126	1195	1069	1661	2705
PL	8	8	16	0	0	0	0	0	0
PT	76	0	0	0	0	0	0	0	0
SE	100	130	83	141	90	128	103	113	154
UK	32390	26717	27365	28393	24983	23343	0	32993	29758
Division VIa									
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
DE	7	0	1	0	1	0	0	0	0
ES	44	5	10	21	28	36	15	0	19
FO	1	2	0	0	0	0	0	0	0
FR	291	211	151	136	89	73	32	51	67
IE	526	759	879	297	396	290	845	746	653
NO	17	16	28	18	9	4	0	6	15
UK	4947	2780	1776	2380	2415	1364	0	3878	3230
Northern Shelf									
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Official landings	43858	36172	34862	35831	32308	30288	6488	43830	40945
ICES landings	43334	34672	33058	35590	31940	36570	38162	43681	41143
ICES discards	23094	32651	14503	12326	13071	13067	5032	3038	5090
ICES IBC	535	48	199	52	431	24	1	54	65
ICES total catch	66962	67371	47759	47968	45442	49661	43195	46772	46298
TAC IV	51850	54640	46444	42110	35794	34057	39000	45041	40711
TAC IIIa	3189	3360	2856	2590	2201	2100	2095	2770	2504
TAC VIa	7810	7200	6120	3520	2670	2005	6015	4211	4536
Total TAC	62849	65200	55420	48220	40665	38162	47110	52022	47751

Summary of the assessment

Table 6.3.10.10^{ss} Haddock in Subarea IV and Divisions VIa and IIIa West. Assessment summary (weights in tonnes).

Year	Recruitment	High	Low	SSB	High	Low	Landings	Discards	Industrial bycatch	Mean F Ages (2-4)	High	Low
	Age 0 thousands											
1972	9328640	14204080	9328640	301240	344620	257860	234019	14436	29585	0.848	0.962	0.734
1973	38405840	49759280	38405840	283400	316900	249900	207489	12610	11267	0.763	0.879	0.647
1974	72158740	96907640	72158740	331980	373860	290100	167528	18180	47505	0.72	0.838	0.602
1975	3930370	8344330	3930370	162170	179210	145130	160271	29332	41487	0.851	0.985	0.717
1976	7154090	10733390	7154090	197760	232220	163300	184421	16977	48163	0.794	0.932	0.656
1977	16274290	20373890	16274290	353840	419300	288380	156639	48732	35022	0.797	0.943	0.651
1978	32364350	37040430	32364350	155730	179390	132070	102970	32860	10903	0.859	1.001	0.717
1979	68639010	79137750	68639010	95100	110360	79840	97896	35054	16240	0.898	1.04	0.756
1980	12268230	14754290	12268230	103960	120820	87100	111371	68831	22472	0.848	0.976	0.72
1981	20591510	24442910	20591510	198050	221030	175070	147806	61683	17041	0.673	0.777	0.569
1982	12157950	14251670	12157950	453900	494960	412840	195456	41297	19383	0.578	0.662	0.494
1983	39465430	44351630	39465430	299100	326840	271360	188754	51584	12898	0.695	0.789	0.601
1984	8266560	9804620	8266560	246120	271900	220340	158205	79012	10080	0.833	0.941	0.725
1985	12665430	14909590	12665430	171750	187270	156230	182946	58373	5998	0.78	0.88	0.68
1986	22769550	25706970	22769550	294110	325070	263150	185137	36063	2643	0.866	0.972	0.76
1987	1801580	2936340	1801580	169470	186450	152490	135022	55674	4410	0.882	0.994	0.77
1988	2052920	4054480	2052920	127990	143790	112190	126227	49833	4002	0.912	1.032	0.792
1989	3592490	4767770	3592490	183460	205060	161860	92840	32453	2410	0.89	1.014	0.766
1990	11670120	13340800	11670120	85920	96480	75360	61605	22548	2589	0.845	0.965	0.725
1991	11764750	13410610	11764750	55560	62540	48580	55208	36610	5386	0.853	0.973	0.733
1992	17850000	20364480	17850000	59470	65070	53870	81566	42477	10927	0.853	0.951	0.755
1993	5222010	6230170	5222010	121170	135370	106970	98631	70748	10766	0.898	1	0.796
1994	19432730	22172170	19432730	139810	158030	121590	95141	70668	3576	0.876	0.984	0.768
1995	5210790	6123610	5210790	188540	212820	164260	89859	71262	7695	0.811	0.919	0.703
1996	7586740	8936200	7586740	122690	135210	110170	92615	10720	5000	0.832	0.936	0.728
1997	4303890	5118410	4303890	241300	267880	214720	95391	67879	6684	0.654	0.746	0.562
1998	3204910	3823670	3204910	168240	185100	151380	95472	61399	5101	0.755	0.859	0.651
1999	45057750	51470730	45057750	131080	146240	115920	76009	43562	3835	0.931	1.055	0.807
2000	8807810	10019050	8807810	77100	86900	67300	54504	64185	8134	1.017	1.151	0.883
2001	913480	1862480	913480	46800	52260	41340	47592	11788	7879	0.739	0.849	0.629
2002	1419020	1704400	1419020	431230	488070	374390	65405	86051	3717	0.513	0.599	0.427
2003	1384880	2015180	1384880	339660	376220	303100	47282	25975	1150	0.322	0.382	0.262
2004	1510170	1750810	1510170	214960	240200	189720	51896	20020	554	0.314	0.372	0.256
2005	13596730	15255430	13596730	142160	162460	121860	51528	12389	168	0.358	0.422	0.294
2006	2591420	2918000	2591420	84080	98820	69340	43334	23094	535	0.583	0.669	0.497
2007	1754680	1975900	1754680	54050	64150	43950	34672	32651	48	0.555	0.641	0.469
2008	1316960	1502880	1316960	185820	206940	164700	33058	14503	199	0.341	0.401	0.281
2009	9526650	10641170	9526650	135080	149540	120620	35590	12326	52	0.273	0.323	0.223
2010	988730	1371110	988730	117250	129770	104730	31940	13071	431	0.278	0.332	0.224
2011	391170	604490	391170	86790	97830	75750	36570	13067	24	0.386	0.46	0.312
2012	1232790	1457530	1232790	231510	259510	203510	38162	5032	1	0.234	0.286	0.182
2013	523510	772450	523510	181770	205870	157670	43734	3305	54	0.219	0.269	0.169
2014	4716120	6825260	4716120	118520	138380	98660	41143	5090	65	0.312	0.392	0.232
2015	1155730	2318350	1155730	94590	115130	74050						

^{ss} Version 2: Values updated

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