

Horse mackerel (*Trachurus trachurus*) in Division 9.a (Atlantic Iberian waters)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 165 173 tonnes.

Management of southern horse mackerel, blue jack mackerel, and Mediterranean horse mackerel under a combined TAC prevents effective control of the single-species exploitation rates and could lead to overexploitation of any of these species.

Stock development over time

Fishing pressure on the stock is below F_{MSY} and spawning-stock size is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

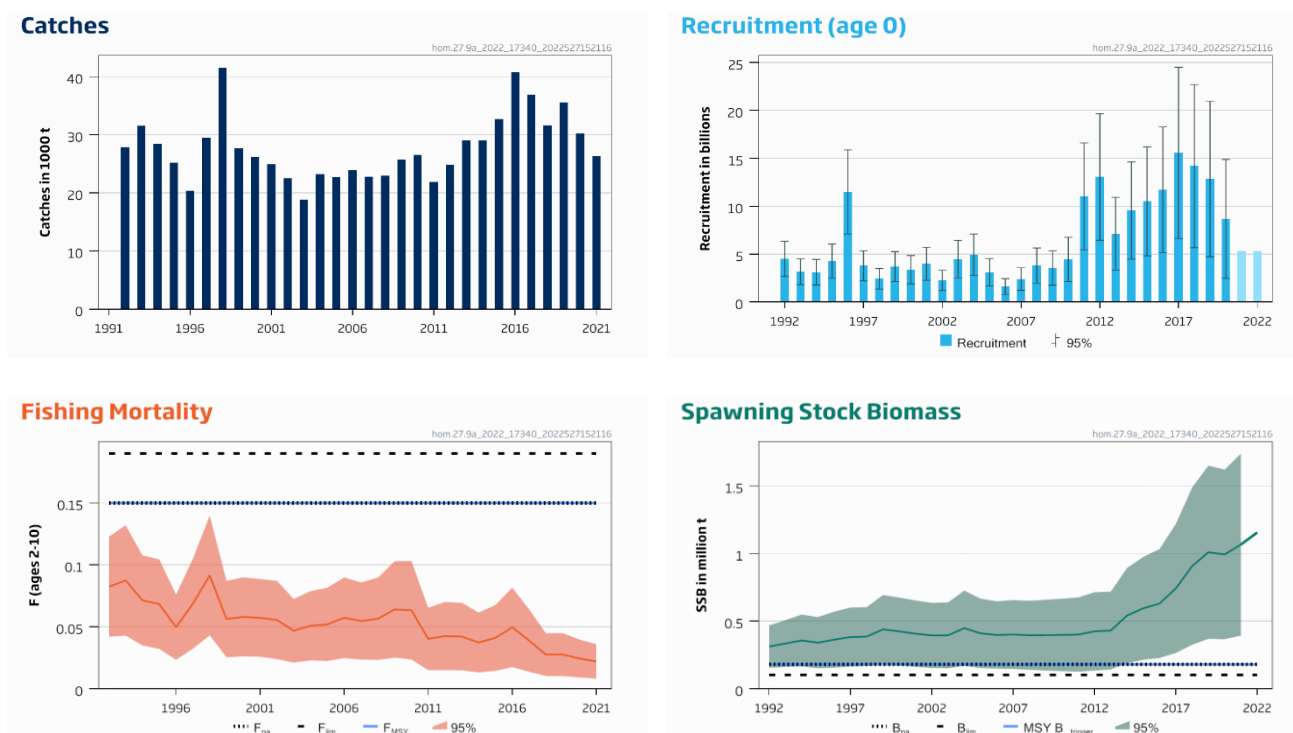


Figure 1 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Summary of the stock assessment. The assumed recruitment values for 2021 and 2022 are shaded in a lighter colour.

Catch scenarios

Table 1 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages\ 2-10}$ (2022)	0.022	$F_{ages\ 2-10}$ (2021)
SSB (2022)	1 155 488	Short-term forecast; tonnes
$R_{age\ 0}$ (2021-2023)	5310	Geometric mean (1992–2020); millions
Total catch (2022)	26 254	Short-term forecast using an $F_{2022} = F_{2021}$; tonnes
Landings (2022)	26 254	Short-term forecast using an $F_{2022} = F_{2021}$; tonnes
Discards (2022)	0	Negligible

Table 2 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Annual catch scenarios. All weights are in tonnes.

Basis	Catches (2023)	F (2023)	SSB*(2023)	SSB*,#(2024)	% SSB change**	% catch change***	% advice change ^
ICES advice basis							
MSY approach: F_{MSY}	165173	0.150	1195440	1069137	-10.6	528	15.1
Other scenarios							
$F = 0$	0	0	1202540	1241548	3.2	-100	-100
$F = F_{2021}$	25956	0.022	1201486	1214321	1.07	-1.38	-82
Management plan^^	123365	0.110	1197330	1112580	-7.1	369	-14.0
$F = F_{2021} \times 1.2$	31083	0.027	1201275	1208949	0.64	18	-78
$F = F_{2021} \times 1.6$	41273	0.035	1200854	1198277	-0.21	57	-71
$F = F_{2021} \times 2.0$	51378	0.044	1200432	1187701	-1.06	95	-64
F_{pa}	165173	0.150	1195440	1069137	-10.6	528	15.1
F_{lim}	205452	0.190	1193554	1027417	-13.9	681	43
$SSB(2024) = B_{lim}$	1169479	2.5	1087697	103002	-91	4343	715
$SSB(2024) = B_{pa}$	1074965	1.96	1113050	181005	-84	3984	649
$SSB(2024) = MSY B_{trigger}$	1074965	1.96	1113050	181005	-84	3984	649

* For this stock, the SSB is determined at spawning time (assumed to be mid-January) and is influenced by fisheries before spawning.

** SSB 2024 relative to SSB 2023.

*** Catches in 2023 relative to ICES estimates of catches in 2021 (26 320 tonnes).

^^ Advised catches for 2023 relative to the advised catches for 2022 (143 505 tonnes).

^^ Management plan with $F_{target} = 0.11$ (F_{MSY} at the time of the management plan establishment).

Assuming same catch scenario in 2024 as in 2023.

The advice for 2023 has increased compared to the advice provided for 2022 owing to the increasing biomass estimate.

Basis of the advice

Table 3 Horse mackerel (*Trachurus trachurus*) in Division 9.a. The basis of the advice.

Advice basis	MSY approach
Management plan	A management plan (MP) was proposed for this stock and has been evaluated as precautionary by ICES (ICES, 2018). The MP was modified in 2021 by setting the F_{target} to be achieved by 2022 and is considered precautionary. ICES was requested by the EU to base its advice for 2023 on ICES MSY approach and include the MP as a catch scenario.

Quality of the assessment

In 2019 and 2020 the survey was not carried out in the Portuguese area of Division 9.a. As this part of the survey covers 87% of the total stock area, the combined survey index could not be estimated. Because of this, the stock assessment was performed without the 2019 and 2020 survey index values. In 2021, the Portuguese Bottom Trawl Survey was carried out and the combined survey index estimate was used in the assessment. The assessment continues to show high variability, reflected in the large confidence intervals for SSB and recruitment.

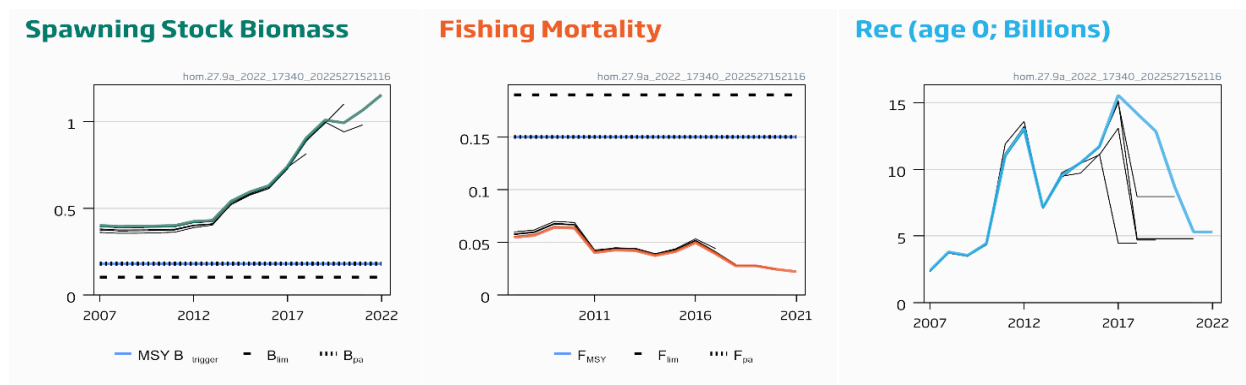


Figure 2 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Historical assessment results. The differences observed in the recruitment plot are due to the different range of years used for the geometric mean recruitment assumptions.

Issues relevant to the advice

The advice pertains to *T. trachurus*, while the total allowable catch (TAC) is set for several *Trachurus* species, including *T. picturatus* (blue jack mackerel) and *T. mediterraneus* (Mediterranean horse mackerel). Part of the catches consist of other *Trachurus* species, and the percentage composition can vary from year to year. Estimates indicate that in 2021, 23% of the catch consisted of *Trachurus* spp. other than *T. trachurus* (6712 tonnes). ICES considers that management of several species under a combined TAC prevents effective control of the single-species exploitation rates and could lead to overexploitation of any of these species.

Reference points

Table 4 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Reference points, values, and their technical basis. Weights in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY B_{trigger}	181000	Lower bound (average) of 90% confidence intervals of the SSB time-series in a stock being exploited well below F_{MSY}	ICES (2016, 2017)
	F_{MSY}	0.15	Stochastic long-term simulations using a segmented regression with breakpoint at MSY B_{trigger}	ICES (2016, 2021)
Precautionary approach	B_{lim}	103000	Derived from B_{pa} and assessment uncertainty ($B_{\text{lim}} = B_{\text{pa}} \times \exp(-1.645\sigma)$; $\sigma = 0.34$)	ICES (2016, 2017)
	B_{pa}	181000	MSY B_{trigger}	ICES (2016, 2017)
	F_{lim}	0.19	Equilibrium scenarios with stochastic recruitment: F corresponding to 50% probability of ($\text{SSB} < B_{\text{lim}}$)	ICES (2016, 2017)
	F_{pa}	0.15	F that leads to $\text{SSB} \geq B_{\text{lim}}$ with 95% probability	ICES (2016, 2021)
Management plan	MP MSY B_{trigger}	181000	MSY B_{trigger}	ICES (2018)
	MP B_{lim}	103000	B_{lim}	ICES (2018)
	MP F_{target}	0.11	Previous defined F_{MSY} *	ICES (2018)
	MP F_{bycatch}	0.01	F to be applied when $\text{SSB} \leq B_{\text{lim}}$ to allow for bycatches	ICES (2018)

* F_{MSY} recalculated in 2021 following redefinition of F_{pa} to F_{P05} (ICES, 2021).

Basis of the assessment

Table 5 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2022a)
Assessment type	Analytical assessment (AMISH model) that uses catches in the model and in the forecast (ICES, 2022b)
Input data	Commercial catches (international landings, ages, and length frequencies from catch sampling). One combined index, using two IBTS surveys (Spanish North Coast Bottom Trawl Survey [G2784] and Portuguese International Bottom Trawl Survey [G8899]); maturity data from Daily Egg Production Method surveys [I4189])
Discards and bycatch	Not included and considered negligible
Indicators	None
Other information	This stock was benchmarked in 2017 (WKPELA; ICES, 2017)
Working group	Working Group Southern Horse Mackerel, Anchovy and Sardine (WGHANSA)

History of the advice, catch, and management

Table 6 Horse mackerel (*Trachurus trachurus*) in Division 9.a. ICES advice, agreed TAC, and official landings. All weights are in tonnes.

Year	ICES advice*	Catch corresponding to advice (<i>T. trachurus</i>)	Agreed TAC (<i>Trachurus</i> spp.)**	ICES catches (<i>T. trachurus</i>) ***
1987	Not assessed	-	72500	55000^
1988	Mesh size increase	-	82000	56000^
1989	No increase in F; TAC	72500	73000	56000^
1990	F at $F_{0.1}$; TAC	38000	55000	49000^
1991	Precautionary TAC	61000	73000	22000
1992	If required, precautionary TAC	61000	73000	27858
1993	No advice	-	73000	31521
1994	Status quo prediction (Catch at status quo F)	55000	73000	28441
1995	No long-term gains in increasing F (Catch at status quo F)	63000	73000	25147
1996	No long-term gains in increasing F (Catch at status quo F)	60000	73000	20400
1997	No advice	-	73000	29491
1998	F should not exceed the F (94–96)	59000	73000	41564
1999	No increase in F	58000	73000	27733
2000	$F < F_{pa}$	< 59000	68000	26160
2001	$F < F_{pa}$	< 54000	68000	24910
2002	$F < 0.113$	< 34000	57500	22506
2003	Average of last three years	< 49000	55200	18887
2004	Should not exceed the recent average (2000–2002)	< 47000	55000	23252
2005	Should not exceed the recent average (2000–2002)	< 25000	55000	22695
2006	Should not exceed the recent average (2000–2004, excluding 2003)	< 25000	55000	23902
2007	Same advice as last year	< 25000	55000	22790
2008	Same advice as last year	< 25000	57800	22993
2009	Same advice as last year	< 25000	57800	25737
2010	Same advice as last year	< 25000	31100	26556
2011	Same advice as last year	< 25000	29585	21875
2012	No increase in F	< 30800	30800	24868
2013	No increase in F	< 26000	30000	28993
2014	MSY approach	< 35000	35000	29017

Year	ICES advice*	Catch corresponding to advice (<i>T. trachurus</i>)	Agreed TAC (<i>Trachurus</i> spp.)**	ICES catches (<i>T. trachurus</i>) ***
2015	MSY approach	< 71824	59500	32723
2016	MSY approach	≤ 68583	68583	40730
2017	MSY approach	≤ 73349	73349	36946
2018	MSY approach	≤ 55555	55555	31661
2019	MSY approach	≤ 94017	94017	35520
2020	MSY approach	≤ 116871	116871	30177
2021	MSY approach	≤ 128627	128627	26320
2022	MSY approach	≤ 143505	143505	
2023	MSY approach	≤ 165173		

* Advice referred to divisions 8.c and 9.a until 2004 and refers to Division 9.a since then as a result of a change in the stock definition.

** From 1987–1989 the TAC applied to Division 8.c, subareas 9 and 10, and Division 34.1.1 of the Fishery Committee for the Eastern Central Atlantic (CECAF [EU waters only]), and from 1990–2009 the TAC applied to Division 8.c and Subarea 9. From 2010 onwards, the TAC applies only to Subarea 9.

*** Not including Spanish catches in 9.a South-Cadiz, considered to be less than 2% of the total catches in recent years.

History of the catch and landings

Table 7 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Catch distribution by fleet in 2021 as estimated by ICES. (Note: Spanish catches in 9.a South-Cadiz are not included).

Catch (2021)	Landings			Discards
26320 tonnes	bottom trawl 31%	purse-seine 64%	other gears 5%	Negligible
	26320 tonnes			

Table 8 Horse mackerel (*Trachurus trachurus*) in Division 9.a. History of ICES estimated catch (in tonnes). Spanish catches from 9.a South-Cadiz are included from 2002 onwards. Catches from 2002–2012 are uncertain; these catches are small and therefore not included in the assessment.

Year	Catch used in the assessment (excluding Spanish catches in 9.a South-Cadiz)	Spanish catches in 9.a South-Cadiz	Total catch in 9.a
1992	27858		
1993	31521		
1994	28441		
1995	25147		
1996	20400		
1997	29491		
1998	41564		
1999	27733		
2000	26160		
2001	24910		
2002	22506	1157	23663
2003	18887	679	19566
2004	23252	325	23577
2005	22695	416	23111
2006	23902	656	24558
2007	22790	634	23424
2008	22993	600	23593
2009	25737	760	26497
2010	26556	660	27216
2011	21875	700	22575
2012	24868	448	25316
2013	28993	389	29382
2014	29017	188	29205
2015	32723	455	33178
2016	40730	351	41081
2017	36946	143	37089
2018	31661	259	31920

Year	Catch used in the assessment (excluding Spanish catches in 9.a South-Cadiz)	Spanish catches in 9.a South-Cadiz	Total catch in 9.a
2019	35520	1016	36536
2020	30177	1167	31344
2021	26320	425	26745

Summary of the assessment

Table 9 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Assessment summary.

Year	Recruitment			Spawning–stock biomass (SSB)**			Total catch	Fishing mortality		
	Age 0	97.5%	2.5%	SSB	97.5%	2.5%		Ages 2–10	97.5%	2.5%
	thousands			tonnes						
1992	4511750	6343219	2680281	312644	469568	155720	27858	0.082	0.123	0.042
1993	3157140	4503194	1811086	334915	507772	162059	31521	0.088	0.132	0.043
1994	3116640	4457094	1776186	357692	549568	165815	28441	0.071	0.108	0.035
1995	4262840	6046591	2479089	341582	530801	152364	25147	0.068	0.105	0.032
1996	11485300	15877758	7092842	363614	570636	156593	20400	0.050	0.076	0.023
1997	3776370	5348521	2204219	382830	601181	164479	29491	0.069	0.105	0.032
1998	2422560	3498186	1346934	386496	603998	168994	41564	0.092	0.140	0.043
1999	3698310	5268088	2128532	439734	693938	185531	27733	0.056	0.087	0.025
2000	3376760	4845508	1908012	424627	675185	174069	26160	0.058	0.090	0.026
2001	3990810	5717301	2264319	407941	653336	162546	24910	0.057	0.089	0.026
2002	2255730	3311010	1200450	395041	636004	154079	22506	0.056	0.087	0.024
2003	4477560	6435522	2519598	395506	639269	151743	18887	0.047	0.073	0.021
2004	4941720	7100542	2782898	448590	726787	170394	23252	0.051	0.079	0.023
2005	3106400	4531688	1681112	410485	666978	153993	22695	0.052	0.082	0.022
2006	1619040	2439741	798339	398318	647454	149182	23902	0.057	0.090	0.025
2007	2400310	3576771	1223849	401867	656355	147380	22790	0.055	0.086	0.024
2008	3804480	5644273	1964687	396024	651472	140575	22993	0.057	0.090	0.023
2009	3549020	5347869	1750171	396981	658457	135505	25737	0.064	0.103	0.025
2010	4443340	6756552	2130128	398639	666737	130541	26556	0.063	0.103	0.024
2011	11032300	16608167	5456433	401282	675939	126624	21875	0.040	0.066	0.0150
2012	13050500	19657229	6443771	425006	714813	135199	24868	0.043	0.070	0.0151
2013	7131340	10935230	3327450	430724	718701	142747	28993	0.042	0.069	0.0149
2014	9551120	14617583	4484657	541959	893490	190427	29017	0.037	0.062	0.0132
2015	10503000	16188490	4817510	595386	975881	214890	32723	0.041	0.068	0.0145
2016	11724300	18280480	5168120	630963	1033777	228149	40730	0.050	0.082	0.0175
2017	15568400	24506862	6629938	742574	1219718	265429	36946	0.039	0.064	0.0138
2018	14186700	22702959	5670441	907062	1488802	325323	31661	0.028	0.045	0.0103
2019	12849300	20973578	4725022	1009547	1649839	369256	35520	0.028	0.045	0.0103
2020	8679670	14883521	2475819	993801	1620903	366700	30177	0.024	0.040	0.0091
2021	5309945*			1066959	1739882	394037	26320	0.022	0.036	0.0083
2022	5309945*			1155488						

* Geometric mean (1992–2020).

** SSB is estimated at spawning time (mid-January).

Sources and references

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[Download the stock assessment data and figures.](#)

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