

7.3.12 Hake (*Merluccius merluccius*) in Divisions VIIIc and IXa (Southern stock) (Cantabrian Sea, Atlantic Iberian waters)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2016 should be no more than 6078 tonnes. If this stock is not under the EU landing obligation in 2016 and discard rates do not change from the average of the last three years (2012–2014), this implies landings of no more than 5292 tonnes.

Stock development over time

The spawning-stock biomass (SSB) has increased since 2004 and is well above B_{lim} in 2015. The fishing mortality (F) is well above the F_{MSY} . Recruitment (R) was high in 2005 to 2009, and it is currently close to the historical mean.

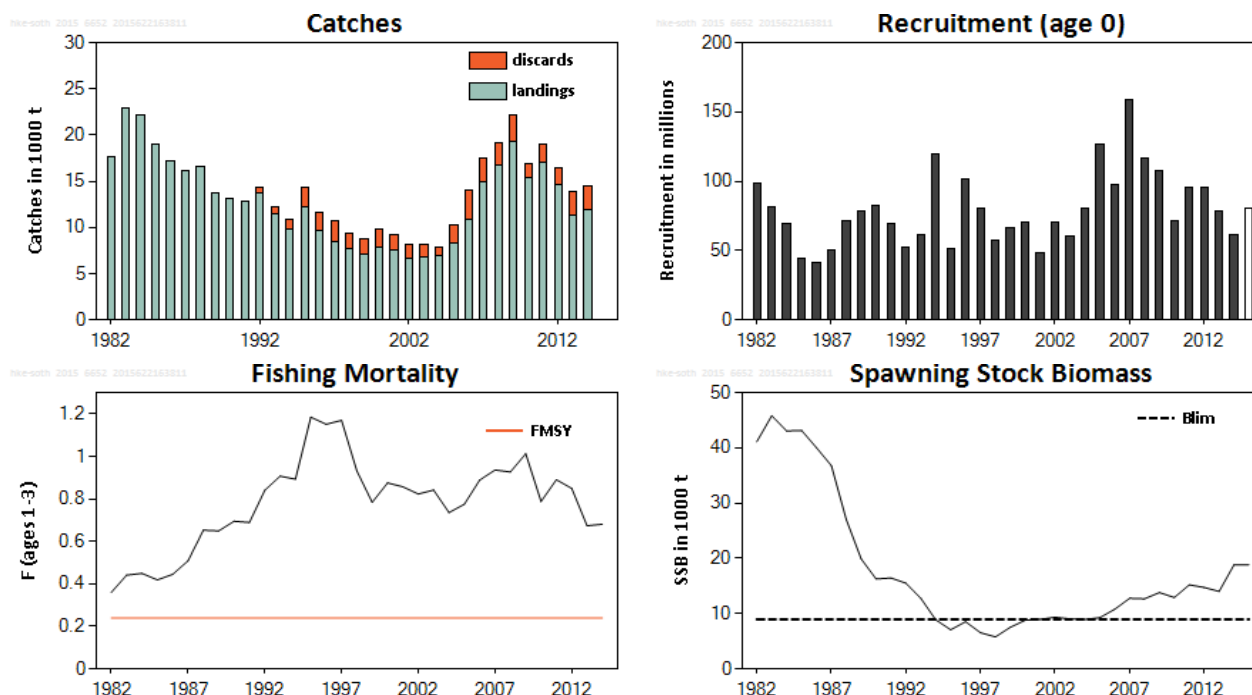


Figure 7.3.12.1 Hake in Divisions VIIIc and IXa (Southern stock). Summary of stock assessment (weights in thousand tonnes). Assumed recruitment values are not shaded.

Stock and exploitation status

Table 7.3.12.1 Hake in Divisions VIIIc and IXa (Southern stock). 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}	✗	✗	✗	Above	?	?	?
Precautionary approach	F_{pa}	?	?	?	Undefined	?	?	?
Management plan	F_{MGT}	-	-	-	Not applicable	-	-	-
	$B_{trigger}$?	?	?	Unknown	?	?	?
	B_{pa}, B_{lim}	?	?	?	Above B_{lim}	?	?	?
	SSB_{MGT}	-	-	-	Not applicable	-	-	-

Catch options

Table 7.3.12.2 Hake in Divisions VIIIC and IXa (Southern stock). The basis for the catch options.

Variable	Value	Source	Notes
F ₂₀₁₅	0.73	ICES (2015a)	Average 2012–2014
SSB (2016)	16443 t	ICES (2015a)	
R (2015)	80.2 million	ICES (2015a)	GM (1989–2013)
R (2016)	80.2 million	ICES (2015a)	
Catch (2015)	15586 t	ICES (2015a)	Based on F(2015) = Average F(2012–2014)
Landings (2015)	13687 t	ICES (2015a)	According to 2012–2014 average discard rates at length estimated by the assessment.
Discards (2015)	1898 t	ICES (2015a)	According to 2012–2014 average discard rates at length estimated by the assessment.

Table 7.3.12.3 Hake in Divisions VIIIC and IXa (Southern stock). The catch options. All weights are in thousand tonnes.

Rationale	Total catch (2016) [#]	Wanted catch (2016) ^{##}	Unwanted catch (2016) ^{##}	Basis	F Total* (2016)	F Wanted catch ^{##} (2016)	F Unwanted catch ^{##} (2016)	SSB (2017)	%SSB change ^{**}	%TAC change ^{***}
MSY approach	6.078	5.292	0.79	$F_{MSY} (F_{sq} \times 0.33)$	0.24	0.21	0.03	29.28	78%	–62%
EU recovery plan ^{####}	13.603	11.752	1.85	$TAC_{2015} \times 0.85$	0.67	0.58	0.09	17.11	4%	–15%
Zero catch	0.0	0.00	0.00	$F = 0$	0.00	0.00	0.00	39.57	141%	–100%
Other options	1.879	1.641	0.24	$F_{sq} \times 0.1$	0.07	0.06	0.01	36.37	121%	–88%
	5.319	4.634	0.69	$F_{sq} \times 0.3$	0.21	0.18	0.03	30.55	86%	–66%
	8.360	7.264	1.10	$F_{sq} \times 0.5$	0.35	0.30	0.05	25.51	55%	–47%
	11.032	9.560	1.47	$F_{sq} \times 0.7$	0.50	0.43	0.07	21.19	29%	–31%
	13.364	11.549	1.81	$F_{sq} \times 0.9$	0.65	0.56	0.09	17.49	6%	–16%
	14.411	12.437	1.97	$F_{sq} \times 1$	0.73	0.63	0.10	15.85	–4%	–10%
	16.062	13.826	2.24	TAC_{2015}	0.87	0.75	0.12	13.31	–19%	0%
	18.570	15.900	2.67	$TAC_{2015} \times 1.15$	1.15	0.99	0.17	9.475	–42%	15%

* Note that small differences in F may result from non-linearity in the effort–F relationship in length-based models.

** SSB 2017 relative to SSB 2016.

*** Wanted catch 2016 relative to TAC 2015.

[#] Total catch is equal to wanted plus unwanted catch.

^{##} “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 discarding ogives estimated by the assessment model.

^{####} Applying a 10% reduction in F relative to F₂₀₁₅ corresponds to a TAC reduction greater than 15% in 2016. In these circumstances, the recovery plan implies a 15% reduction in TAC.

Basis of the advice

Table 7.3.12.4 Hake in Divisions VIIIc and IXa (Southern stock). The basis of the advice.

Advice basis	MSY approach
Management plan	A recovery plan was agreed by the EU in 2005 (EU, 2005, Appendix 7.3.7). The aim of the plan is to rebuild the stock to safe biological limits, set as a spawning-stock biomass above 35000 tonnes by 2016, and to reduce fishing mortality to 0.27. The main elements of the plan are a 10% annual reduction in F and a 15% constraint on TAC change between years. ICES has not evaluated the plan; therefore, it is not used as the advice basis.

Quality of the assessment

Some required data arrived after the ICES data call deadline, thus reducing time to review and audit the assessment results. Although the data were used, the problem may impact ICES quality assurance.

The 2013 and 2014 values from the lpue series from Spain (A Coruña fleet) and the P-TR lpue series since 2011 were not used in the assessment because of a change in the data source. These lpue series, used to calibrate the model, are the main source of information trends for large fish. To what extent this lack of update influences the quality of the assessment is unknown.

The retrospective analysis shows a tendency in the assessment to overestimate SSB and underestimate F.

ICES is uncertain about recent Spanish landing estimates due to differences between the old and new estimation methods.

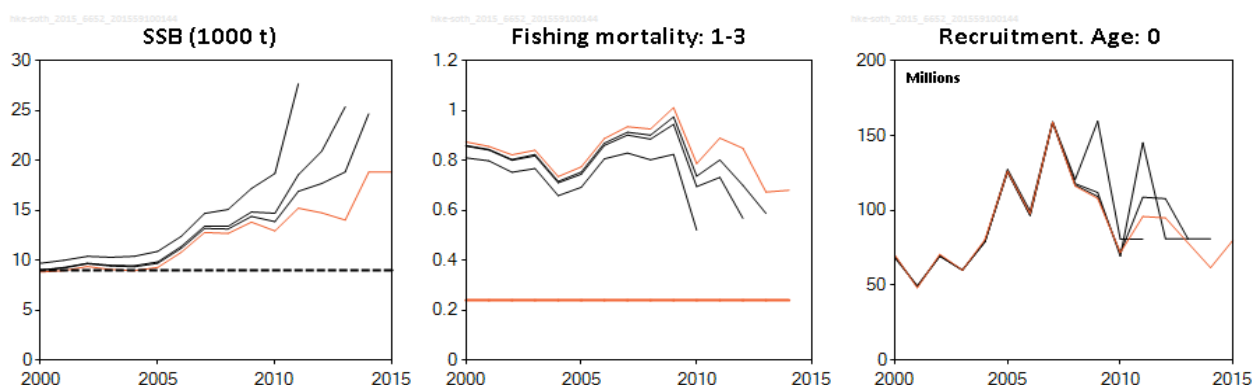


Figure 7.3.12.2 Hake in Divisions VIIIc and IXa (Southern stock). Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

The assessment's retrospective pattern shows that the stock size is systematically overestimated. This may create a too optimistic advice, the degree of which cannot be quantified.

Reference points

Table 7.3.12.5 Hake in Divisions VIIIc and IXa (Southern stock). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B_{trigger}	Not defined		
	F_{MSY}	0.24	F_{max}	ICES (2010)
Precautionary approach	B_{lim}	9000 t	A biomass that produces a recruitment that is at or above average	ICES (2014)
	B_{pa}	Not defined		
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{MGT}	Not defined		
	F_{MGT}	Not defined		

Basis of the assessment

Table 7.3.12.6 Hake in Divisions VIIIc and IXa (Southern stock). The basis of the assessment.

ICES stock data category	1 (ICES, 2015b).
Assessment type	Length–age analytical assessment (GADGET; ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, discards and length frequencies from catch sampling); three survey indices (SpGFS-WIBTS-Q4 [1983 to 2014], SPGFS-caut-WIBTS-Q4 [1997 to 2014], and PtGFS-WIBTS-Q4 [1989–2014]); two commercial indices (SP-CORUTR [1985 to 2012] and P-TR [1989 to 2010]); annual maturity data from commercial catch; natural mortality constant value (0.4) used.
Discards and bycatch	Included in the assessment since 1992. Data series from the main fleets raised to the effort.
Indicators	None.
Other information	Benchmarked in WKSOUTH 2014 (ICES, 2014).
Working group	Working Group for the Bay of Biscay and the Iberian waters Ecoregion (WGBIE).

Information from stakeholders

There is no available information.

History of advice, catch and management

Table 7.3.12.7 Hake in Divisions VIIIc and IXa (Southern stock). History of ICES advice, the agreed TAC, and ICES estimates of landings, discards, and catch. All weights are in thousand tonnes.

Year	ICES advice	Predicted landings corresponding to advice	Agreed TAC***	ICES estimated landings	ICES estimated discards	ICES estimated catch
1987	Precautionary TAC; juvenile protection	15.0	25.0	16.2	-	-
1988	TAC; juvenile protection	15.0	25.0	16.4	-	-
1989	TAC; juvenile protection	15.0	20.0	13.8	-	-
1990	TAC; juvenile protection	15.0	20.0	13.2	-	-
1991	Precautionary TAC	10.0	18.0	12.8	-	-
1992	Precautionary TAC	10.3	16.0	13.8	0.5	14.3
1993	F = 10% of F ₉₁	1.0	12.0	11.5	0.7	12.2
1994	F lowest possible, at least reduced by 80%	2.0	11.5	9.9	1.0	10.9
1995	F lowest possible	-	8.5	12.2	2.1	14.3
1996	F lowest possible	-	9.0	9.7	1.9	11.6
1997	F lowest possible	-	9.0	8.5	2.3	10.8
1998	60% reduction in F	4.0	8.2	7.7	1.7	9.4
1999	Reduce F below F _{pa}	9.5	9.0	7.2	1.5	8.7
2000	20% reduction from 1994–98 average landings	< 7.7	8.5	7.9	1.83	9.7
2001	Reduce F below F _{pa} ; no increase in landings	8.5	8.9	7.6	1.66	9.2
2002	F below F _{pa}	< 8.0	8.0	6.7	1.49	8.2
2003	Lowest possible catch / rebuilding plan	0	7.0	6.7	1.46	8.1
2004	Zero catch	0	5.95	6.9	0.91	8.0
2005	Zero catch	0	5.968	8.30	1.98	10.3
2006	Zero catch	0	6.661	10.80	3.26	14.1
2007	Zero catch	0	6.128	14.93	2.50	17.4
2008	Zero catch	0	7.047	16.77	2.31	19.1
2009	Zero catch	0	8.104	19.24	1.98	22.4
2010	Reach B _{pa} in 2011	4.9	9.300	15.74	1.58	17.3
2011	See scenarios	< 9.9	10.695	17.07	1.95	19.0
2012	MSY transition	< 14.3	12.299	14.57	1.823	16.396
2013	MSY transition	< 10.6	14.144	11.661	2.553	14.214
2014	MSY transition	< 13.123*	16.266	12.011	2.602	14.614
2015	MSY approach	< 8.417*	13.826			
2016	MSY approach	≤ 6.078 **				

* This value refers to total catch, including discards.

** This value refers to total catch, including unwanted catch.

*** Applies to ICES Division VIIIc and Subareas IX and X; EU waters of CECAF 34.1.1.

History of catch and landings

Table 7.3.12.8 Hake in Divisions VIIIc and IXa (Southern stock). Catch distribution by fleet in 2014 as estimated by ICES.

Total catch (2014)	Landings			Discards
14.614 kt	34% trawlers	47% other fleets	19% unallocated	2.602 kt
	12.011 kt			

Table 7.3.12.9 Hake in Divisions VIIIc and IXa (Southern stock). History of commercial catch and landings, as estimated by ICES by country and gear.

Year	Spain									Portugal				France *	Unall. **	Total		
	Artisanal	Gill-net	Long-line	Cd-Trw	Pr-Bk TRW	Pa-Trw	Ba-Trw	Discards	Landings	Artisanal	Trawl	Discards	Landings	Total		Discards	Landings	Catch
1972	7.10	-	-	-	10.20				17.3	4.70	4.10	-	8.8			-	26.1	26.1
1973	8.50	-	-	-	12.30				20.8	6.50	7.30	-	13.8	0.20		-	34.8	34.8
1974	1.00	2.60	2.20	-	8.30				14.1	5.10	3.50	-	8.6	0.10		-	22.8	22.8
1975	1.30	3.50	3.00	-	11.20				19.0	6.10	4.30	-	10.4	0.10		-	29.5	29.5
1976	1.20	3.10	2.60	-	10.00				16.9	6.00	3.10	-	9.1	0.10		-	26.1	26.1
1977	0.60	1.50	1.30	-	5.80				9.2	4.50	1.60	-	6.1	0.20		-	15.5	15.5
1978	0.10	1.40	2.10	-	4.90				8.5	3.40	1.40	-	4.8	0.10		-	13.4	13.4
1979	0.20	1.70	2.10	-	7.20				11.2	3.90	1.90	-	5.8	-		-	17.0	17.0
1980	0.20	2.20	5.00	-	5.30				12.7	4.50	2.30	-	6.8	-		-	19.5	19.5
1981	0.30	1.50	4.60	-	4.10				10.5	4.10	1.90	-	6.0	-		-	16.5	16.5
1982	0.27	1.25	4.18	0.49	3.92				10.1	5.01	2.49	-	7.5	-		-	17.6	17.6
1983	0.37	2.10	6.57	0.57	5.29				14.9	5.19	2.86	-	8.0	-		-	22.9	22.9
1984	0.33	2.27	7.52	0.69	5.84				16.7	4.30	1.22	-	5.5	-		-	22.2	22.2
1985	0.77	1.81	4.42	0.79	5.33				13.1	3.77	2.05	-	5.8	-		-	18.9	18.9
1986	0.83	2.07	3.46	0.98	4.86				12.2	3.16	1.79	-	4.9	0.01		-	17.2	17.2
1987	0.53	1.97	4.41	0.95	3.50				11.4	3.47	1.33	-	4.8	0.03		-	16.2	16.2
1988	0.70	1.99	2.97	0.99	3.98				10.6	4.30	1.71	-	6.0	0.02		-	16.7	16.7
1989	0.56	1.86	1.95	0.90	3.92				9.2	2.74	1.85	-	4.6	0.02		-	13.8	13.8
1990	0.59	1.72	2.13	1.20	4.13				9.8	2.26	1.14	-	3.4	0.03		-	13.2	13.2
1991	0.42	1.41	2.20	1.21	3.63				8.9	2.71	1.25	-	4.0	0.01		-	12.8	12.8
1992	0.40	1.48	2.05	0.98	3.79			0.14	8.7	3.77	1.33	0.33	5.1	-		0.5	13.8	14.3
1993	0.37	1.26	2.74	0.54	2.67			0.24	7.6	3.04	0.87	0.44	3.9	-		0.7	11.5	12.2
1994	0.37	1.90	1.47	0.32		0.82	1.90	0.29	6.8	2.30	0.79	0.71	3.1	-		1.0	9.9	10.9
1995	0.37	1.59	0.96	0.46		2.34	2.94	0.93	8.6	2.56	1.03	1.18	3.6	-		2.1	12.2	14.3
1996	0.23	1.15	0.98	0.98		1.46	2.17	0.91	7.0	2.01	0.76	0.99	2.8	-		1.9	9.7	11.6
1997	0.30	1.04	0.76	0.88		1.32	1.78	1.07	6.1	1.52	0.90	1.20	2.4	-		2.3	8.5	10.8
1998	0.32	0.75	0.62	0.53		0.88	1.95	0.57	5.0	1.67	0.97	1.11	2.6	-		1.7	7.7	9.4
1999	0.33	0.60	0.00	0.57		0.87	1.59	0.35	4.0	2.12	1.09	1.17	3.2	-		1.5	7.2	8.7
2000	0.26	0.85	0.15	0.58		0.83	1.98	0.62	4.7	2.09	1.16	1.21	3.3	-		1.83	7.90	9.7
2001	0.32	0.55	0.11	1.20		1.06	1.12	0.37	4.4	2.02	1.20	1.29	3.2	-		1.66	7.58	9.2
2002	0.22	0.58	0.12	0.88		1.37	0.75	0.38	3.9	1.81	0.97	1.11	2.8	-		1.49	6.70	8.2
2003	0.37	0.43	0.17	1.25		1.36	1.07	0.41	4.7	1.13	0.96	1.05	2.1	-		1.46	6.74	8.2
2004	0.48	0.42	0.13	1.06		1.66	1.13	0.22	4.9	1.27	0.80	0.69	2.1	-		0.91	6.94	7.9
2005	0.72	0.63	0.09	0.88		2.77	1.14	0.38	6.2	1.10	0.96	1.60	2.1	-		1.98	8.30	10.3
2006	0.48	0.71	0.35	0.63		4.70	1.81	2.65	8.7	1.22	0.91	0.61	2.1	-		3.26	10.80	14.1

Year	Spain									Portugal				France *	Unall. **	Total		
	Artisanal	Gill-net	Long-line	Cd-Trw	Pr-Bk TRW	Pa-Trw	Ba-Trw	Discards	Landings	Artisanal	Trawl	Discards	Landings	Total		Discards	Landings	Catch
2007	0.83	1.80	0.89	0.50		6.71	2.07	1.19	12.8	1.41	0.72	1.31	2.1	-		2.50	14.93	17.4
2008	1.12	2.64	1.51	0.53		6.32	2.44	1.45	14.6	1.27	0.94	0.86	2.2	-		2.31	16.77	19.1
2009	1.41	2.92	2.10	0.55		7.37	2.54	0.98	16.9	1.39	0.96	1.96	2.4	-		2.93	19.24	22.4
2010	0.72	1.71	1.88	0.68		6.33	1.71	1.00	13.0	1.61	0.73	0.58	2.3	0.36		1.58	15.74	17.3
2011	0.42	1.09	0.76	0.53		2.18	1.48	1.21	6.5	1.72	0.49	0.74	2.2		8.40	1.95	17.07	19.0
2012	0.34	0.85	1.08	0.50		1.64	1.42	1.35	5.8	1.79	0.81	0.47	2.6		6.14	1.823	14.57	16.396
2013	0.64	1.75	1.11	0.62		1.86	1.16	2.22	7.2	1.93	0.81	0.33	2.7	0.31	1.46	2.553	11.661	14.214
2014	0.75	1.46	1.60	0.54		1.72	1.18	2.02	7.3	1.71	0.66	0.58	2.4	0.14	2.25	2.602	12.011	14.614

* French catches are not considered in the assessment until the full time-series is reviewed.

** Unallocated landings have been included since 2011.

Summary of the assessment

Table 7.3.12.10 Hake in Divisions VIIIc and IXa (Southern stock). Assessment summary (weights in tonnes).

Year	Recruitment Age 0	SSB	Landings*	Discards	Mean F Ages 1–3
	thousands				
1982	98402	41104	17592		0.36
1983	81483	45802	22950		0.441
1984	69478	43052	22179		0.45
1985	44095	43147	18941		0.419
1986	40965	40031	17161		0.445
1987	50134	36773	16185		0.509
1988	71229	27035	16653		0.653
1989	78083	19905	13786		0.65
1990	82325	16287	13190		0.695
1991	69856	16462	12827		0.689
1992	52406	15527	13798	473	0.84
1993	61081	12775	11484	683	0.907
1994	119550	8908	9865	994	0.892
1995	51260	7104	12239	2102	1.184
1996	101033	8552	9715	1910	1.151
1997	80484	6557	8498	2270	1.169
1998	57588	5812	7683	1681	0.931
1999	66659	7545	7170	1519	0.784
2000	70382	8823	7902	1835	0.875
2001	48252	8973	7580	1662	0.857
2002	70670	9379	6690	1492	0.823
2003	60083	9075	6744	1461	0.841
2004	80505	8962	6942	913	0.736
2005	126162	9286	8333	1978	0.775
2006	97773	10802	10816	3262	0.888
2007	158997	12786	14932	2504	0.936
2008	116221	12695	16795	2311	0.926
2009	108010	13830	19240	2935	1.012
2010	71761	12940	15368	1580	0.788
2011	95936	15229	17062	1948	0.89
2012	95012	14756	14573	1823	0.849
2013	78345	14036	11353	2553	0.674
2014	61680	18836	11875	2602	0.681
2015	80200**	18856			
Average	79297	17695	12973	1847	0.779

* Landings do not include the small French landings presented in Table 7.3.12.9.

** Geometric mean 1989–2013.

Sources and references

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