

### 9.3.18 Horse mackerel (*Trachurus trachurus*) in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k (Northeast Atlantic)

#### ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2016 should be no more than 126 103 tonnes.

#### Stock development over time

The stock and the fishery are very dependent on occasional high recruitments. The very high 1982 recruitment gave a peak in SSB in 1988, and the relatively high one in 2001 gave a moderate increase in SSB up to 2009. In recent years, SSB has been declining and is currently just above MSY  $B_{trigger}$ . Fishing mortality has been increasing since 2007, but remains just below  $F_{MSY}$ . Recruitment has been low from 2002 onwards.

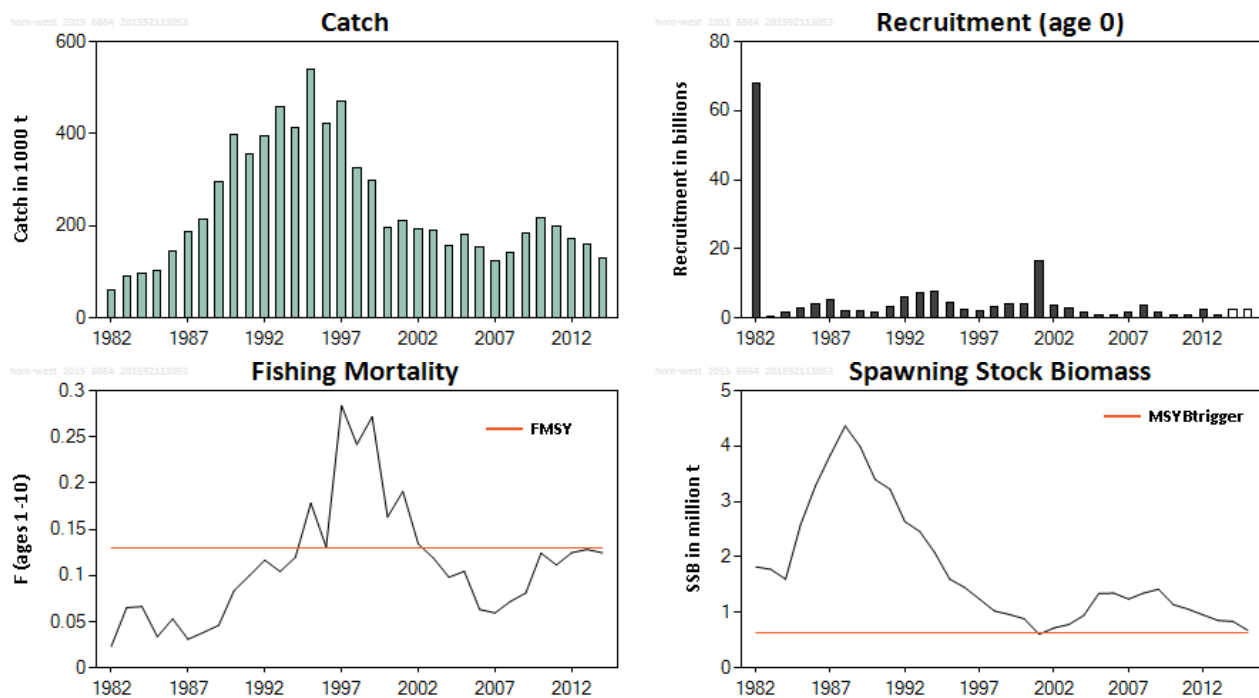


Figure 9.3.18.1 Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. Summary of stock assessment. Predicted values are not shaded.

#### Stock and exploitation status

Table 9.3.18.1 Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2012	2013	2014	2013	2014	2015
Maximum sustainable yield	$F_{MSY}$	✓	✓	✓ Below	$MSY$	✓	✓ Above
Precautionary approach	$F_{pa}$ , $F_{lim}$	?	?	?	$B_{pa}$ , $B_{lim}$	?	?
Management plan	$F_{MGT}$	-	-	-	$SSB_{MGT}$	-	-

## Catch options

**Table 9.3.18.2** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. The basis for the catch options.

Variable	Value	Source	Notes
F ages 1–10 (2015)	0.09	ICES (2015a)	Catch constraint
SSB (2016)	718285 t	ICES (2015a)	SSB at 1st January, used in the ICES MSY advice rule
R <sub>age0</sub> (2015–2017)	2449397	ICES (2015a)	GM 1983–2013
Catch (2015)	97604 t	ICES (2015a)	EU TAC – which is also the expected catch. The catches since 2007 have been below the total TAC (EU TAC plus national quotas of other countries) and closer to the EU TAC.

**Table 9.3.18.3** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. The catch options.

Rationale	Catch (2016)	Basis	F (2016)	SSB (2016)*	SSB (2017)*	%SSB change**	% TAC change***
MSY approach ^	126103	F <sub>MSY</sub>	0.13	626488	562151	-10	27
Zero catch	0	F = 0		671401	696624	4	-100
Other options	79443	20% TAC reduction	0.08	643386	610367	-5	-20
	84408	15% TAC reduction	0.08	641676	605358	-6	-15
	121571	F <sub>2014</sub>	0.12	628157	566789	-10	22
	99304	Advised TAC(2015)	0.1	636148	589371	-7	0
	114200	15% TAC increase	0.12	630879	574412	-9	15
	119165	20% TAC increase	0.12	628994	569123	-10	20

Weights in tonnes.

\* SSB at spawning time.

\*\* SSB<sub>2017</sub> relative to SSB<sub>2016</sub> at spawning time.

\*\*\* Catch advice 2016 relative to last year's TAC (2015) advice (99 304 tonnes).

^ ICES MSY advice rule is based on SSB back calculated to Jan 1<sup>st</sup> for this stock.

## Basis of the advice

**Table 9.3.18.4** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. The basis of the advice.

Advice basis	MSY approach.
Management plan	ICES is not using the proposed management plan as basis for advice. The Pelagic RAC proposed a management plan for horse mackerel in 2007 ( <a href="#">ICES, 2014</a> ; see Annex 9.3.12.1). Since 2011 ICES has not advised according to the management plan because it has been concluded that the management plan in its current configuration is not consistent with the precautionary approach (PA) (ICES, 2013). However, this work also showed that the plan could be made consistent with the PA through the introduction of a protection rule (ICES, 2013).

## Quality of the assessment

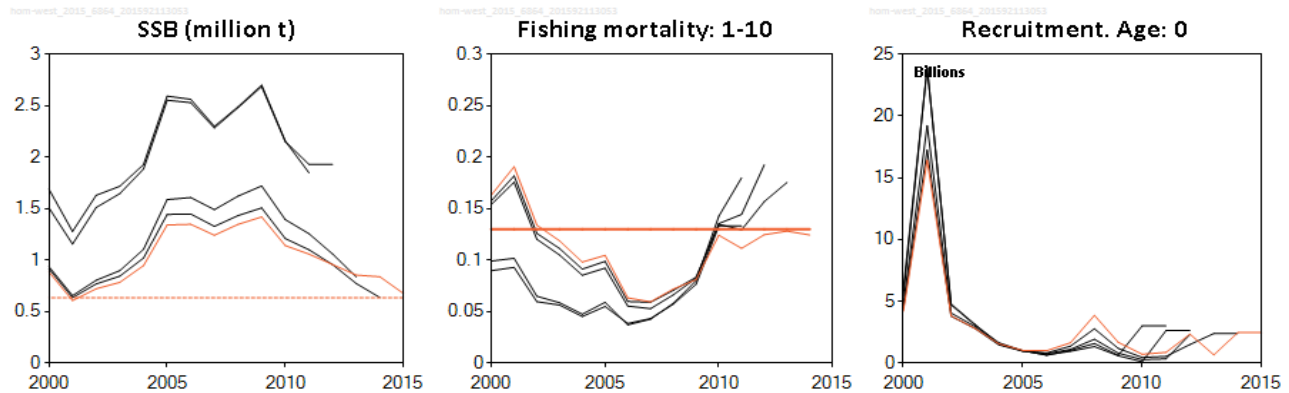
There is large uncertainty in the absolute estimates of SSB. The only fishery-independent information for this stock is a measure of egg production from surveys conducted every three years. The assessment assumes that fecundity is consistent over time. If this assumption is incorrect, the assessment results may be biased. A change of perception of the stock occurred after the 2013 egg survey estimate was included in the assessment. A new survey point is added only every third year.

The working group made a minor amendment to the 2014 catch data (+5%), but this was not included in the final assessment. The impact of this is negligible.

Historically few countries provided data on discards; consequently, there is no estimate of the total amount of discards in the historical data of horse mackerel fisheries. For 2014 most countries provided discard data which are included in the assessment, showing that in 2014 discarding was negligible.

The landings fraction sampled to estimate biological parameters has increased for 2013; it is important to maintain these levels of sampling to maintain the quality of catch-at-age data. As in previous years, and despite the data sampling regulations for EU countries, some countries with major catches have not conducted biological sampling programs.

Work is ongoing with the development of a fisheries-independent abundance or recruitment index through combining a number of international bottom trawl surveys.



**Figure 9.3.18.2** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. Historical assessment results (final-year recruitment estimates included).

**Issues relevant for the advice**

There is no information to present for this stock.

**Reference points**

**Table 9.3.18.5** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B <sub>trigger</sub>	634577 t	B <sub>loss</sub> 2014 assessment; SSB in 2001.	ICES (2014)
	F <sub>MSY</sub>	0.13	F <sub>0.1</sub> from the yield-per-recruit.	ICES (2010)
Precautionary approach	B <sub>lim</sub>	Not defined.		
	B <sub>pa</sub>	Not defined.		
	F <sub>lim</sub>	Not defined.		
	F <sub>pa</sub>	Not defined.		

## Basis of the assessment

**Table 9.3.18.6** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. The basis of the assessment.

ICES stock data category	Category 1 ( <a href="#">ICES, 2015b</a> ).
Assessment type	Age-based analytical (Linked Separable Adapt VPA; ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Commercial catches: international catches and ages from catch sampling. One survey index: Triennial egg survey index. One tuning index: potential fecundity vs. fish weight 1987, 1992, 1995, 1998, 2000, and 2001. Annual maturity data: constant since 1998. Natural mortalities: constant = 0.15.
Discards and bycatch	Discards are known to take place but are only quantified for part of the fisheries (discards in 2014 were below 1.5% in weight, 95% of the landings covered), and are considered negligible.
Indicators	None.
Other information	Benchmark planned for 2017.
Working group	Working Group on Widely Distributed Stocks ( <a href="#">WGWIDE</a> ).

## Information from stakeholders

Horse mackerel has been relatively easy to catch during the beginning of 2015. In the first quarter of the year 40% of the TAC had been caught, while the main fishery still had to take place. Several fisheries have reported unexpected large quantities of horse mackerel in Divisions VIa and IVa in winter. The Irish industry reported large shoals west of Ireland (Divisions VIIb,c) and west of Scotland (Division VIa). Substantial quantities of small horse mackerel were also caught southwest of Ireland. The Danish industry reported a substantial influx of horse mackerel in the Skagerrak.

**History of advice, catch, and management**

**Table 9.3.18.7** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. History of ICES advice, the agreed TAC, and ICES estimates of landings and catch.

Year	ICES advice	Predicted catch corresp. to advice**	Agreed TAC*	ICES landings***	Discards ***	ICES catch***
1987	Not assessed	-	155	157	-	157
1988	No increase in catches	102	169	184	4	188
1989	If sustained catches required; TAC	100	153	267	1	269
1990	TAC	~200	203	363	10	373
1991	Within safe biological limits	-	230	328	5	334
1992	Within safe biological limits	-	250	369	2	371
1993	Within safe biological limits	-	250	424	9	433
1994	Prudent not to increase F	-	300	385	4	389
1995	Reduction in catch	-	300	509	2	511
1996	Reduction in catch	-	300	379	17	397
1997	Reduction in F	173	300	440	3	443
1998	Reduction in F to 0.15	150	320	296	1	304
1999	Effectively limit catches to 200 000 t	< 200	265	274	-	274
2000	Effectively limit catches to 200 000 t	< 200	240	175	-	175
2001	Effectively limit catches to 224 000 t	< 224	233	191	-	191
2002	Effectively limit catches to 98 000 t	< 98	150	172	-	172
2003	Effectively limit catches to 113 000 t	< 113	137	190	-	190
2004	Limit catches to less than 130 000 t	< 130	137	157	1	158
2005	Limit catches to less than 150 000 t	< 150	137	182	1	182
2006	Limit catches to less than 150 000 t	< 150	137	155	0	155
2007	Limit catches to less than 150 000 t	< 150	137	123	0	123
2008	Follow proposed management plan	180	170	143^	0	143^
2009	Follow proposed management plan	180	170	183^	0	183^
2010	Follow proposed management plan	180	185	203^	15	218
2011	See scenarios	181–229	184	193	7	200
2012	MSY framework	≤ 211	183	170	3	173
2013	MSY framework	≤ 126	183	161	4	165
2014	MSY approach	≤ 110.546	135	127	2	129.025
2015	MSY approach	≤ 99.304	97.604			
2016	MSY approach	≤ 126.103				

Weights in thousand tonnes.

\* Applies to EU waters only, 2014 and 2015 is EU TAC.

\*\* Excluding Division VIIIc before 2005.

\*\*\* Excluding Division VIIIc before 2003.

^ Revised in 2015.

### History of catch and landings

**Table 9.3.18.8** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. Catch distribution by fleet in 2014 as estimated by ICES.

Total catch	Landings			Discards
129 kt	23% pelagic pair trawl	11% purse seine	66% undefined gear	Discarding is known to take place and is estimated at 1.5%; considered negligible
	127 kt			

**Table 9.3.18.9** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. History of catch and landings, both the official and ICES estimated values are presented by area. Unallocated catch not included.

Year	IIa, Vb	IIIa	IVa	VIa,b	VIIa–c,e–k	VIIIa,b,d,e	VIIIc	Discards	Total Western Stock
1982	-		-	6283	32231	3073	19610	-	61197
1983	412		-	24881	36926	2643	25580	-	90442
1984	23		94	31716	38782	2510	23119	500	96744
1985	79		203	33025	35296	4448	23292	7500	103843
1986	214		776	20343	72761	3071	40334	8500	145999
1987	3311		11185	35197	99942	7605	30098	-	187338
1988	6818		42174	45842	81978	7548	26629	3740	214729
1989	4809		85304*	34870	131218	11516	27170	1150	296037
1990	11414	14878	112753*	20794	182580	21120	25182	9930	398645
1991	4487	2725	63869*	34415	196926	25693	23733	5440	357288
1992	13457	2374	101752	40881	180937	29329	24243	1820	394793
1993	3168	850	134908	53782	204318	27519	25483	8600	458628
1994	759	2492	106911	69546	194188	11044	24147	3935	413022
1995	13133	128	90527	83486	320102	1175	27534	2046	538131
1996	3366		18356	81259	252823	23978	24290	16870	420942
1997	2617	2037	65073**	40145	318101	11677	29129	2921	471700
1998	2540***		17011	35043	232451	15662	22906	830	326443
1999	2557^	2095	47316	40381	158715	22824	24188		298076
2000	1169^^	1105	4524	20657	115245	32227	21984		196911
2001	60	72	11456	24636	100676	54293	20828		212090
2002	1324	179	36855	14190	86878	32450	22110	305	194292
2003	24	1974	21272	23254	101948	21732	19979		190183
2004	47		11841	21929	98984	8353	15772	701	157627
2005	176		26315	22054	91431	26483	14775	760	181994
2006	30		27152	15722	77970	20651	13470	99	155094
2007	366	110	4940	26279	63223	14428	13960	102	123408
2008	572^^^	3	12014	25902	67325	14537	19345	43	139741
2009	1847	-	58738	17775	65122	12452	20903	81	176918
2010	1627	88	11516	22641	114483	2042	37505	15366	205268

Year	Ila, Vb	Illa	IVa	Vla,b	VIIa-c,e-k	VIIIa,b,d,e	VIIIc	Discards	Total Western Stock
2011	648	1	14724	39298	103156	2303	32943	6522	199593
2012	66	9	3312	44975	104098	5051	12351	3280	173142
2013	30	19	6703	43264	83683	9212	17773	4401	165085
2014	424	4096	10573	32444	48747	4118	26727	1896	129025

Weight in tonnes.

\* Norwegian catches in Division IVb included.

\*\* Norwegian catches in Division IVb included (1426 t).

\*\*\* Includes 1937 t from Division Vb.

^ Includes 132 t from Division Vb.

^^ Includes 250 t from Division Vb.

^^^ All from Division Vb.

**Table 9.3.18.10** Horse mackerel in Subarea VIII and Divisions Ila, IVa, Vb, Vla, and VIIa-c, e-k. History of catch and landings, both the official and ICES estimated values are presented by country.

Year	Denmark	France	Germany, Fed.Rep.	Ireland	Netherlands	Norway	Spain	UK (Engl. + Wales)	Other countries	Unallocated + discards	Total
1997	62.897	39.188	28.533	74.250	82.885	45.058	31.087	19.778	36.371	51.653	471.700
1998	29.542	24.267	27.872	70.811	92.535	13.363	14.882	12.162	20.034	20.975	326.443
1999	22.663	25.141	17.629	57.956	75.333	46.410	25.123	9.257	14.175	4.389	298.076
2000	13.084	20.457	13.348	55.300	57.971	2.087	22.669	1.555	9.235	1.205	196.911
2001	6.108	15.145	11.493	51.874	73.439	7.956	23.053	7.096	8.132	7.794	212.090
2002	10.152	18.951	12.614	36.483	42.019	36.689	23.214	5.971	4.184	4.015	194.292
2003	11.739	10.383	15.826	35.855	47.327	20.315	24.588	4.440	1.805	17.905	190.183
2004	11.480	8.060	17.830	26.431	40.987	10.751	16.272	4.617	5.962	15.957	158.328
2005	1.021	10.690	16.734	35.361	43.445	25.113	16.636	3.560	4.430	25.023	181.994
2006	8.353	11.034	10.863	26.779	37.130	27.114	13.878	3.583	8.727	7.633	155.094
2007	7.617	12.748	5.784	30.091	29.083	4.182	14.257	5.482	6.799	7.365	123.408
2008	5.261	12.626	11.708	35.612	43.648	1.223	19.851	3.365	7.475	2.337	143.106
2009	6.009	-	15.121	40.754	39.451	59.764	21.077	6.482	1.671	-6.929	183.400
2010	5.941	0.260	17.688	44.488	61.504	11.978	38.744	12.714	2.743	22.083	218.143
2011	6.109	8.271	21.114	38.464	55.692	13.755	34.581	11.716	3.369	6.522	199.593
2012	4.002	1.795	17.063	45.242	66.396	3.251	13.560	12.122	1.335	8.375	173.141
2013	6.829	3.593	24.835	35.791	53.697	6.596	22.541	3.959	2.843	4.401	165.087
2014	5.945	3.428	9.826	32.667	25.053	14.353	19.442	4.832	3.036	10.441	129.025

Weights in thousand tonnes.

## Summary of the assessment

**Table 9.3.18.11** Horse mackerel in Subarea VIII and Divisions IIa, IVa, Vb, VIa, and VIIa–c, e–k. Assessment summary with weights in tonnes and recruitment in thousands.

Year	R (age 0)	SSB**	TSB	Catch	Yield/SSB	F(1-3)	F(4-8)	F(1-10)
1982	68032700	1822660	2097975	61197	0.034	0.018	0.029	0.023
1983	526707	1777640	2040600	90442	0.051	0.008	0.084	0.065
1984	1551200	1599340	4089199	96744	0.060	0.004	0.088	0.066
1985	2788350	2581900	4941143	103843	0.040	0.010	0.043	0.034
1986	3911490	3281450	5191489	145999	0.044	0.002	0.058	0.053
1987	5209280	3843960	5115406	187338	0.049	0.000	0.035	0.031
1988	1998970	4361100	5017377	214729	0.049	0.003	0.049	0.038
1989	2110830	3989020	4774216	296037	0.074	0.003	0.045	0.046
1990	1836840	3396650	4156095	398645	0.117	0.031	0.066	0.084
1991	3344910	3220720	3929771	357288	0.111	0.036	0.119	0.100
1992	6129400	2637580	3192412	394793	0.150	0.064	0.083	0.117
1993	7231120	2458820	3030160	458628	0.187	0.028	0.142	0.104
1994	7532210	2078060	2746582	413022	0.199	0.110	0.119	0.120
1995	4375160	1600240	2365943	538131	0.336	0.099	0.190	0.178
1996	2362390	1451670	2276455	420942	0.290	0.134	0.114	0.131
1997	2008420	1240440	2067004	471700	0.380	0.149	0.276	0.284
1998	3226040	1026430	1569803	326443	0.318	0.148	0.207	0.242
1999	3960480	963625	1406467	298076	0.309	0.091	0.247	0.272
2000	4183550	885165	1252197	196911	0.222	0.047	0.167	0.163
2001	16427100	606007	1042332	212090	0.350	0.070	0.206	0.191
2002	3815000	720761	1212952	194292	0.270	0.054	0.149	0.134
2003	2788650	783084	1730547	190183	0.243	0.078	0.117	0.119
2004	1547820	945880	1995686	157627	0.167	0.056	0.093	0.098
2005	1013890	1341390	2066867	181994	0.136	0.109	0.092	0.105
2006	991274	1348350	1767190	155094	0.115	0.045	0.066	0.063
2007	1631090	1241670	1534173	123408	0.099	0.056	0.064	0.059
2008	3853390	1347480	1631200	143106	0.106	0.063	0.075	0.072
2009	1666080	1419420	1759164	183400	0.129	0.047	0.092	0.081
2010	697595	1141150	1637262	218143	0.191	0.072	0.141	0.124
2011	856096	1058020	1495420	199593	0.189	0.065	0.126	0.111
2012	2330290	956537	1239484	173141	0.181	0.073	0.141	0.125
2013	651330	854205	1093927	165085	0.188	0.075	0.145	0.128
2014	2449397*	838100	1143955	129025	0.154	0.072	0.141	0.124
2015	2449397*, ***	723560						

\* R(age 0) is the geometric mean of the time-series 1983 to 2013.

\*\* On 1<sup>st</sup> January.

\*\*\*Version 2: value added.

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