

NEAFC request on updated advice for haddock (*Melanogrammus aeglefinus*) in Division 5.b (Faroes grounds)

ICES advice on fishing opportunities

Please note: The present advice replaces the advice given in June 2018 for catches in 2019.¹

ICES advises that when the MSY approach is applied, catches in 2019 should be no more than 7366 tonnes. ICES is not in a position to advise on the corresponding level of fishing effort.

Stock development over time

The spawning-stock biomass (SSB) has been below B_{lim} since 2009 but has increased to above $MSY B_{trigger}$ in 2018. The fishing mortality (F) has decreased in recent years and was slightly above F_{MSY} in 2017. Recruitment was low from 2004 to 2016, while the 2017 and 2018 recruitments of one-year-olds are estimated to be high, though there is large uncertainty concerning these estimates.

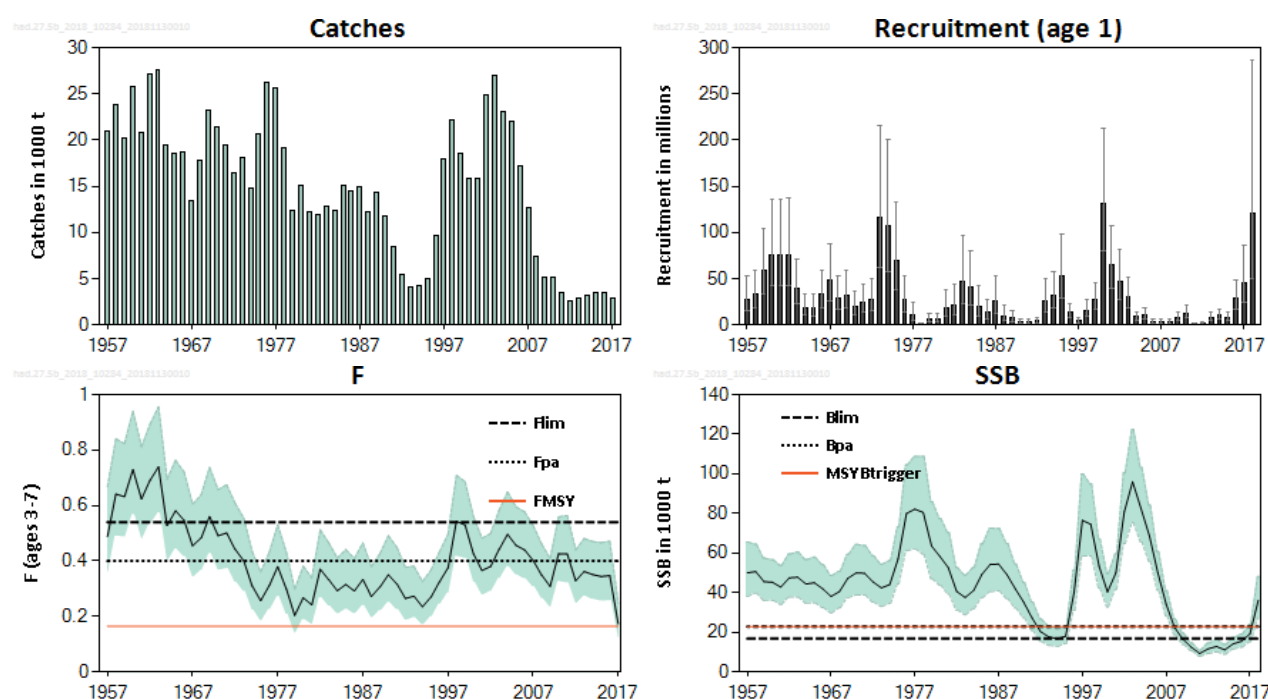


Figure 1 Haddock in Division 5.b. Summary of the stock assessment with 95% confidence intervals.

Stock and exploitation status

ICES assesses that fishing pressure on the stock is above F_{MSY} and below F_{pa} and F_{lim} , while the spawning stock size is above $MSY B_{trigger}$, B_{pa} , and B_{lim} .

Table 1 Haddock in Division 5.b. 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}	✗	✗	✗ Above	$MSY B_{trigger}$	✗	✓ Above trigger
Precautionary approach	F_{pa}, F_{lim}	✓	✓	✓ Harvested sustainably	B_{pa}, B_{lim}	✗	✓ Full reproductive capacity
Management plan	F_{MGT}	—	—	— Not applicable	B_{MGT}	—	— Not applicable

¹ The NEAFC request is found in Annex 1.

Catch scenarios

Table 2 Haddock in Division 5.b. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{\text{ages 3-7}}$ (2018)	0.174	$F_{2018} = F_{2017}$.
SSB (2019)	68198 tonnes	Based on $F_{2018} = 0.174$.
$R_{\text{age 1}}$ (2019)	10157 thousands	Median of resampled estimates from 2000–2017.
$R_{\text{age 1}}$ (2020)	10157 thousands	Median of resampled estimates from 2000–2017.
Total catch (2018)	4313 tonnes	Based on $F_{2018} = 0.174$.
Landings (2018)	4313 tonnes	Landings = catches.
Discards (2018)	0 tonnes	Discarding is considered negligible.

Table 3 Haddock in Division 5.b. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2019)	F_{total} (2019)	SSB (2020)	% SSB change *	% Advice change **
ICES advice basis					
MSY approach: F_{MSY}	7366	0.165	129070	89	61
Other scenarios					
$F = 0$	0	0	139613	105	-100
$F = F_{2018}$	7768	0.174	128437	88	70
$F = F_{\text{pa}}$	15916	0.40	118493	73	248
$F = F_{\text{lim}}$	20193	0.54	112606	65	342

* SSB 2020 relative to SSB 2019.

** Advice value 2019 relative to advice value for 2018 as issued in 2017.

The increased recruitment in recent years and the decline in fishing mortality has led to a large increase in the perception of stock size and an increase in the catch advice for 2019 compared to the advice for 2018.

Basis of the advice

Table 4 Haddock in Division 5.b. 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

The stock was benchmarked in 2017 and the assessment model and input data were changed. The 2017 recruitment estimate has been reduced significantly in the latest assessment.

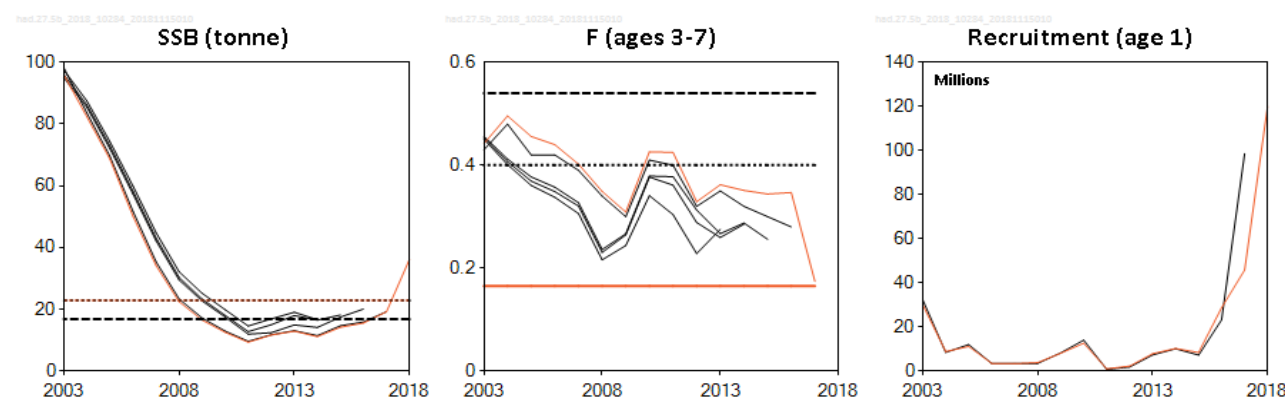


Figure 2 Haddock in Division 5.b. Historical assessment results. The age of recruitment changed from age 2 to age 1 at the 2017 benchmark; the recruitment plot therefore shows only two lines.

Issues relevant for the advice

The advice provided in June 2018 for 2019 has been updated because of a change in the fishing year. From 1996 to 2016, the fishing year was from 1 September to 31 August the following year. The current fishing year started 1 September 2017 and will end 31 December 2018. From 2019 onwards, the fishing year will follow the calendar year. To reflect this new fishing year, ICES is providing updated advice that incorporates the newest survey information from August 2018.

An effort management system has been in place since 1996. ICES is currently not in a position to quantify the relationship between effort and F for this stock.

Faroe Plateau cod and Faroe haddock are caught in a mixed fishery.

Reference points

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

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	22 843 t	B_{pa}	ICES (2017)
	F_{MSY}	0.165	Stochastic simulations based on a segmented regression stock–recruitment relationship.	ICES (2017)
Precautionary approach	B_{lim}	16 780 t	The lowest biomass that has led to good recruitment.	ICES (2017)
	B_{pa}	22 843 t	$B_{lim} \times \exp(1.645 \times \sigma)$, where $\sigma = 0.19$.	ICES (2017)
	F_{lim}	0.54	Stochastic simulations (ICES, 2017) that give a 50% probability of $SSB > B_{lim}$.	ICES (2017)
	F_{pa}	0.40	$F_{lim} \times \exp(-1.645 \times \sigma)$, where $\sigma = 0.18$.	ICES (2017)
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 6 Haddock in Division 5.b. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018a).
Assessment type	SAM with catch-at-age data and age-disaggregated indices, using catches in the model and in the forecast (ICES, 2018b).
Input data	Commercial catches (mainly Faroese catches, ages and length frequencies from catch sampling); survey indices (FO-GFS-Q1 and FO-GFS-Q3); annual maturity data from FO-GFS-Q1; natural mortalities set at 0.2.
Discards and bycatch	Discarding is considered negligible.
Indicators	Co-occurrence of high recruitment of haddock with sandeel abundance.
Other information	Benchmarked in 2017 (ICES, 2018c).
Working group report	North-Western Working Group (NWWG)

Information from stakeholders

There is no additional available information.

History of the advice, catch, and management

Table 7 Haddock in Division 5.b. ICES advice and catch. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC*	ICES catch
1987	No increase in F	17000		14882
1988	No increase in F	18000		12178
1989	No increase in F	11000		14325
1990	No increase in F	11000		11726
1991	TAC	11000		8429
1992	TAC	13000–15000		5476
1993	Reduction in F	8000		4026
1994	No fishing	0	6200	4252
1995	No fishing	0	6200	4948
1996	TAC	8300	12600	9642
1997	F = F(95)	9300		17924
1998	F = F(96)	16000		22210
1999	F < proposed F_{pa} (0.25)	9000		18482
2000	F < proposed F_{pa} (0.25)	22000		15821
2001	F < proposed F_{pa} (0.25)	20000		15891
2002	No fishing	0		24933
2003	F < proposed F_{pa} (0.25)	12000		26942
2004	F < proposed F_{pa} (0.25)	21000		23100
2005	F < proposed F_{pa} (0.25)	19000		21944
2006	F < proposed F_{pa} (0.25)	18000		17154
2007	F < 0.20	16000		12631
2008	F_{pa}	14000		7393
2009	No fishing and recovery plan	0		5197
2010	No fishing and recovery plan	0		5202
2011	No direct fishing; minimize bycatch, implement recovery plan	0		3546
2012	No direct fishing; minimize bycatch, implement recovery plan	0		2634
2013	No direct fishing; minimize bycatch, implement recovery plan	0		2924
2014	No direct fishing; minimize bycatch, implement recovery plan	0		3253
2015	No direct fishing; minimize bycatch, implement recovery plan	0		3422
2016	No direct fishing; minimize bycatch, implement recovery plan	0		3457
2017	MSY approach ($F \leq 0.17$)	≤ 3500		2849**
2018	MSY approach ($F \leq 0.165$)	≤ 4570		
2019	MSY approach	≤ 7366		

* Not applicable since 1997.

** Preliminary.

History of the catch and landings

Table 8 Haddock in Division 5.b. Catch distribution by fleet in 2017 as estimated by ICES. All weights are in tonnes.

Catch (2017)	Landings		Discards
2849	Longliners 57%	Trawlers 43%	Discarding is negligible
	2849		

Table 9 Haddock in Division 5.b. History of commercial catch and landings in subdivisions 5.b.1. and 5.b.2; the ICES estimated catches are presented for each country participating in the fishery. All weights are in tonnes. Faroese catches used in the assessment (first column) are obtained by adding the Faroe Bank (Subdivision 5.b.2) and the Faroe Plateau (Subdivision 5.b.1) catches, with corrections by applying conversion factors for round/gutted weight.

Year	Faroe Islands	England	France	Germany	Iceland	Norway	Scotland	Spain	Greenland	Russia	Total
2000	15185	19	6	1	0	403	185	0	22	0	15821
2001	15406	4	8	2	0	323	148	0	0	0	15891
2002	24474	11	2	6	4	255	177	0	4	0	24933
2003	26419	14	4	1	0	319	185	0	0	0	26942
2004	22589	8	0	6	0	246	186	49	0	16	23100
2005	20616	1	0	0	0	257	1070	0	0	0	21944
2006	16975	1	12	1	0	58	106	0	1	0	17154
2007	12499	0	4	0	0	69	50	0	9	0	12631
2008	7284	0	3	0	0	31	65	0	0	10	7393
2009	5087	0	2	0	0	11	91	0	6	0	5197
2010	5110	0	1	0	0	6	73	0	12	0	5202
2011	3544	0	2	0	0	0	0	0	0	0	3546
2012	2631	0	1	0	2	0	0	0	0	0	2634
2013	2924	0	0	0	0	0	0	0	0	0	2924
2014	2827	350	0	0	0	2	74	0	0	0	3253
2015	2967	428	1	0	0	5	21	0	0	0	3422
2016	3189	252	5	0	0	11	0	0	0	0	3457
2017*	2757	86	1	0	0	6	0	0	0	0	2849

* Preliminary.

Summary of the assessment

Table 10 Haddock in Division 5.b. Assessment summary. Weights are in tonnes.

Table 10

Handbook in Division 5.0: Assessment summary. Weights are in tonnes.

Year	Recruitment			SSB			Catch	F		
	R age 1	97.5 percentile	2.5 percentile	SSB	97.5 percentile	2.5 percentile		F mean ages 3–7	97.5 percentile	2.5 percentile
1957	28034	52749	14899	50010	65565	38145	20995	0.49	0.67	0.36
1958	32876	59292	18229	50662	64414	39846	23871	0.64	0.84	0.49
1959	58177	103353	32747	45565	57404	36168	20239	0.63	0.82	0.49
1960	76061	135178	42798	45273	56654	36179	25727	0.73	0.94	0.57
1961	75998	135994	42470	42811	53727	34113	20831	0.62	0.81	0.48
1962	76172	136480	42513	47443	59489	37836	27151	0.69	0.89	0.53
1963	39735	71528	22073	47819	60472	37813	27571	0.74	0.96	0.57
1964	18577	33686	10245	44382	56663	34762	19490	0.53	0.70	0.40
1965	17980	32680	9892	44994	57908	34960	18479	0.58	0.76	0.44
1966	32871	59667	18109	41951	54130	32512	18766	0.55	0.72	0.42
1967	48003	87174	26433	38095	48643	29834	13381	0.46	0.61	0.34
1968	29128	52769	16079	40553	50817	32362	17852	0.48	0.64	0.37
1969	32525	58832	17981	47237	59392	37569	23272	0.56	0.74	0.43
1970	19846	35982	10946	49961	64349	38790	21361	0.49	0.66	0.37
1971	24270	43954	13401	49763	63810	38809	19393	0.50	0.68	0.37
1972	27206	49394	14985	45474	58648	35259	16485	0.44	0.61	0.32
1973	115654	215829	61974	42409	54373	33078	18035	0.40	0.56	0.29

Year	Recruitment			SSB			Catch	F		
	R age 1	97.5 percentile	2.5 percentile	SSB	97.5 percentile	2.5 percentile		F mean ages 3–7	97.5 percentile	2.5 percentile
	thousands									
1974	107444	201107	57404	44067	56133	34595	14773	0.31	0.43	0.22
1975	70072	132246	37129	57057	73148	44506	20715	0.26	0.36	0.184
1976	27327	52275	14285	79980	104519	61203	26211	0.31	0.43	0.22
1977	10954	23925	5015	82168	108680	62124	25555	0.38	0.53	0.27
1978	1008	2222	458	80471	108798	59520	19200	0.30	0.43	0.21
1979	6064	11778	3122	63538	85868	47014	12424	0.20	0.30	0.139
1980	6007	12418	2906	58283	77457	43855	15016	0.27	0.38	0.188
1981	17999	37187	8711	52582	70256	39354	12233	0.24	0.34	0.172
1982	21151	43763	10222	40608	52659	31315	11937	0.37	0.51	0.27
1983	46232	96094	22242	37559	48846	28880	12894	0.33	0.47	0.24
1984	41270	79758	21355	41052	52659	32004	12378	0.29	0.41	0.21
1985	20418	42603	9785	49251	64656	37517	15143	0.32	0.44	0.23
1986	13373	27993	6389	54259	72557	40577	14477	0.29	0.41	0.21
1987	25081	52826	11908	54429	72417	40909	14882	0.33	0.47	0.24
1988	9921	20834	4724	49055	64896	37080	12178	0.27	0.38	0.195
1989	7426	15460	3567	41924	54422	32296	14325	0.31	0.43	0.22
1990	3279	6801	1581	35144	45192	27329	11726	0.35	0.49	0.25
1991	2844	5876	1377	27205	35283	20976	8429	0.32	0.45	0.22
1992	3954	8211	1904	20338	26720	15481	5476	0.27	0.38	0.186
1993	25560	49956	13078	17665	23240	13427	4026	0.27	0.38	0.195
1994	31878	57937	17539	16743	21654	12945	4252	0.24	0.33	0.170
1995	52799	98285	28364	17974	22511	14351	4948	0.27	0.37	0.198
1996	13793	23167	8212	40003	51344	31168	9642	0.33	0.43	0.24
1997	4177	7224	2415	76524	99891	58623	17924	0.38	0.50	0.28
1998	15794	26782	9315	74529	94859	58556	22210	0.54	0.71	0.42
1999	27511	44660	16947	53294	67184	42276	18482	0.53	0.69	0.41
2000	131129	212985	80732	40387	49707	32815	15821	0.43	0.56	0.32
2001	65317	106668	39996	49942	59603	41847	15891	0.37	0.48	0.28
2002	46807	80882	27088	80691	100529	64767	24933	0.38	0.50	0.29
2003	30037	51302	17587	96004	122406	75297	26942	0.44	0.58	0.34
2004	8760	14395	5331	82361	103179	65742	23100	0.50	0.65	0.38
2005	11097	18838	6537	68652	84193	55980	21944	0.46	0.60	0.35
2006	3437	5829	2027	50153	60780	41383	17154	0.44	0.58	0.34
2007	3287	5569	1941	34177	41111	28414	12631	0.40	0.53	0.31
2008	3760	6259	2259	22437	26738	18828	7393	0.35	0.46	0.26
2009	7998	13520	4731	16484	19559	13893	5197	0.31	0.41	0.23
2010	12547	21468	7334	12484	14656	10634	5202	0.43	0.56	0.33
2011	968	1732	541	9304	10970	7891	3546	0.43	0.56	0.32
2012	2186	3802	1257	11610	14530	9278	2634	0.33	0.44	0.25
2013	7812	13388	4559	12860	16386	10094	2924	0.36	0.48	0.27
2014	10157	17228	5988	11119	13788	8966	3253	0.35	0.47	0.26
2015	8349	14333	4863	14145	17280	11578	3422	0.34	0.47	0.26
2016	28674	48344	17007	15491	19154	12528	3457	0.35	0.47	0.26
2017	45751	85640	24441	19169	24116	15237	2849	0.174	0.25	0.123
2018	120067	286190	50372	36186	48176	27180				

Sources and references

ICES. 2017. Report of the North-Western Working Group (NWWG), 27 April–4 May, 2017, ICES Headquarters, Copenhagen. ICES CM 2017/ACOM:08. 642 pp.

ICES. 2018a. Advice basis. *In* Report of the ICES Advisory Committee, 2018. ICES Advice 2018, Book 1, Section 1.2. <https://doi.org/10.17895/ices.pub.4503>.

ICES. 2018b. Report of the North-Western Working Group (NWWG), 26 April–3 May, 2018, ICES HQ, Copenhagen, Denmark. ICES CM 2018/ACOM:09. 803 pp.

ICES. 2018c. Report of the Benchmark Workshop on Faroese Stocks (WKFAROE 2017), 13–17 February 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:33. 239 pp.

Annex 1

NEAFC sent ICES the following request on 22 October 2018. The present advice is a reply to the requested stock advice update on haddock in Division 5.b. Replies to the other requested stock advice updates are found in ICES Advice 2018: cod in Subdivision 5.b.1 (sr.2018.31a) and saithe in Division 5.b (sr.2018.31c).

Subject: Updated ICES advice for Faroe demersal stocks this autumn - request through NEAFC

Under the existing MOU between NEAFC and ICES, Faroese demersal fish stocks are assessed in ICES.

The normal procedure has been to do the assessment in April, release the ICES advice and the national advice in June for the fishing year that started on 1st of September. With the implementation of the new Faroese management system, the fishing year has changed from 1st of September - 31st August to follow the calendar year (1st of January to 31st of December). This implies that new survey data become available in the autumn and there is time to rerun the assessments with the new data. To release an updated ICES advice (in November) requires additional work to be done by ICES.