

Ling (*Molva molva*) in Division 5.a (Iceland grounds)

ICES stock advice

ICES advises that when the Icelandic management plan is applied, catches in the fishing year 1 September 2017 to 31 August 2018 should be no more than 8598 tonnes. All catches are assumed to be landed.

Stock development over time

Recruitment was high from 2004 to 2010, but has since declined to the levels of the 1980s and 1990s. The spawning-stock biomass (SSB) and the reference biomass (ling longer than 75 cm) in 2017 are among the highest in the time-series. The harvest rate (HR) has decreased since 2008 and is now the lowest in the time-series, below HR_{MSY} .

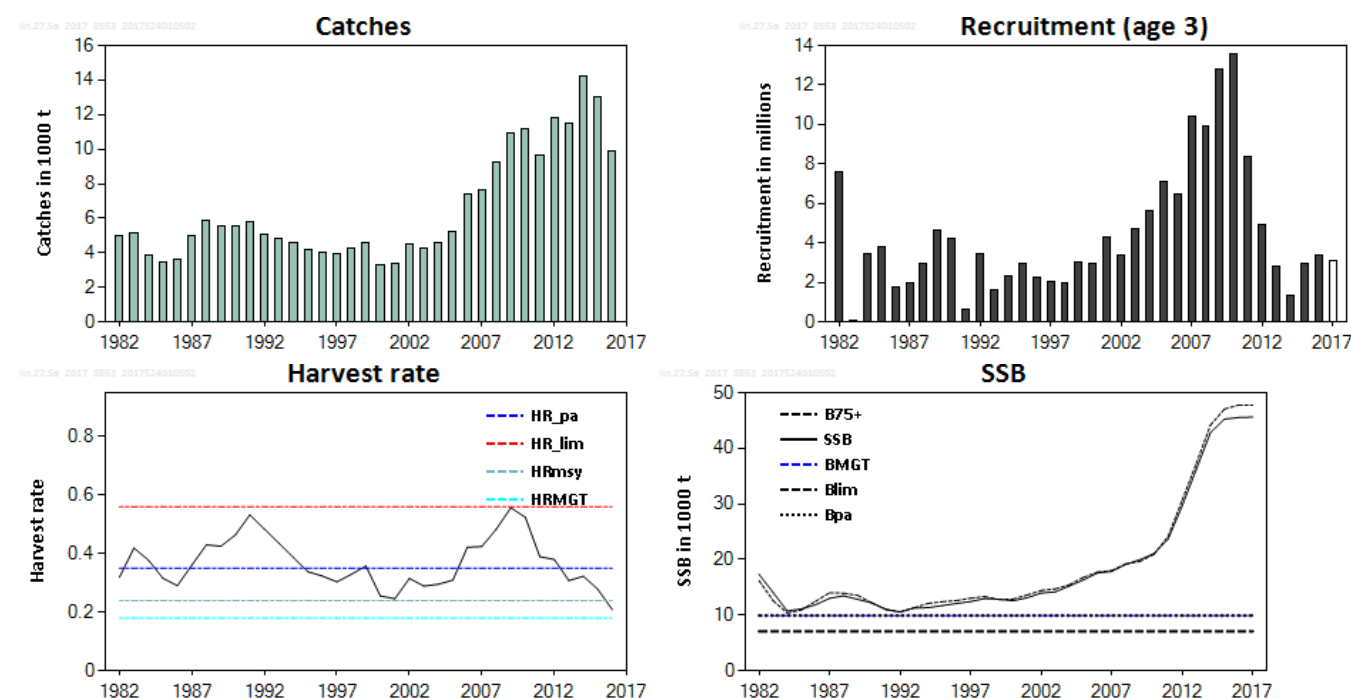


Figure 1 Ling in Division 5.a. Summary of the stock assessment. In the lower right panel (SSB), the B75+ line represents the trend in the biomass of ling at 75 cm and greater that is used in the harvest control rule.

Stock and exploitation status

Table 1 Ling in Division 5.a. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size		
		2014	2015	2016		2015	2016	2017
Maximum Sustainable Yield	HR_{MSY}	✗	✗	✓	Below	MSY	✓	✓
Precautionary Approach	HR_{pa}	✓	✓	✓	Harvested sustainably	$B_{Trigger}$	✓	✓
	HR_{lim}	✓	✓	✓		B_{pa}, B_{lim}	✓	✓
Management plan	HR_{MGT}	✗	✓	✓	within the range	B_{MGT}	✓	✓
								✓ Above trigger
								✓ Full reproductive capacity
								✓ Above

Catch options

The basis of the catch options for this stock is the management plan. A catch option is provided for the fishery year from September 2017 to end August 2018, based on the estimated reference biomass at the end of quarter 1 in 2017. A short-term forecast to the end of 2018 is provided to evaluate the impact of the catch on the SSB.

Table 2 Ling in Division 5.a. The basis for the catch options.

Variable	Value	Source	Notes
HR _{MGT}	0.18	ICES (2017a)	
Reference biomass 2017	47765	ICES (2017a)	Biomass of fish at 75 cm and greater (75+) at the end of quarter 1; in tonnes.
R age 3 (2018)	3906	ICES (2017a)	In thousands.

Table 3 Ling in Division 5.a. Annual catch options. All weights are in tonnes.

Basis	Total catch (2017/2018)	HR (2018)	SSB (2019)	% SSB change **	% TAC change ***
Management plan	8598	0.189	42247	-5%	0%

* SSB in 2019 relative to SSB in 2018.

** Catches in 2018 relative to the TAC in 2017.

Basis of the advice

Table 4 Ling in Division 5.a. The basis of the advice.

Advice basis	Management plan.
Management plan	<p>The Icelandic Ministry of Industries and Innovation's fisheries management plan for Icelandic ling has been evaluated by ICES (ICES, 2017a). It is considered to be precautionary and conforms to the ICES MSY approach. According to the management plan the TAC for the fishing year Y/Y+1 (1 September of year Y to 31 August of year Y+1) is calculated as follows:</p> <p><i>When SSB_Y is equal or above MGT B_{trigger}:</i> $TAC_{Y/Y+1} = HR_{MGT} * B_{Ref,Y}$</p> <p><i>When SSB_Y is below MGT B_{trigger}:</i> $TAC_{Y/Y+1} = HR_{MGT} * (SSB_Y / MGT B_{trigger}) * B_{Ref,Y}$</p> <p><i>The spawning stock biomass trigger (MGT B_{trigger}) is defined as 9.93 kt, the reference biomass is defined as the biomass of ling 75+ cm and the target harvest rate (HR_{MGT}) is set to 0.18.</i></p>

Quality of the assessment

This stock was benchmarked in 2017 (ICES, 2017a); therefore, the present assessment is not fully comparable with previous assessments of this stock. Fishing pressure is defined in terms of harvest rate of biomass of ling at 75 cm and larger, but in the assessments prior to 2017 it was defined in terms of fishing mortality for ages 15–19.

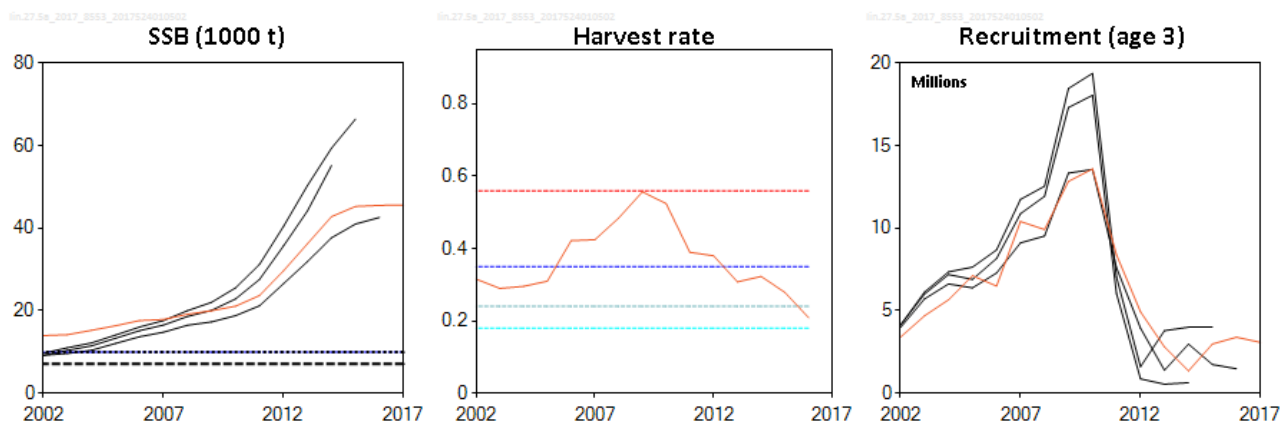


Figure 2 Ling in Division 5.a. Historical assessment results. The harvest rate graph shows only the current assessment as fishing pressure in the historic assessments was estimated as fishing mortality.

Issues relevant for the advice

There is no information to present for this stock.

Reference points

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

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	9930	B_{pa} (tonnes)	ICES (2017a)
	F_{MSY}	0.284	Stochastic simulations	ICES (2017a)
	HR_{MSY}	0.24	Stochastic simulations	ICES (2017a)
Precautionary approach	B_{lim}	7090	$B_{pa}/1.4$ (tonnes)	ICES (2017a)
	B_{pa}	9930	B_{loss} (tonnes)	ICES (2017a)
	F_{lim}	0.7	Equilibrium F that will maintain the stock above B_{lim} with a 50% probability.	ICES (2017a)
	F_{pa}	0.41	5% probability that the true F has been above F_{lim} .	ICES (2017a)
	HR_{lim}	0.56	Equilibrium HR that will maintain the stock above B_{lim} with a 50% probability.	ICES (2017a)
	HR_{pa}	0.35	5% probability that the true HR has been above HR_{lim} .	ICES (2017a)
Management plan	SSB_{mgt}	9930	B_{pa} (tonnes)	ICES (2017a)
	HR_{mgt}	0.18	Percentage of biomass 75+ cm. Leads to long-term MSY. Realized HR can range from 0.12 to 0.28.	ICES (2017a)

Basis of the assessment

Table 6 Ling in Division 5.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2016).
Assessment type	Analytical length-based assessment (Gadget model) that uses catches in the model and in the forecast (ICES, 2017b).
Input data	March Icelandic groundfish survey and data from commercial catches.
Discards and bycatch	Not included, discarding is considered negligible.
Indicators	None.
Other information	Last benchmark in 2017 (ICES, 2017a).
Working group	Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP)

Information from stakeholders

There is no available information.

History of the advice, catch, and management

Table 7 Ling in Division 5.a. ICES advice and official landings. All weights are in tonnes.

Year*	ICES advice*	Predicted catch corresp. to advice**	ICES catches Division 5.a**	TAC Icelandic Division 5.a*	ICES catches Division 5.a*
2003/2004	30% reduction on fishing effort^	-	4621	3000	4608
2004/2005	Biennial^	-	5195	3000	5238
2005/2006	30% reduction on fishing effort^	-	7431	4000	6961
2006/2007	Biennial^	-	7619	5000	7617
2007/2008	Maintain catches at 2001–2004 level	3800	9279	5000	8560
2008/2009	Biennial	3800	10948	7000	10489
2009/2010	Constrain catches to 2006–2007 average	7500	11150	7000	10713
2010/2011	Biennial	7500	9650	7500	10095
2011/2012	Same advice as previously	7500	11829	9000	11133
2012/2013	Fproxy target	12000	11536	12000	12445
2013/2014	No new advice, same as 2013	12000	14246	14000	14983
2014/2015	Fishing at F_{MSY}	14362	13036	14300	13166
2015/2016	Fishing at F_{MSY}	≤ 16156	9884	16200	9769
2016/2017	Fishing at F_{MSY}	≤ 9343			
2017/2018	Management plan	≤ 8598			

* Icelandic fishing year ending on 31 August.

** Calendar year (refers to the second year in the fishing year period).

^ Prior to 2007/2008, the advice for ling was for the whole Northeast Atlantic area.

History of the catch and landings

This stock is distributed primarily in Icelandic waters and does not extend to the NEAFC regulatory area.

Table 8 Ling in Division 5.a. Catch distribution by fleet in 2016 as estimated by ICES.

Table 3. Ling in Division 5A: catch distribution by fleet in 2016 as estimated by ICES.				
Catch (2016)	Landings			Discards
9766 tonnes	longlines 66%	trawl 26%	other 8%	Negligible
	9766 tonnes			

Table 9 Ling in Division 5.a. History of ICES estimated landings for each country participating in the fishery. All weights are in tonnes.

Year	Belgium	Faroes	France	Germany	Iceland	Norway	UK	Total
1973	1080	984	0	586	3564	418	829	7461
1974	681	890	0	486	3868	318	532	6775
1975	736	732	23	375	3748	522	562	6698
1976	431	498	0	404	4538	502	268	6641
1977	442	613	0	254	3433	506	0	5248
1978	541	534	0	0	3439	484	0	4998
1979	508	536	0	0	3759	399	0	5202
1980	445	607	0	0	3149	423	0	4624
1981	196	489	0	0	3348	415	0	4448
1982	116	524	0	0	3738	612	0	4990
1983	128	644	0	0	4236	115	0	5123
1984	103	450	0	0	3306	21	0	3880
1985	59	384	0	0	2989	17	0	3449
1986	88	556	0	0	2948	4	0	3596
1987	157	657	0	0	4154	6	0	4974
1988	134	619	0	0	5083	10	0	5846
1989	95	614	0	0	4833	5	0	5547
1990	42	399	0	0	5121	0	0	5562
1991	69	530	0	0	5187	0	0	5786
1992	34	526	0	0	4529	0	0	5089
1993	20	501	0	0	4322	0	0	4843
1994	3	548	0	0	4054	0	0	4605
1995	0	463	0	0	3733	0	0	4196
1996	0	358	0	0	3671	20	0	4049
1997	0	299	0	0	3635	0	0	3934
1998	0	699	0	0	3604	0	0	4303
1999	0	500	0	0	3972	120	1	4593
2000	0	0	0	0	3218	67	3	3288
2001	0	362	0	2	2870	116	1	3351
2002	0	1629	0	0	2840	45	0	4514
2003	0	565	0	2	3599	108	5	4279
2004	0	739	0	1	3742	139	0	4621
2005	0	682	0	1	4312	180	20	5195
2006	0	960	0	1	6312	158	0	7431
2007	0	807	0	0	6627	185	0	7619
2008	0	1366	0	0	7737	176	0	9279
2009	0	1157	0	0	9619	172	0	10948
2010	0	1095	0	0	9887	168	0	11150
2011	0	588	0	0	8813	249	0	9650
2012	0	875	0	0	10706	248	0	11829
2013	0	1030	0	0	10212	294	0	11536
2014	0	1738	0	0	12450	158	0	14246
2015	0	1233	0	0	11553	250	0	13036
2016*	0	1072	0	0	8582	230	0	9884

* Preliminary.

Summary of the assessment

Table 10 Ling in Division 5.a. Assessment summary. Catches in the assessments are based on landings from the Icelandic Directorate of Fisheries to make splitting of catches by quarters possible. Weights are in tonnes.

Year	Recruitment (thousands)	SSB (tonnes)	Total catch (tonnes)	Harvest rate	Biomass of 75+ cm (tonnes)
1982	7592	17377	4990	0.319	16219
1983	70	14070	5123	0.419	12602
1984	3426	10754	3880	0.378	10394
1985	3810	11123	3449	0.316	10926
1986	1755	11870	3596	0.291	12478
1987	1957	13027	4974	0.361	14022
1988	2930	13480	5846	0.43	13957
1989	4633	12837	5547	0.425	13553
1990	4222	12212	5562	0.464	12184
1991	657	11006	5786	0.533	11047
1992	3467	10569	5089	0.484	10613
1993	1617	11282	4843	0.436	11326
1994	2334	11341	4605	0.387	12122
1995	2963	11725	4196	0.339	12423
1996	2269	12099	4049	0.323	12619
1997	2067	12449	3934	0.304	13048
1998	1954	12982	4303	0.329	13343
1999	3019	12873	4593	0.358	12818
2000	2959	12582	3288	0.256	12889
2001	4313	13115	3351	0.246	13621
2002	3396	13964	4514	0.315	14433
2003	4684	14184	4279	0.29	14714
2004	5654	15241	4621	0.295	15465
2005	7120	16338	5195	0.31	16803
2006	6490	17591	7433	0.422	17738
2007	10403	17859	7619	0.425	18025
2008	9919	19133	9279	0.484	19224
2009	12831	19970	10948	0.557	19652
2010	13591	21093	11150	0.524	20937
2011	8384	23660	9650	0.39	24169
2012	4933	29655	11829	0.38	30682
2013	2803	36236	11536	0.308	37268
2014	1350	42796	14246	0.323	44158
2015	2980	45254	13036	0.279	47065
2016	3391	45531	9884	0.209	47782
2017	3075	45631			47765

Sources and references

ICES. 2016. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.

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