

Haddock (*Melanogrammus aeglefinus*) in Division 7.a (Irish Sea)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2018 should be no more than 3444 tonnes.

Stock development over time

The spawning-stock biomass (SSB) is currently at the highest observed levels as the 2013 year class has matured. SSB is currently well above $MSY B_{trigger}$. Fishing mortality (F) has been below F_{MSY} since 2012. Recent recruitment has been above the time-series mean, although recruitment has been highly variable throughout the time-series.

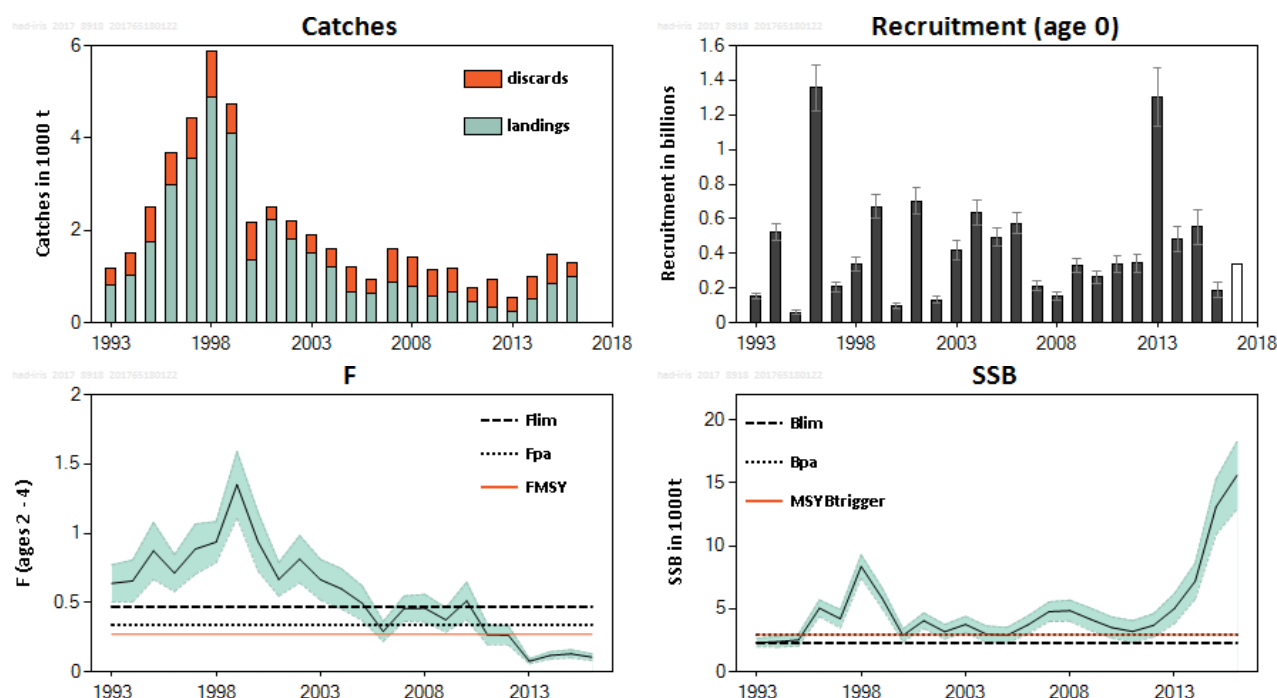


Figure 1 Haddock in Division 7.a. Summary of stock assessment (weights in tonnes), Recruitment, F, and SSB have uncertainty boundaries ($1 \times$ standard deviation) in the plot. The predicted recruitment value is not shaded.

Stock and exploitation status

Table 1 Haddock in Division 7.a. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2014	2015	2016	2015	2016	2017
Maximum sustainable yield	F_{MSY}	✓	✓	✓ Below	$MSYB_{Trigger}$	✓	✓ Above trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓ Harvested sustainably	B_{pa}, B_{lim}	✓	✓ Full reproductivity capacity
Management plan	F_{MGT}	—	—	— Not applicable	S_{SBMGT}	—	— Not applicable

Catch options

Table 2 Haddock in Division 7.a. The basis for the catch options.

Variable	Value	Source	Notes
F ages 2–4 (2017)	0.26	ICES (2017a)	Catch constraint. TAC 2017 adjusted for annual reallocation of
SSB (2018)	18 974 tonnes	ICES (2017a)	Short-term forecast
R _{age 0} (2017 and 2018)	337 738 thousands	ICES (2017a)	Geometric mean (1993–2014)
Catch (2017)	2 270 tonnes	ICES (2017a)	Short-term forecast (F = 0.26006)
Wanted catch * (2017)	1 791 tonnes	ICES (2017a)	Average discard pattern (2013–2016)
Unwanted catch *(2017)	380 tonnes	ICES (2017a)	Average discard pattern (2013–2016)

* “Wanted catch” is used to describe fish that would be landed in the absence of the EU landing obligation. The “unwanted catch” refers to the component that was previously discarded.

Table 3 Haddock in Division 7.a. Annual catch options. All weights are in tonnes.

Basis	Total catch (2018)	Wanted catch* (2018)	Unwanted catch* (2018)	F _{total} (2018)	F _{wanted} (2018)	F _{unwanted} (2018)	SSB (2019)	% SSB change **	% TAC change ***
ICES advice basis									
MSY approach: F _{MSY}	3444	2796	648	0.27	0.20	0.067	13406	-29	32
Other options									
F = 0	0	0	0	0	0	0	16567	-12.7	-100
F _{pa}	4234	3437	798	0.34	0.26	0.084	12721	-33	62
F _{lim}	5604	4546	1058	0.47	0.35	0.116	11551	-39	143
SSB (2019) = B _{lim}	18265	14603	3662	2.9	2.2	0.72	2300	-88	598
SSB (2019) = B _{pa}	17146	13751	3395	2.5	1.88	0.62	2944	-84	556
SSB (2019) = MSY B _{trigger}	17146	13751	3395	2.5	1.88	0.62	2944	-84	556
F = F ₂₀₁₇	3329	2702	626	0.26	0.20	0.064	13506	-29	27

* “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 2014–2016.

** SSB 2019 relative to SSB 2018.

*** Total catch in 2018 relative to TAC in 2017 (2615 t).

Basis of the advice

Table 4 Haddock in Division 7.a. The basis of the advice.

Advice basis	MSY approach
Management plan	ICES is not aware of any agreed precautionary management plan for haddock in this area.

Quality of the assessment

There is uncertainty around the historical discard estimates and reported landings in the period 2003–2007, but stock trends in the assessment appear to be robust to this uncertainty (ICES, 2017b).

This stock was benchmarked in January 2017 and the advice for 2017 was updated shortly after. The result of the benchmark was that the stock was changed from a category 3 stock (trend-based assessment) to a category 1 stock (analytical assessment). The assessment includes information from the commercial fishery, including both landings and discards, and takes into account selectivity changes that have occurred in 2000 and 2008. Maturity and natural mortality parameters were updated to reflect current stock dynamics.

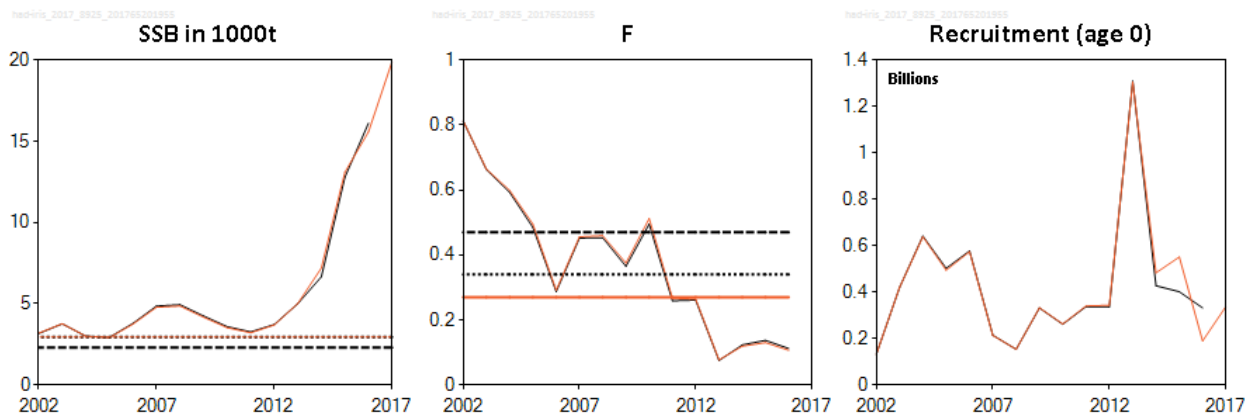


Figure 2 Haddock in Division 7.a. Historical assessment results.

Issues relevant for the advice

The advice for 2017 for the haddock stock in Division 7.a was updated in February 2017 in response to a request from the European Commission, following the benchmark in January 2017 (ICES, 2017b). The TAC for 2017 was increased to 2615 tonnes. The forecast is based on estimated landings in 2017, which assumes uptake of the TAC, taking into consideration annual reallocated landings from the southern rectangles 33E2 and 33E3.

Landings have been adjusted since 2003 to exclude landings taken from the rectangles 33E2 and 33E3 in the Irish Sea as they are not believed to be part of this stock (Table 10). This should be considered when setting TACs for the two management areas for haddock in divisions 7.a and 7.b–k.

Vessels actively targeting haddock have been subject to the EU landing obligation since 2016. Other fleets, for which haddock is a bycatch species, are not currently under a landing obligation (EU, 2016).

Reference points

Table 5 Haddock in Division 7.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	2 944 tonnes	B_{pa}	ICES (2017b)
	F_{MSY}	0.27	Median point estimates of EqSim with segmented regression stock–recruitment relationship	ICES (2017b)
Precautionary approach	B_{lim}	2 300 tonnes	Lowest observed: SSB in 1993	ICES (2017b)
	B_{pa}	2 944 tonnes	B_{lim} combined with the assessment error; $B_{lim} \times \exp(1.645 \times \sigma)$; $\sigma = 0.15$	ICES (2017b)
	F_{lim}	0.47	F with 50% probability of SSB < B_{lim}	ICES (2017b)
	F_{pa}	0.34	F_{lim} combined with the assessment error; $F_{lim} \times \exp(-1.645 \times \sigma)$; $\sigma = 0.2$	ICES (2017b)
Management plan	SSB_{MGT}	Not applicable		
	F_{MGT}	Not applicable		

Basis of the assessment

Table 6 Haddock in Division 7.a. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2016)
Assessment type	Age-structured model (ASAP)
Input data	Four survey indices (NIGFS-WIBTS-Q1 NIGFS-WIBTS-Q4, NIMIK, UKFSPW); annual maturity and growth data from the NIGFS-WIBTS-Q1 survey and from commercial landings in quarter 1. Commercial catch at age.
Discards and bycatch	Included in the assessment for the full time-series
Indicators	None
Other information	This stock was benchmarked in 2017 (ICES, 2017b).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

Information from stakeholders

The estimate of SSB from the UK Fisheries Science Partnership survey (UK-FSP) in 2017 (not included in the current assessment) has the highest value in the series and shows the appearance of older year classes in very recent years.

History of the advice, catch, and management

Table 7 Haddock in Division 7.a. ICES advice and official landings. All weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Predicted landings corresp. to advice	Agreed TAC*	Official landings	ICES landings	ICES discards	ICES catches
1987	Not dealt with			6000	1287	1287		
1988	Not dealt with			6000	747	747		
1989	Not dealt with			6000	560	560		
1990	Not dealt with			6000	582	582		
1991	Not dealt with			6000	616	616		
1992	Not dealt with			6000	703	656		
1993	Not dealt with			6000	730	813		
1994	Not dealt with			6000	681	1042		
1995	Not dealt with			6000	841	1736	780	2516
1996	No advice			10000	1453	2981	709	3690
1997	Means of setting catch limits req'd			14000	1925	3547	895	4442
1998	Catch limit for Division 7.a		3000	20000	3015	4874	1015	5889
1999	No increase in F; catch limit for Division 7.a		7000	4990	2370	4095	634	4729
2000	Reduce F below F_{pa}		< 2800	3400	2447	1357	802	2159
2001	Reduce F below F_{pa}		< 1710	2700	2229	2246	269	2515
2002	Reduce F below F_{pa}		< 1200	1300	1115	1817	387	2204
2003	No cod catches		-	585	674	659^	-	-
2004	$F < F_{pa}$		< 1500	1500	761	1217	392	1609
2005	$F < F_{pa}$		< 1370	1500	547	666	551	1217
2006	Substantial reduction in fishing mortality	-		1275	655	633	306	939
2007	Substantial reduction in fishing mortality	-		1179	1078	886	722	1608
2008	No increase in effort	-		1238	879	786	643	1429
2009	No increase in effort	-		1424	846	581	579	1160
2010	No increase in effort	-		1424	939	679	508	1187
2011	See scenarios	-		1317	813	446	307	753

Year	ICES advice	Predicted catch corresp. to advice	Predicted landings corresp. to advice	Agreed TAC*	Official landings	ICES landings	ICES discards	ICES catches
2012	Reduce catch and improved selectivity	-		1215	813	343	599	942
2013	Decrease catch by 18%	-	< 710	1189	656	254	283	537
2014	Increase catch by 17%	1120	< 572	1181	974	518	488	1006
2015	Increase catch by 20%	< 893	< 425	1181	1154**	833	652	1485
2016	Precautionary approach (increase catch by 20%)	≤ 1072	≤ 481	1654	1463**	1008	298	1306
2017	MSY approach	≤ 3061	≤ 2348	2615***				
2018	MSY approach	≤ 3444^^	≤ 2796					

* Precautionary TAC for subareas 7–10 and CECF 34.1.1 up to 1998. Since 1999 a special condition or separate TAC has been set for Division 7.a.

** Preliminary.

*** Revised TAC in March 2017

^ Underestimate because of inadequate sampling.

^^ Catches taken or reported in rectangles 33E2 and 33E3 are not believed to belong to the haddock stock in Division 7.a but rather to the stock in divisions 7.b–k (Southern Celtic Seas and English Channel). Catches of haddock taken or reported in rectangles 33E2 and 33E3 are therefore included in the assessment of the stock in divisions 7.b–k.

History of the catch and landings

Table 8 Haddock in Division 7.a. Catch distribution by fleet in 2016 as estimated by ICES.

Catch (2016)	Estimated landings				
1306 tonnes	otter trawls		Scottish seines	mid-water trawl	other gear types
	<i>Nephrops</i> directed fishery	Demersal fish directed fishery	17%	45%	2.7%
	18%	18%			
	1008 tonnes				
	Estimated discards				
	otter trawls		Scottish seines	mid-water trawl	other gear types
	<i>Nephrops</i> directed fishery	Demersal fish directed fishery	1.5%	4.5%	7.4%
	46%	41%			
	298 tonnes				

Table 9 Haddock in Division 7.a. History of commercial catch and landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	Belgium	France	Ireland	Netherlands	UK (England & Wales)*	UK (Isle of Man)	UK (N. Ireland)*	UK (Scotland)	United Kingdom	Total	ICES landings
1984	3	38	199	-	29	2	38	78		387	387
1985	4	31	341	-	28	5	215	104		728	728
1986	5	39	275	-	22	4	358	23		726	726
1987	10	50	797	-	41	3	230	156		1287	1287
1988	12	47	363	-	74	3	196	52		747	747
1989	4	n/a	215	-	252	3	...	86		560	560
1990	4	n/a	80	-	177	5	...	316		582	582
1991	1	n/a	254	-	204	14	...	143		616	616
1992	8	73	251	-	244	13	...	114		703	656
1993	18	41	252	-	260	19	...	140		730	813
1994	22	22	246	-	301	24		66		681	1042
1995	32	58	320	-	294	27		110		841	1736
1996	34	105	798	1	463	38		14		1453	2981
1997	55	74	1005	14	717	9		51		1925	3547
1998	104	86	1699	10	1023	13		80		3015	4874
1999	53	n/a	759	5	1479	7		67		2370	4095
2000	22	49	1238	2	1061	19		56		2447	1357
2001	68	184	652	-	1238	1		86		2229	2246
2002	44	72	401	-	551	-		47		1115	1817
2003	20	146	229	-	248	-		31		674	n/a
2004	15	20	296	-	421	-		9		761	1217
2005	22	36	139	-	344	-		6		547	666
2006	23	20	184		419	-		9		655	633
2007	30	11	477	-	559	-		1		1078	886
2008	15	6	319	-	521	1		17		879	786
2009	7	3	388	-	446	1		1		846	581
2010	9	2	333	-	593	-		2		939	679
2011	16	8	434	-	355	-		-		813	446
2012	13	3	561	-		-			236*	813*	343
2013	6	1	492	-	-	<.1		-	155	656	254
2014	7	0	541	-		< 1			426	974	518
2015**	7	7	507			< 1			633	1154	833
2016**	5	1	632						825	1463	1008

* Since 1989 Northern Ireland has been included with England and Wales.

** Preliminary.

n/a = not available.

Table 10 Haddock in Division 7.a. ICES landings, discards, catch, % discards by weight for Division 7.a haddock. All weights are in tonnes.

Year	ICES landings	ICES discards estimates	ICES catch estimates	% discard	Landings taken or reported in rectangles 33E2 and 33E3 (belonging to the 7.b–k stock)**
1995	1736	780	2516	31.0	16
1996	2981	709	3690	19.2	33
1997	3547	895	4442	20	36
1998	4874	1015	5889	17.2	28
1999	4095	634	4729	13.4	34
2000	1357	802	2159	37	11
2001	2246	269	2515	10.7	74
2002	1817	387	2204	17.6	82
2003*	659	-	-		64
2004	1217	392	1609	24	53
2005	666	551	1217	45	35
2006	633	306	939	33	26
2007	886	722	1608	45	222
2008	786	643	1429	45	194
2009	581	579	1160	50	285
2010	679	508	1187	43	267
2011	446	307	753	41	374
2012	343	599	942	64	473
2013	254	283	537	53	410
2014	518	488	1006	49	444
2015	833	652	1485	44	322
2016	1008	298	1306	23	455

* Underestimate or low confidence due to inadequate sampling.

** Landings in the south of Division 7.a (33E2 and 33E3) are not included in the assessment and are considered to be part of the stock (had.27.7b–k)

Summary of the assessment

Table 11 Haddock in Division 7.a. Assessment summary. All weights are in tonnes. Low and high refer to 1 std confidence limits.

Year	Recruitment (age 0) thousands	High	Low	SSB	High	Low	Landings	Discards	F (Ages 2– 4)	High	Low
1993	152699	171378	134020	2323	2653	1992	813	365	0.64	0.77	0.50
1994	523336	574965	471707	2396	2823	1968	1042	468	0.66	0.81	0.50
1995	60221	71965	48477	2528	2998	2057	1736	780	0.87	1.08	0.67
1996	1356009	1487949	1224069	5052	5707	4397	2981	709	0.71	0.84	0.58
1997	206532	236997	176067	4214	4936	3492	3547	895	0.89	1.07	0.70
1998	337497	379086	295908	8364	9272	7456	4874	1015	0.94	1.08	0.79
1999	670677	738411	602943	5866	6666	5066	4095	634	1.35	1.59	1.11
2000	94955	111951	77959	2896	3403	2388	1357	802	0.94	1.15	0.73
2001	702455	777150	627760	4064	4684	3445	2246	269	0.67	0.79	0.55
2002	130864	151710	110018	3185	3756	2615	1817	387	0.81	0.98	0.64
2003	420020	476144	363896	3767	4401	3132	1517	389	0.66	0.81	0.52
2004	638360	710842	565878	2994	3641	2346	1217	392	0.60	0.74	0.45
2005	494628	550283	438973	2909	3530	2288	666	551	0.49	0.62	0.37
2006	574096	633242	514950	3744	4452	3037	633	306	0.29	0.36	0.22
2007	213076	238922	187230	4779	5553	4005	886	722	0.46	0.55	0.36
2008	153331	174098	132564	4853	5686	4020	786	643	0.46	0.56	0.36
2009	332345	372088	292602	4167	5049	3285	581	579	0.38	0.46	0.29
2010	262396	298038	226754	3519	4359	2679	679	508	0.51	0.65	0.38
2011	340160	386599	293721	3207	4060	2354	446	307	0.27	0.34	0.195
2012	343261	396052	290470	3689	4611	2766	343	599	0.26	0.33	0.196
2013	1304991	1474791	1135191	5011	6198	3824	254	282	0.077	0.095	0.059
2014	483257	558400	408114	7197	8621	5772	518	488	0.119	0.145	0.092
2015	551419	649540	453298	13097	15298	10896	833	652	0.130	0.159	0.101
2016	189178	235798	142558	15586	18264	12908	1008	298	0.106	0.131	0.082
2017	337738*			19897							

*GM recruitment 1993–2014.

Sources and references

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