

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 2022 should be no more than 143 505 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} , F_{pa} , and F_{lim} and spawning–stock size is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

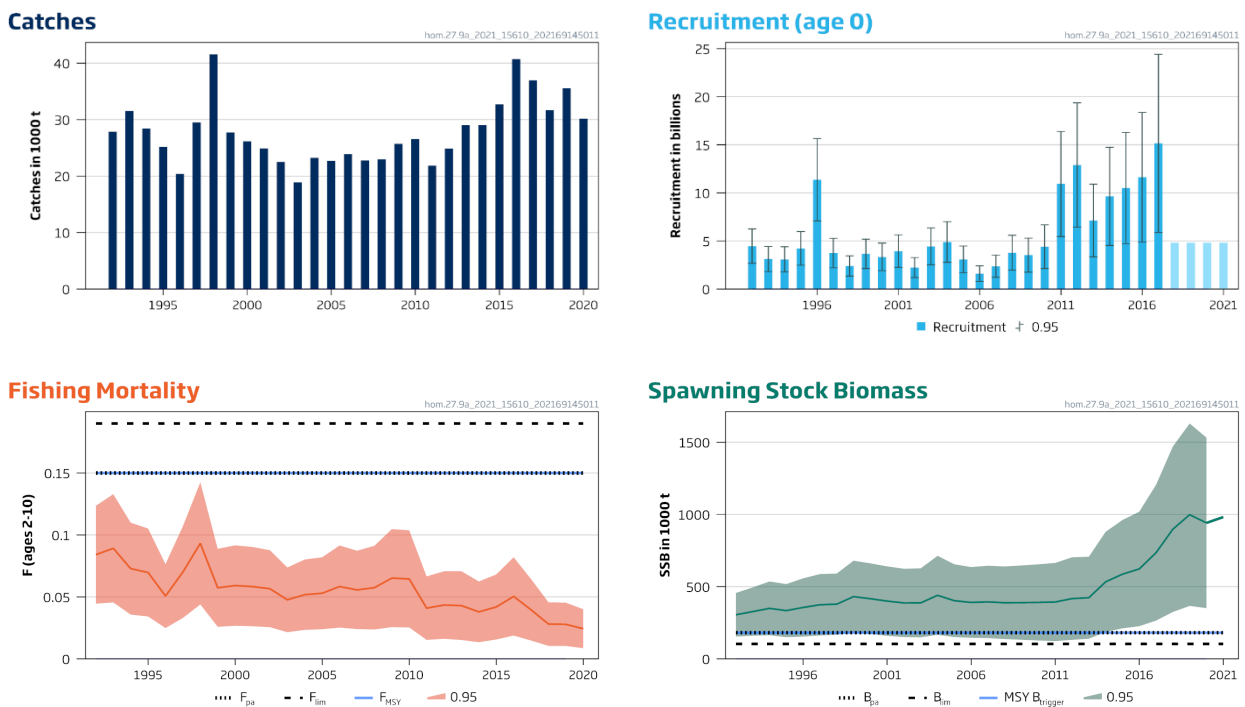


Figure 1 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Summary of the stock assessment. The assumed recruitment values for 2020 and 2021 are shaded in a lighter colour.

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
$F_{ages\ 2-10}$ (2021)	0.024	$F_{ages\ 2-10}$ (2020)
SSB (2021)	981 870	Short-term forecast; Tonnes
$R_{age\ 0}$ (2018-2022)	4806	Geometric mean (1992–2017); millions.
Total catch (2021)	30 106	Short-term forecast using an F_{2020} ; tonnes
Landings (2021)	30 106	Short-term forecast using an F_{2020} ; tonnes
Discards	0	Negligible

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

Basis	Catches (2022)	F (2022)	SSB*(2022)	SSB*,#(2023)	% SSB change **	% Catch change ***	% Advice change ^
ICES advice basis							
MSY approach: F_{MSY}	143505	0.15	1014303	920156	-9	+376	+12
Other scenarios							
$F = 0$	0	0	1020305	1067543	5	-100	-100
$F = F_{2020}$	24515	0.024	1019335	1042245	2	-19	-81
Management plan ^^	107460	0.11	1015887	957010	-6	+256	-16
$F = F_{2020} \times 1.2$	29352	0.029	1019141	1037258	+2	-3	-77
$F = F_{2020} \times 1.6$	38962	0.039	1018753	1027358	+1	+29	-70
$F = F_{2020} \times 2.0$	48486	0.049	1018365	1017554	0	+61	-62
F_{pa}	143505	0.15	1014303	920156	-9	+376	+12
F_{lim}	178254	0.19	1012722	884739	-13	+491	+39
SSB (2023) = B_{lim}	1005636	2.41	928708	103000	-89	+3234	+682
SSB (2023) = B_{pa}	910765	1.82	950233	181000	-81	+2919	+608
SSB (2023) = MSY $B_{trigger}$	910765	1.82	950233	181000	-81	+2919	+608

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

** SSB 2023 relative to SSB 2022.

*** Catches in 2022 relative to ICES estimates of catches in 2020 (30 177 tonnes).

^ Advised catches for 2022 relative to the advised catches for 2021 (128 627 tonnes).

^^ Modification of the proposed management plan was requested, calling for $F_{target} = 0.11$ (F_{MSY} at time of the management plan establishment) to be achieved in 2022.

Assuming same catch scenario in 2023 as in 2022.

The advice for 2022 has increased compared to the advice provided for 2021 because of the redefined F_{MSY} (from 0.11 to 0.15 [ICES, 2021a]).

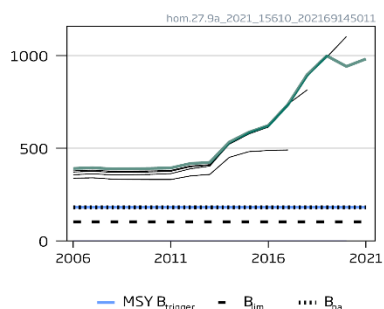
Basis of the advice

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

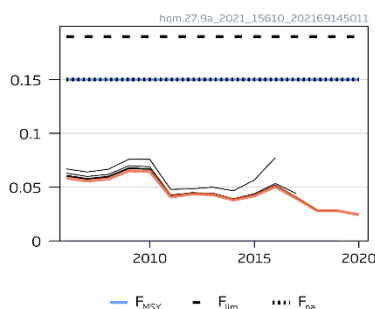
Advice basis	MSY approach
Management plan	A management plan (MP) was proposed for this stock and has been evaluated as precautionary by ICES (ICES, 2018). The MP was modified in 2021 by setting the F_{target} to be achieved by 2022 and is considered precautionary. ICES was requested by the EU to base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

Quality of the assessment

Spawning Stock Biomass



Fishing Mortality



Rec (age 0; Billions)

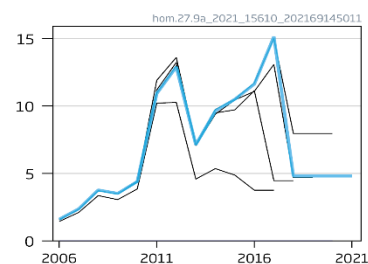


Figure 2 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Historical assessment results. For the first three lines in the recruitment plot, the last two values are the geometric mean of 1992–2017. In the 2020 assessment, the last three values are the geometric mean of 2008–2017, while in the 2021 assessment the last four values are taken as the 1992–2017 geometric mean. Biomass is in million tonnes.

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 values.

The collection of data from the commercial fishery during 2020 has been impacted by COVID-19 restrictions to a varying degree across Member States. This has had an impact on the catch-at-age used in the assessment (ICES, 2021a).

For the above reasons, estimated recruitment since 2018 is considered uncertain and therefore was replaced in the short-term forecast by the geometric mean (1992–2017) for 2018 to 2021. This assumed recruitment is estimated to contribute 22% of the advised catch for 2022.

There has been a continued and significant shift in relative catch contribution from bottom trawls to purse-seines in the last few years (Table 7). This has led to a change in the age composition of catches, with an increase in the proportion of age-1 individuals from 27% in 2016 to 40% in 2020. This may lead to inconsistency in estimating selectivity in the last period of the assessment.

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 2020, less than 10% of catch consisted of *Trachurus* spp. other than *T. trachurus* (2498 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.

ICES has redefined F_{pa} as F_{P05} (the F that leads to $SSB \geq B_{lim}$ with 95% probability [ICES, 2021a]), and this led to a redefinition of F_{MSY} to 0.15. This updated F_{MSY} differs from the F_{target} (previous $F_{MSY} = 0.11$) considered in the management plan that was evaluated by ICES in 2018 (ICES, 2018).

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	Constrained by F_{pa} ($F_{MSY} = F_{pa}$). Stochastic long-term simulations using a segmented regression with breakpoint at MSY $B_{trigger}$.	ICES (2016, 2021a)
Precautionary approach	B_{lim}	103000	Derived from B_{pa} and assessment uncertainty ($B_{lim} = B_{pa} \times \exp(-1.645\sigma)$; $\sigma = 0.34$).	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 ($SSB < B_{lim}$)	ICES (2016, 2017)
	F_{pa}	0.15	F that leads to $SSB \geq B_{lim}$ with 95% probability	ICES (2016, 2021a)
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 $SSB \leq B_{lim}$ to allow for bycatches.	ICES (2018)

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, 2021b)
Assessment type	Analytical assessment (AMISH model) that uses catches in the model and in the forecast (ICES, 2021b)
Input data	Commercial catches (international landings, ages, and length frequencies from catch sampling). One IBTS survey combined index (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	<i>Status quo</i> prediction (Catch at <i>status quo</i> F)	55000	73000^	28441
1995	No long-term gains in increasing F (Catch at <i>status quo</i> F)	63000	73000^	25147
1996	No long-term gains in increasing F (Catch at <i>status quo</i> F)	60000	73000^	20400
1997	No advice	-	73000^	29491

Year	ICES advice*	Catch corresponding to advice (<i>T. trachurus</i>)	Agreed TAC (<i>Trachurus</i> spp.)	ICES catches (<i>T. trachurus</i>) ^{^^^}
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
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 ^{^^}	
2022	MSY approach	≤ 143505		

* Advice referred to divisions 8.c and 9.a until 2010, and to Division 9.a since then as a result of a change in the stock definition.

** 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]).

[^] Division 8.c and Subarea 9.

^{^^} Subarea 9.

^{^^^} Not including Spanish catches in 9.a South-Cadiz, considered to be less than 4% 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 2020 as estimated by ICES. (Note: Spanish catches in 9.a South-Cadiz are not included).

Catch (2020)	Landings			Discards
	36% trawl	58% purse-seine	6% other gears	
30177 tonnes	30177 tonnes			Negligible

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		

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
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
2019	35520	1016	36536
2020	30177	1167	31344

Summary of the assessment

Table 9 Horse mackerel (*Trachurus trachurus*) in Division 9.a. Assessment summary. High and low refer to 95% confidence intervals.

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			tonnes			
1992	4463320	6249433	2677207	305266	456438	154093	27858	0.084	0.124	0.045
1993	3125940	4441394	1810486	327415	494866	159965	31521	0.089	0.133	0.046
1994	3085070	4395352	1774788	349669	535891	163448	28441	0.073	0.110	0.036
1995	4227780	5973858	2481702	334146	518151	150142	25147	0.070	0.105	0.034
1996	11372800	15656321	7089279	355887	557463	154312	20400	0.051	0.077	0.025
1997	3741120	5278781	2203459	374673	587389	161956	29491	0.070	0.107	0.033
1998	2399250	3452191	1346309	378601	590619	166582	41564	0.093	0.143	0.044
1999	3659150	5192652	2125648	431044	679965	182122	27733	0.057	0.089	0.026
2000	3338670	4773790	1903550	416495	661690	171300	26160	0.059	0.092	0.027
2001	3948390	5636703	2260077	400076	640584	159567	24910	0.058	0.090	0.026
2002	2234510	3270005	1199015	387340	623843	150836	22506	0.057	0.088	0.026
2003	4434010	6353624	2514396	387822	626961	148683	18887	0.048	0.074	0.021
2004	4888150	7003500	2772800	440090	713686	166494	23252	0.052	0.080	0.023
2005	3074530	4473643	1675417	402780	654868	150691	22695	0.053	0.082	0.024
2006	1603890	2411598	796182	390740	635684	145796	23902	0.058	0.092	0.025
2007	2377910	3535725	1220095	394374	644976	143772	22790	0.056	0.087	0.024
2008	3771960	5584782	1959138	388570	640106	137035	22993	0.057	0.091	0.024
2009	3520100	5294527	1745673	389360	646811	131909	25737	0.065	0.105	0.026
2010	4403520	6681726	2125314	390933	654882	126984	26556	0.065	0.104	0.025
2011	10922900	16387890	5457910	393644	664324	122964	21875	0.041	0.067	0.0153
2012	12896200	19361201	6431199	417338	703272	131405	24868	0.043	0.071	0.0162
2013	7128300	10908042	3348558	423390	707525	139255	28993	0.043	0.071	0.0152
2014	9640120	14748507	4531733	533183	880030	186336	29017	0.038	0.062	0.0134

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			tonnes			
2015	10503200	16281868	4724532	586363	961611	211115	32723	0.042	0.068	0.0156
2016	11626700	18374706	4878694	622618	1019169	226066	40730	0.050	0.082	0.0188
2017	15151300	24419924	5882676	735017	1205385	264648	36946	0.040	0.064	0.0148
2018	4806105*			897896	1471183	324610	31661	0.028	0.046	0.0105
2019	4806105*			998293	1630039	366547	35520	0.028	0.045	0.0104
2020	4806105*			941433	1531900	350966	30177	0.024	0.040	0.0086
2021	4806105*			981870						

* Geometric mean (1992–2017).

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

Sources and references

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

Recommended citation: ICES. 2021. Horse mackerel (*Trachurus trachurus*) in Division 9.a (Atlantic Iberian waters). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, hom.27.9a, <https://doi.org/10.17895/ices.advice.7779>.