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

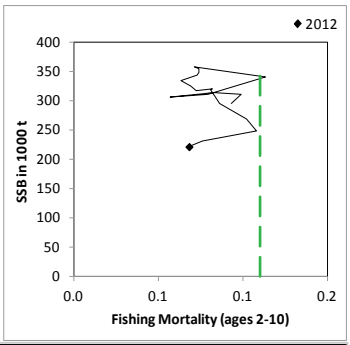
Advice for 2014

ICES advises on the basis of the MSY approach that catches should be no more than 35 000 t in 2014. All catches are assumed to be landed.

Stock status

F (Fishing Mortality)	2010	2011	2012	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	?	?	?	Not defined

SSB (Spawning-Stock Biomass)	2011	2012	2013	
Qualitative evaluation	→	→	→	Below long term average



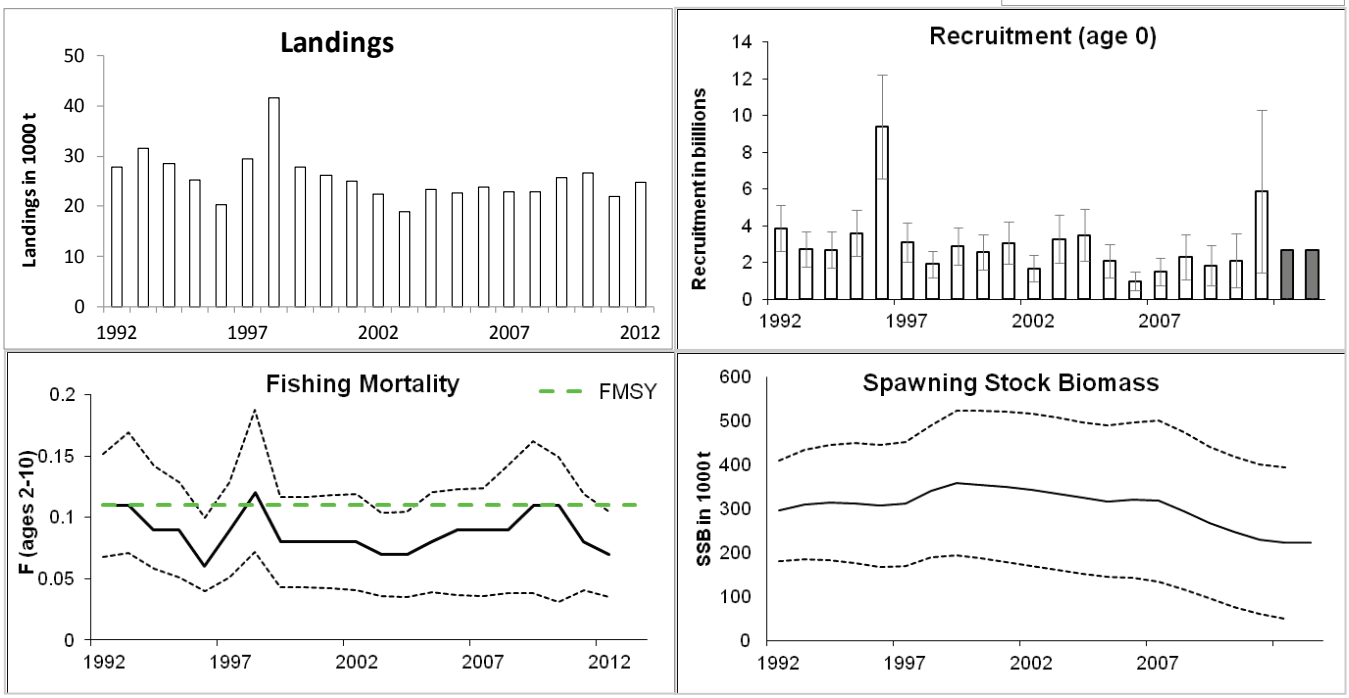


Figure 7.4.8.1 Horse mackerel in Division IXa. Summary of stock assessment (weights in thousand tonnes) with 95% confidence intervals included for R, F, and SSB. Top right: SSB and F over the time-series used in the assessment. Estimates are shaded.

Fishing mortality has decreased in the last two years. The SSB has decreased gradually since 2007 and is at present around 30% below the long-term average. Recruitment is estimated to be above average in 2011.

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 show a large proportion of juveniles. In the last decade the Spanish bottom trawl fleet has gained increasing importance, targeting mainly adult fish; this fishery has decreased in the last two years. 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 (2012) = 25 kt, all of which is landed (31% trawl, 51% purse-seine, and 18% artisanal).

Quality considerations

The catch-at-age data are considered to be reliable. Confidence intervals for the assessment estimates are very wide, indicating a high uncertainty in F, SSB, and recruitment in the most recent years. There was no survey index for 2012 from the Portuguese survey due to engine problems, so this index was not included in the assessment. Hence, the incoming year classes since 2012 are assumed at the long-term mean.

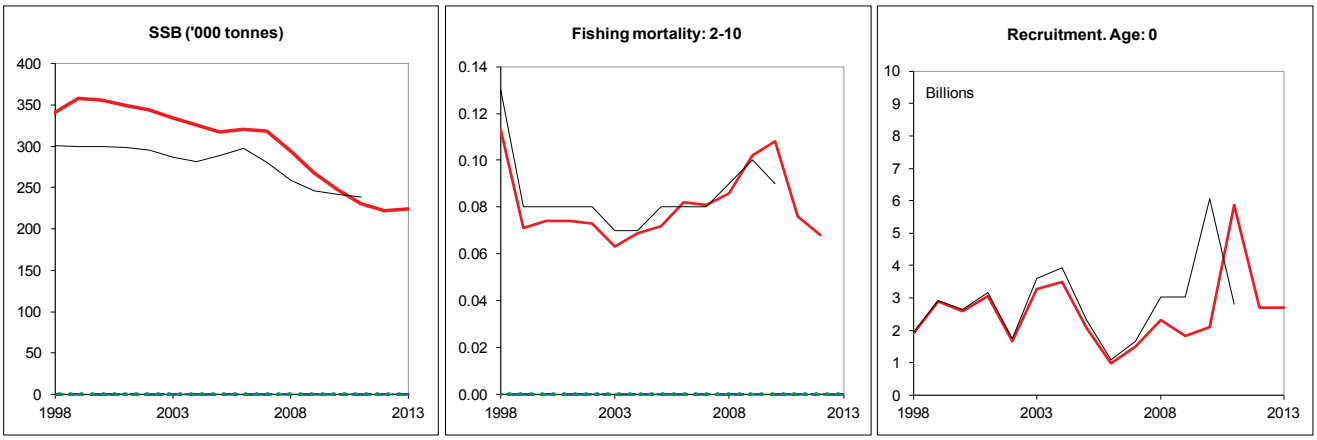


Figure 7.4.8.2 Horse mackerel in Division IXa. Historical median assessment results (final-year recruitment and biomass estimates included).

Scientific basis

Assessment type	Analytical assessment (AMISH model).
Input data	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 during surveys), and natural mortalities from the multispecies model.
Discards and bycatch	Discards were not included in the assessment but are available for monitoring (bottom trawler fleet), and are believed to be negligible.
Indicators	None.
Other information	This stock was benchmarked in 2011 (WKBENCH; ICES, 2011b).
Working group report	WGHANSA (ICES, 2013).

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

Reference points

No precautionary reference points have been defined for this stock. $F_{35\%SPR}$ (0.11) is proposed as a proxy for F_{MSY}. Historical fishing mortalities have on average (0.09) been at or below the candidate F_{MSY} (though actual estimates are very uncertain).

Yield and spawning biomass per Recruit F-reference points 2013:

	Fish Mort Ages 2–10	Yield/R	SSB/R
Average last 3 years	0.08	0.009	0.10
$F_{35\%SPR}$	0.11	0.01	0.07
$F_{0.1}$	0.14	0.010	0.05
F_{med}	0.06	0.007	0.10

Outlook for 2014

Basis: F (2013) = Mean (F (2012 and 2011) = 0.072; SSB (2014) = 241; Catches (2013) = 24; R(2012–2014) = Geom. Mean (1992–2011) = 2695 millions.

Rationale	Catches (2014)	Basis	F (2014)	SSB (2015)	%SSB change [1)]	% TAC change [2)]
MSY approach	35	F_{MSY} (F_{2013} × 1.53)	0.11	233	−3%	+17%
Zero catch	0	0	0	266	+9%	−100%
Other options	5	F_{2013} × 0.2	0.014	261	+8%	−83%
	10	F_{2013} × 0.4	0.029	257	+6%	−67%
	14	F_{2013} × 0.6	0.043	252	+4%	−53%
	19	F_{2013} × 0.8	0.058	248	+3%	−37%
	24	F_{2013}	0.072	244	+1%	−20%
	28	F_{2013} × 1.2	0.087	240	0%	−7%
	30	F_{2013} × 1.3 (TAC 2013)	0.094	238	−1%	0%

Weights in thousand tonnes.
[1)] SSB 2015 relative to SSB 2014.
[2)] Catches 2015 relative to TAC 2014.

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 35 000 t in 2014. This is expected to lead to an SSB of 233 000 t in 2015. Discards are considered negligible and therefore all catches are assumed to be landed.

Additional considerations

Currently, the biomass is 30% below the long-term average. Following the MSY approach implies an increase in fishing mortality. Managers may want to consider keeping F at the 2013 level to ensure a greater increase in biomass than by fishing at F_{MSY}.

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

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

Comparison with previous assessment and advice

No assessment was presented in 2012 because of data issues. Compared to the assessment in 2011, SSB_{2011} is now estimated to be 2% lower and F_{2010} is estimated to be 10% higher.

The advice is based on the MSY approach, while last year precautionary considerations were used.

Assessment and management area

Since 2010 the management area and advice area have been identical, but the TAC is set for all *Trachurus spp*. The present advice only applies to *Trachurus trachurus*, which comprises the majority of the catches.

Sources

ICES. 2011a. Report of the Working Group on Anchovy and Sardine (WGANSA), 24–28 June 2011, Vigo, Spain. ICES CM 2011/ACOM:16.

ICES. 2011b. 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. 2012. Report of the Working Group on Anchovy, Sardine, and Horse Mackerel Assessments (WGHANSA), 22–28 June 2012, Horta, Azores, Portugal. ICES CM 2012/ACOM:16

ICES. 2013. Report of the Working Group on Southern Horse Mackerel, Anchovy, and Sardine (WGHANSA), 21–26 June 2013, Bilbao, Spain. ICES CM 2013/ACOM:16.

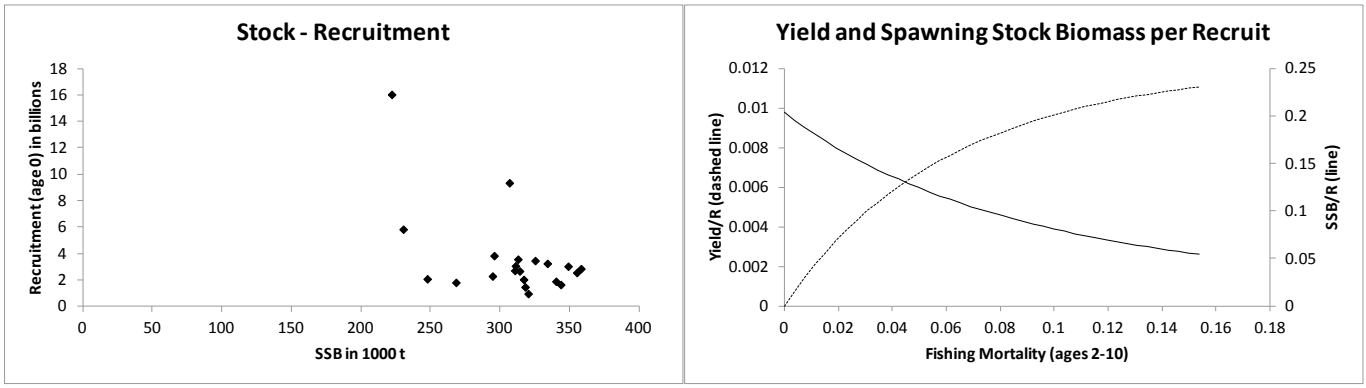


Figure 7.4.8.3 Horse mackerel in Division IXa. 2011 Stock–recruitment plot and yield-per-recruit analysis.

Table 7.4.8.1 Horse mackerel in Division IXa. ICES advice, management, and catches.

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

Weights in thousand tonnes.
[1] Includes all *Trachurus* spp.
[2] Includes only *T. trachurus* L.
[3] Division VIIIc, Subareas IX and X, and CECAF Division 34.1.1 (EC waters only).
[4] Division VIIIc and Subarea IX.
[5] Catch at *status quo* F.
[6] Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries protecting stocks outside safe biological limits.
[7] Figures for Division IXa only from 1991 onwards, following the revision of stock boundaries in 2004.
[8] Subarea IX.
* Catches for 2011 were considered inconsistent with those from previous years.

Table 7.4.8.2 Horse mackerel (*Trachurus trachurus)* in Division IXa. ICES estimated catches and official catch statistics (tonnes).

Year	Official catch	Estimated catch
1991	17 497	34 992
1992	22 654	27 858
1993	25 747	31 521
1994	19 061	28 441[1]
1995	17 698	25 147
1996	14 053	20 400[1]
1997	16 736	29 491
1998	21 334	41 564
1999	14 420	27 733
2000	15 348	26 160
2001	13 760	24 910
2002	14 270	22 506 // (23 663)*
2003	11 242	18 887 // (19 566)*
2004	11 875	23 252 // (23 577)*
2005	13 307	22 695 // (23 111)*
2006	19 426	23 902 // (24 558)*
2007	10 381	22 790 // (23 424)*
2008	9 290	22 993 // (23 593)*
2009	10 841	25 737 // (26 497)*
2010	11 726	26 556// (27 216)*
2011	18 130	21 875// (22 575)*
2012	24160	24 868//(25 316)*

(*) In parenthesis: the Spanish catches from Division IXa South are also included. These catches have only been available since 2002 and they will not be considered in the assessment data until the rest of the time-series is complete.
(1) These figures were revised in 2008.

Table 7.4.8.3 Horse mackerel in Division IXa. Summary of the stock assessment. SD = Standard deviation.

Year	Recruits (10*6)	SD Rec	Total SSB(tonnes)	SD SSB	Fmult	SD Fmult	mean F(2–10)	ICES catches
1992	3867	631.4	295846	57620	0.093305	0.017911	0.11	27858
1993	2744	480.6	310750	62296	0.099310	0.020109	0.11	31521
1994	2702	482.4	314190	65860	0.081582	0.017152	0.09	28450
1995	3598	621.0	312986	68278	0.078184	0.016731	0.09	25132
1996	9380	1410.2	306826	69320	0.056847	0.012157	0.06	20360
1997	3095	531.9	311250	70362	0.079165	0.016919	0.09	29491
1998	1924	361.9	340346	75434	0.113241	0.024408	0.12	41661
1999	2884	510.3	358332	82138	0.070849	0.015769	0.08	27768
2000	2585	479.4	355334	84130	0.073888	0.016685	0.08	26160
2001	3063	573.0	349092	85716	0.073927	0.017004	0.08	24911
2002	1677	355.4	343804	86936	0.073037	0.017197	0.08	22506
2003	3277	646.2	334130	86794	0.062568	0.014773	0.07	18887
2004	3493	701.7	325348	86294	0.069064	0.016647	0.07	23252
2005	2066	452.6	317106	86182	0.072078	0.017983	0.08	22695
2006	994	252.6	320340	88842	0.081915	0.021437	0.09	23902
2007	1497	378.0	318152	91870	0.080902	0.022107	0.09	22790
2008	2321	610.0	294682	89540	0.086237	0.024857	0.09	22993
2009	1838	548.7	268408	86450	0.101958	0.031579	0.11	25737
2010	2109	724.4	247758	85322	0.107536	0.036100	0.11	26556
2011	5864	2212.7	230468	85424	0.076240	0.027616	0.08	21875
2012	2695*		222194	86500	0.068258	0.026533	0.07	24868
2013	2695*		224000					

***** Geometric mean recruitment over all years.