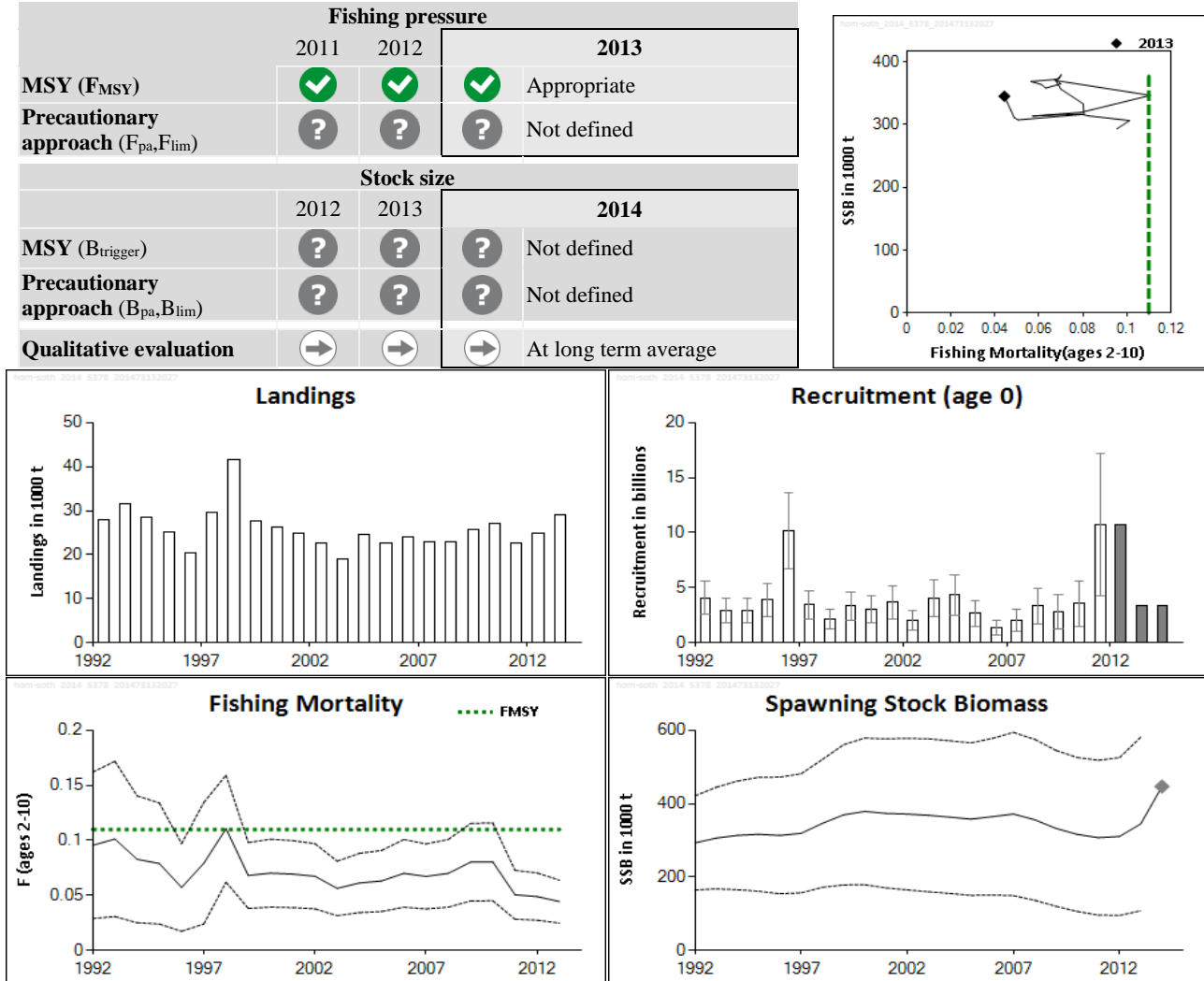


**ECOREGION** Bay of Biscay and Atlantic Iberian waters  
**STOCK** Horse mackerel (*Trachurus trachurus*) in Division IXa (Southern stock)

**Advice for 2015**

ICES advises on the basis of the MSY approach that catches should be no more than 71 824 t in 2015.

**Stock status**



**Figure 7.3.8.1** Horse mackerel in Division IXa. Summary of stock assessment (weights in thousand tonnes) with 95% confidence intervals included for R, F, and SSB. Top right: SSB and F over the time-series used in the assessment. Assumed recruitment and SSB values are shaded.

Fishing mortality has been below  $F_{MSY}$  over the whole time series and the SSB has been relatively stable. Recruitment is estimated to be well above average in 2011 and 2012.

**Management plans**

No specific management objectives are known to ICES.

## Biology

Horse mackerel feeds on crustaceans, squid, and other fishes. As a highly abundant species, horse mackerel is often found in the diet of sharks, dolphins, and seabirds. The distribution pattern of southern horse mackerel is linked to the size of the fish. Most of the older fish are found in the waters off Galicia and northern Portugal, while the distribution of juveniles extends further south.

## Environmental influence on the stock

This stock shows a relatively stable recruitment with occasional large peaks, which may be driven by environmental factors.

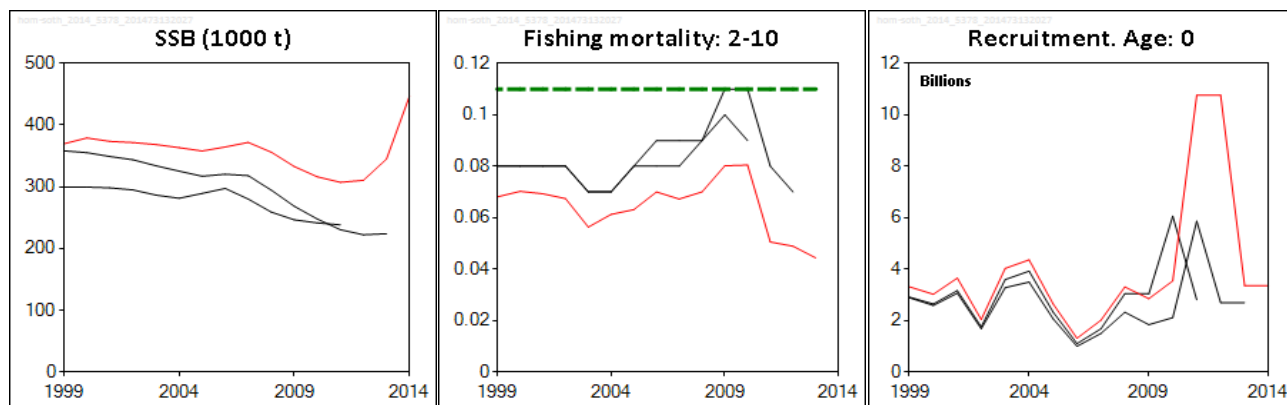
## The fisheries

Horse mackerel is caught in mixed fisheries. Changes in the availability of other species caught in the same fisheries could affect the targeting of horse mackerel. Traditionally, horse mackerel catches have a large proportion of juveniles. The Spanish bottom trawl fleet, targeting mainly adult fish increased in importance until 2010 and has subsequently declined. Other species of horse mackerel are caught together with *T. trachurus* in Division IXa, in particular *T. picturatus* of which 300–800 t were caught annually in the past. The advice for Southern horse mackerel applies to the southern stock of *T. trachurus* only.

**Catch distribution** Total catch (2013) = landings = 29 kt (34% trawl, 57% purse-seine, and 9% artisanal).

## Quality considerations

Estimates of recent recruitment are more uncertain than usual. This is due to the missing IBTS survey in 2012. The historic ssb estimates show an underestimation while fishing mortality is consistently overestimated; this pattern is emphasized in this year's assessment.



**Figure 7.3.8.2** Horse mackerel in Division IXa. Historical median assessment results (final-year recruitment and biomass estimates included).

## Scientific basis

<b>Stock Data Category</b>	1 ( <a href="#">ICES, 2014</a> )
<b>Assessment type</b>	Analytical assessment (AMISH model).
<b>Input data</b>	Commercial catches (international landings, ages and length frequencies from catch sampling). One survey index (combined PT and SP-IBTS-Q4), annual maturity data from commercial catch and surveys.
<b>Discards and bycatch</b>	Not included and are considered negligible
<b>Indicators</b>	None.
<b>Other information</b>	This stock was benchmarked in 2011 ( <a href="#">WKBENCH</a> ; ICES, 2011).
<b>Working group</b>	Working Group on Southern Horse Mackerel, Anchovy, and Sardine ( <a href="#">WGHANSA</a> )

**ECOREGION** Bay of Biscay and Atlantic Iberian waters  
**STOCK** Horse mackerel (*Trachurus trachurus*) in Division IXa (Southern stock)

## Reference points

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
MSY Approach	MSY $B_{trigger}$		
	$F_{MSY}$	0.11	Proxy based on $F_{35\%SPR}$
Precautionary Approach	$B_{lim}$		
	$B_{pa}$		
	$F_{lim}$		
	$F_{pa}$		

(last changed in:2013)

## Outlook for 2015

Basis:  $F(2014) = \text{average}(2012-2013) = 0.0464$ ;  $R(2013-2015) = \text{Geom. Mean}(1992-2011) = 3357$  millions. Catch (2014) = Landings (2014) = 30.564.

Rationale	Catches <i>T. trachurus</i> (2015)	Basis	F (2015)	SSB (2015) <sup>1)</sup>	SSB (2016)	%SSB change <sup>2)</sup>	% Catch change <sup>3)</sup>
MSY approach	71.824	$F_{MSY} (F_{2014} \times 2.4)$	0.11	545.920	536.947	-2%	135%
Zero catch	0	0	0	551.115	612.215	11%	-100%
Other options	6.307	$F_{2014} \times 0.2$	0.009	550.680	605.544	10%	-79%
	12.554	$F_{2014} \times 0.4$	0.019	550.245	598.948	9%	-59%
	18.740	$F_{2014} \times 0.6$	0.028	549.811	592.427	8%	-39%
	24.867	$F_{2014} \times 0.8$	0.037	549.377	585.979	7%	-19%
	30.936	$F_{2014}$	0.046	548.944	579.604	6%	1%
	36.947	$F_{2014} \times 1.2$	0.056	548.511	573.301	5%	21%

Weights in thousand tonnes.

<sup>1)</sup> For this stock, the SSB is determined at spawning time and is influenced by fisheries before spawning.<sup>2)</sup> SSB 2016 relative to SSB 2015.<sup>3)</sup> Catches 2015 relative to catches 2014 (the TAC refers to more than the *T. trachurus* catches).**MSY approach**

Since MSY  $B_{trigger}$  has not been identified for this stock, the ICES MSY approach has been applied without consideration of SSB in relation to MSY  $B_{trigger}$ .

Following the ICES MSY approach implies that fishing mortality can increase to  $F_{MSY}$ , resulting in catches of no more than 71 824 t in 2015. This is expected to lead to an SSB of 536 947 t in 2016. Discards are considered negligible and therefore all catches are assumed to be landed.

**Additional considerations***Management considerations*

Managers may want to consider limiting the increase in catch because the assessment and current recruitment estimates are more uncertain than usual. The uncertainty is mainly due to the missing survey in 2012. Currently, fishing mortality is well below the  $F_{MSY}$  proxy. Following the MSY approach implies increasing current fishing mortality by a factor of 2.4. Keeping the fishing mortality in 2015 at the level of 2014 (0.046) would imply catches of 31 000 t for *Trachurus trachurus*. The advice pertains to *T. trachurus*, while the TAC is set for all *Trachurus* species, including *T. picturatus* (blue jack mackerel) and *T. mediterraneus*. In 2011, 12% of the catches consisted of other species than *T. trachurus*, and this percentage can vary from year to year. Assuming a similar proportion of other *Trachurus* species in 2015, would result in a catch of all *Trachurus* species of 35 000 t.

The traditional fishery across fleets has for a long time targeted juvenile age classes. This exploitation pattern combined with a moderate exploitation rate does not seem to have been detrimental to the dynamics of the stock.

*Uncertainties in the assessment and forecast*

Estimates of recent recruitment are more uncertain than usual. This is due to the missing IBTS survey in 2012. The survey and catch data give an estimate of the 2012 recruitment being the highest in the time series. Due to the uncertainty, the 2012 yearclass was assumed to be at the previous maximum level (recruitment in 2011).

ICES has no information on the status of the other *Trachurus* species in this area.

#### *Comparison of the basis of previous assessment and advice*

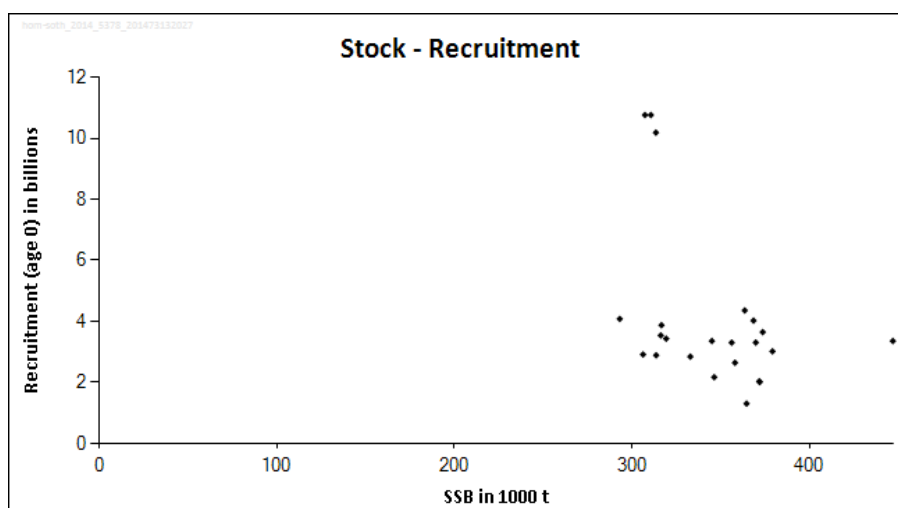
The basis for the assessment has not changed from last year, except for assumptions around recruitment in 2012. The basis for the advice is the same as last year: the MSY approach.

#### **Sources**

ICES. 2011. Report of the Benchmark Workshop on Roundfish and Pelagic Stocks (WKBENCH 2011), 24–31 January 2011, Lisbon, Portugal. ICES CM 2011/ACOM:38. 418 pp.

ICES. 2014a. Advice basis. In Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2.

ICES. 2014b Report of the Working Group on Southern Horse Mackerel, Anchovy, and Sardine (WGHANSA), 20–25 June 2014, ICES HQ, Copenhagen, Denmark. ICES CM 2014/ACOM:16.



**Figure 7.3.8.3** Horse mackerel in Division IXa. Stock–recruitment plot and yield-per-recruit analysis.

Table 7.3.8.1

Horse mackerel in Division IXa. ICES advice, management, and catches.

Year	ICES Advice	Predicted catch corresp. to advice <sup>1</sup>	Agreed TAC <sup>2</sup> <i>Trachurus spp.</i>	ICES catches <i>T. trachurus</i> <sup>1,7</sup>
1987	Not assessed	-	72.5 <sup>3</sup>	55 <sup>4</sup>
1988	Mesh size increase	-	82.0 <sup>3</sup>	56 <sup>4</sup>
1989	No increase in F; TAC	72.5	73.0 <sup>3</sup>	56 <sup>4</sup>
1990	F at F <sub>0.1</sub> ; TAC	38	55.0 <sup>4</sup>	49 <sup>4</sup>
1991	Precautionary TAC	61	73.0 <sup>4</sup>	22
1992	If required, precautionary TAC	61	73.0 <sup>4</sup>	26
1993	No advice	-	73.0 <sup>4</sup>	32
1994	<i>Status quo</i> prediction	55 <sup>5</sup>	73.0 <sup>4</sup>	26
1995	No long-term gains in increasing F	63 <sup>5</sup>	73.0 <sup>4</sup>	25
1996	No long-term gains in increasing F	60 <sup>5</sup>	73.0 <sup>4</sup>	23
1997	No advice	-	73.0 <sup>4</sup>	28
1998	F should not exceed the F(94–96)	59	73.0 <sup>4</sup>	42
1999	No increase in F	58	73.0 <sup>4</sup>	28
2000	F < F <sub>pa</sub>	< 59	68.0 <sup>4</sup>	27
2001	F < F <sub>pa</sub>	< 54	68.0 <sup>4</sup>	25
2002	F < 0.113	< 34	57.5 <sup>4</sup>	24
2003	Average of last 3 years	< 49	55.2 <sup>4</sup>	20
2004	Should not exceed the recent average (2000–2002) <sup>6</sup>	< 47	55.0 <sup>4</sup>	24
2005	Should not exceed the recent average (2000–2002)	< 25 <sup>7</sup>	55.0 <sup>4</sup>	23
2006	Should not exceed the recent average (2000–2004, excluding 2003) <sup>6</sup>	< 25	55.0 <sup>4</sup>	24
2007	Same advice as last year <sup>6</sup>	< 25	55.0 <sup>4</sup>	23
2008	Same advice as last year	< 25	57.8 <sup>4</sup>	22
2009	Same advice as last year	< 25	57.8 <sup>4</sup>	26
2010	Same advice as last year	< 25	31.1 <sup>8</sup>	27
2011	Same advice as last year	< 25	29.585 <sup>8</sup>	22*
2012	No increase in F	< 30.8	30.800 <sup>8</sup>	25
2013	No increase in F	< 26	30.000 <sup>8</sup>	29
2014	MSY approach	< 35.000	35 000 <sup>8</sup>	
2015	MSY approach	< 71.824		

Weights in thousand tonnes.

<sup>1</sup> Includes only *T. trachurus* L.<sup>2</sup> Includes all *Trachurus* spp.<sup>3</sup> Division VIIIc, Subareas IX and X, and CECAF Division 34.1.1 (EC waters only).<sup>4</sup> Division VIIIc and Subarea IX.<sup>5</sup> Catch at *status quo* F.<sup>6</sup> Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries protecting stocks outside safe biological limits.<sup>7</sup> Figures for Division IXa only from 1991 onwards, following the revision of stock boundaries in 2004.<sup>8</sup> Subarea IX.

\* Catches for 2011 were considered inconsistent with those from previous years.

**Table 7.3.8.2**

Horse mackerel (*Trachurus trachurus*) in Division IXa. ICES estimated catches and official catch statistics (thousand tonnes).

Year	Total Catch <i>T. trachurus</i>
1992	27.858
1993	31.521
1994	28.441 <sup>a</sup>
1995	25.147
1996	20.400 <sup>a</sup>
1997	29.491
1998	41.564
1999	27.733
2000	26.160
2001	24.910
2002	22.506 // (23.663)*
2003	18.887 // (19.566)*
2004	23.252 // (23.577)*
2005	22.695 // (23.111)*
2006	23.902 // (24.558)*
2007	22.790 // (23.424)*
2008	22.993 // (23.593)*
2009	25.737 // (26.497)*
2010	26.556 // (27.216)*
2011	21.875 // (22.575)*
2012	24.868 // (25.316)*
2013	28.993 // (29.382)*

(\* In parenthesis: the Spanish catches from Subdivision IXa South are also included. These catches are only available since 2002 and they will not be considered in the assessment data until the rest of the time series be completed.

(<sup>a</sup>) These figures have been revised in 2008.

Table 7.3.8.3

Horse mackerel in Division IXa. Summary of the stock assessment. High/Low: 95% confidence intervals.

Year	Recruitment	High	Low	SSB	High	Low	Landings	Mean F	High	Low
	Age 0							Ages 2-10		
	thousands			tonnes			tonnes			
1992	4083010	5557853	2608167	293104	421497	164711	27858	0.095	0.162	0.029
1993	2918280	4036950	1799610	306248	444853	167643	31521	0.101	0.172	0.031
1994	2891340	4018099	1764581	313640	461926	165354	28451	0.083	0.14	0.025
1995	3875390	5347754	2403026	316608	471991	161225	25132	0.079	0.134	0.024
1996	10184500	13658580	6710420	313428	472460	154396	20360	0.057	0.097	0.017
1997	3435570	4737653	2133487	319228	481699	156757	29491	0.079	0.134	0.024
1998	2173280	3058941	1287619	346332	520684	171980	41661	0.111	0.159	0.062
1999	3308690	4596447	2020933	369734	561008	178460	27768	0.068	0.098	0.038
2000	3018910	4238834	1798986	379130	579221	179039	26161	0.07	0.101	0.039
2001	3648610	5129829	2167391	373656	576944	170368	24911	0.069	0.1	0.039
2002	2038420	2952215	1124625	371652	578416	164888	22506	0.067	0.097	0.038
2003	4026970	5714920	2339020	368434	577067	159801	18887	0.056	0.081	0.032
2004	4358430	6198306	2518554	363440	571646	155234	24485	0.061	0.088	0.034
2005	2645390	3838879	1451901	357986	565924	150048	22689	0.063	0.091	0.035
2006	1308390	1976581	640199	364560	578165	150955	23895	0.07	0.101	0.039
2007	2013810	3017350	1010270	371932	594522	149342	22787	0.067	0.097	0.038
2008	3305380	4964951	1645809	356158	575644	136672	22993	0.07	0.101	0.039
2009	2846070	4406148	1285992	332868	545541	120195	25727	0.08	0.115	0.045
2010	3540740	5635941	1445539	316202	526071	106333	27217	0.08	0.116	0.045
2011	10761500	17225658	4297342	307288	518436	96140	22575	0.051	0.073	0.028
2012	10761500 *			310576	525835	95317	24868	0.049	0.07	0.027
2013	3357000 **			344974	581727	108221	28988	0.044	0.064	0.025
2014	3357000 **			446952						
<b>Average</b>	<b>4080790</b>	<b>5515594</b>	<b>2122674</b>	<b>345397</b>	<b>533240</b>	<b>148322</b>	<b>25951</b>	<b>0.072</b>	<b>0.109</b>	<b>0.034</b>

\* Same as the maximum of the time series (R 2011)

\*\* Geometric mean recruitment 1992-2011.