ICES Advice on fishing opportunities, catch, and effort
Ecoregions in the Northeast Atlantic
Published 30 September 2022

Horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (Northeast Atlantic)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied there should be zero catch in 2023.

Stock development over time

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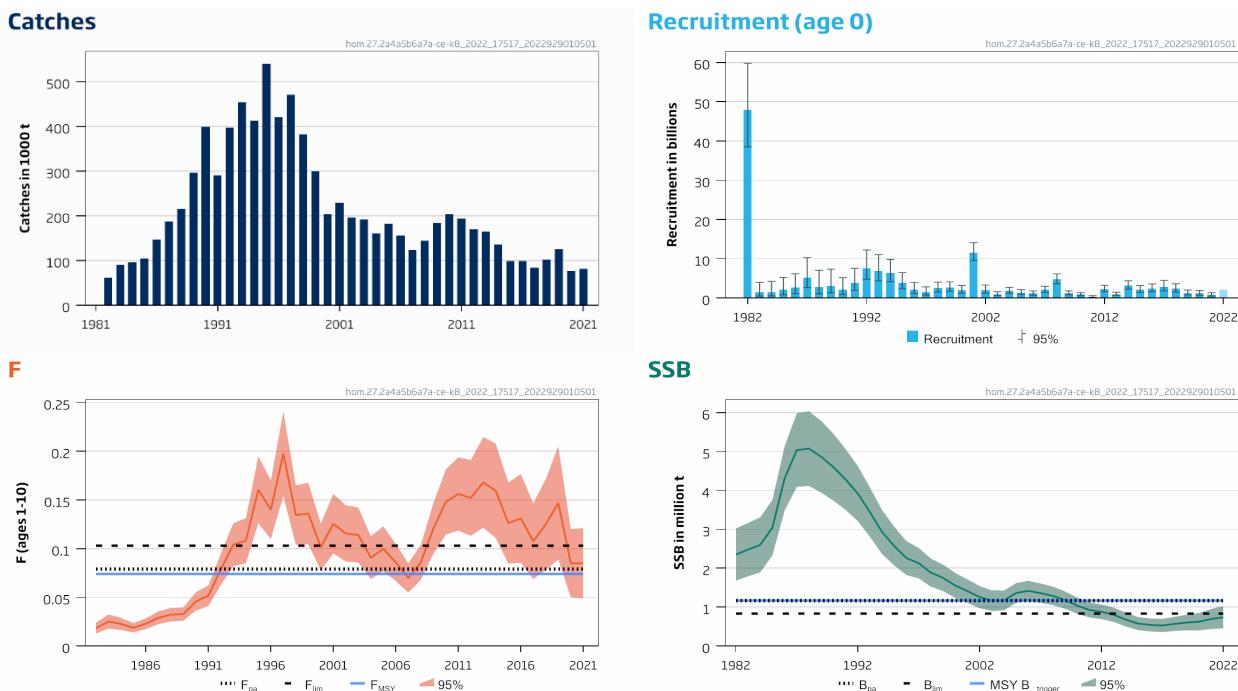

Figure 1 Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Summary of the stock assessment. The assumed recruitment value for 2022 is shaded in a paler colour.

Catch scenarios

Table 1 Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Values in the forecast and for the interim year

Variable	Value	Notes
$F_{ages\ 1–10}$ (2022)	0.072	Based on assumed catches in 2022
SSB (2023)	754 163	Short-term forecast; in tonnes
$R_{age\ 0}$ (2022–2023)	2 174 351	Geometric mean (1983–2021); in thousands
Catch (2022)	71 138	TAC for 2022; in tonnes

Table 2   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	F (2023)	SSB (2024)	% SSB change*	% advice change**
ICES advice basis					
MSY approach: F = 0	0	0	805 946	6.9	−100
Other scenarios					
$F = F_{MSY}$	73 950	0.074	737 593	−2.2	3.95
$F = F_{P05} = F_{pa}$	78 719	0.079	733 196	−2.8	10.7
$F = F_{lim}$	101 225	0.103	712 460	−5.5	42.3
SSB_{2024} = MSY $B_{trigger}$ or B_{pa} or B_{lim}***					
$SSB_{2024} = SSB_{2023}$ ^	56 059	0.055	754 102	0.0	−21.2
$F = F_{2022}$	71 813	0.072	739 564	−1.94	0.95
PelAC proposed HCR^^	15 513	0.015	791 583	4.96	−78

* SSB 2024 relative to SSB 2023 (754 163 t).
** Advice value for 2023 relative to advice value for 2022 (71 138 tonnes).
*** The B_{pa}, B_{lim}, and MSY $B_{trigger}$ options were left blank because none of them be achieved in 2024, even with a zero catch in 2023.
^ Closest available approximation to SSB_{2023}.
^^ HCR proposed by PelAC 2020 and reviewed by ICES (ICES, 2021a). The recovery time frame will differ from that indicated during the evaluation in 2020 as the perception of the stock has changed.

The catch advice for 2023 is 100% lower compared to that provided in 2022. The stock has been revised down in the latest assessment such that SSB is below B_{lim} and is forecast to remain below B_{lim} in 2024 even under a scenario of zero catch in 2023.

Basis of the advice
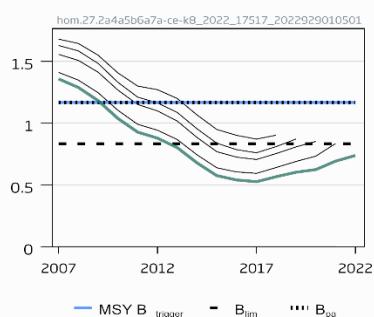
Table 3   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. The basis of the advice.

Advice basis	MSY approach
Management plan	ICES is not aware of any agreed precautionary management plan for horse mackerel in this area
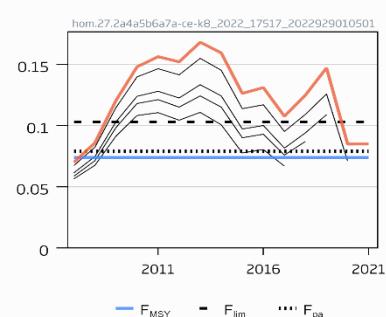
Quality of the assessment

Recent assessments show a strong retrospective pattern with a consistent downward revision in absolute level of SSB and an upward revision in F. However, this does not affect the zero catch advice for 2023.
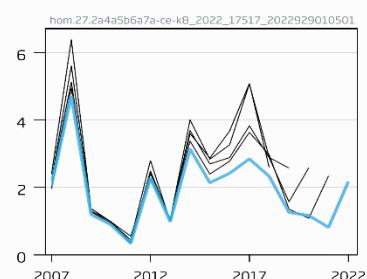

Figure 2   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Historical assessment results. The reference points were revised in 2019 following an interbenchmark (ICES, 2019), and only the last four assessment results should be compared to the reference points.

Issues relevant for the advice

ICES provides zero-catch advice for this stock in 2023 because the SSB remains below B_{lim} by 2024 under all catch scenarios.

Reference points

Table 4   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	1 168 272	B_{pa}; in tonnes	ICES (2019)
	F_{MSY}	0.074	Stochastic simulations (EqSim)	ICES (2019)
Precautionary approach	B_{lim}	834 480	B_{pa}/1.4; in tonnes	ICES (2019)
	B_{pa}	1 168 272	SSB_{2003}; in tonnes	ICES (2019)
	F_{lim}	0.103	Stochastic simulations (EqSim)	ICES (2019)
	F_{pa}	0.079	The F that provides a 95% probability for SSB to be above B_{lim} (F_{P05})	ICES (2019, 2021b)
	F_{P05}	0.079	Stochastic simulations (EqSim)	ICES (2019)
Management plan	SSB_{mgt}			
	F_{mgt}			

Basis of the assessment

Table 5   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022a)
Assessment type	Length- and age-based analytical assessment (Stock Synthesis 3; NOAA Toolbox)
Input data	Commercial catches: international catches, length and age data from catch sampling. Three survey indices: triennial egg survey index (I4189, 1992–2019); a combined recruitment index (2003–2021) derived from EVHOE (G9527), IGFS (G7212), SCOWCGFS (G4748 and G4815), and SWC-IBTS (G1179 and G4299); PELACUS acoustic biomass index ([A2548], 1992–2019, 2021). Length frequency distribution from the PELACUS survey. Time variant maturity-at-age. Natural mortality constant at 0.15 for all ages and years.
Discards and bycatch	Partial (prior to 2014) and full (since 2014) discards are included in the assessment.
Indicators	None
Other information	The stock was benchmarked in 2017 (ICES, 2017). The reference points were updated in 2019 (ICES, 2019) and 2021 (ICES, 2021b)
Working group	Working Group on Widely Distributed Stocks (WGWIDE; ICES 2022b)

History of the advice, catch, and management

Table 6   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. ICES advice, TACs, and catches. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice**	Agreed TAC*	ICES estimated landings***	ICES estimated discards***	ICES estimated catch***
1987	Not assessed	-	155000	187338	-	187338
1988	No increase in catches	102000	169000	210989	3740	214729
1989	If sustained catches required; TAC	100000	153000	294887	1150	296037
1990	TAC	~200000	203000	388721	9930	398651
1991	Within safe biological limits	-	230000	284623	5440	290063
1992	Within safe biological limits	-	250000	395559	1820	397379
1993	Within safe biological limits	-	250000	445484	8600	454084
1994	Prudent not to increase F	-	300000	408968	3935	412903
1995	Reduction in catch	-	300000	538611	2046	540657
1996	Reduction in catch	-	300000	403869	16870	420739
1997	Reduction in F	173000	300000	470252	158	470410
1998	Reduction in F to 0.15	150000	320000	381411	913	382324
1999	Effectively limit catches to 200 000 t	< 200000	265000	299431	0	299431

Year	ICES advice	Catch corresponding to advice**	Agreed TAC*	ICES estimated landings***	ICES estimated discards***	ICES estimated catch***
2000	Effectively limit catches to 200 000 t	< 200000	240000	202350	382	202732
2001	Effectively limit catches to 224 000 t	< 224000	233000	228827	254	229081
2002	Effectively limit catches to 98 000 t	< 98000	150000	195813	307	196120
2003	Effectively limit catches to 113 000 t	< 113000	137000	191014	842	191856
2004	Limit catches to less than 130 000 t	< 130000	137000	157386	2356	159742
2005	Limit catches to less than 150 000 t	< 150000	137000	180199	1802	182001
2006	Limit catches to less than 150 000 t	< 150000	137000	154474	1353	155827
2007	Limit catches to less than 150 000 t	< 150000	137000	122985	370	123356
2008	Follow proposed management plan	180000	170000	142875	474	143349
2009	Follow proposed management plan	180000	170000	183335	447	183782
2010	Follow proposed management plan	180000	183191	202680	432	203112
2011	See scenarios	181000–229000	195130	193268	430	193698
2012	MSY framework	≤ 211000	183000	166579	3279	169858
2013	MSY framework	≤ 126000	181000	160676	4582	165258
2014	MSY approach	≤ 110546	133220	134463	1896	136360
2015	MSY approach	≤ 99304	97603	94192	4228	98419
2016	MSY approach	≤ 126103	124403	94394	4417	98811
2017	MSY approach	≤ 69186	95500	79033	3928	82961
2018	MSY approach	≤ 117070	115470	99072	2609	101682
2019	MSY approach	≤ 145237	136376	121806	3141	124947
2020	MSY approach	≤ 83954	81796	73682	2740	76422
2021	MSY approach	≤ 81376	81375	79916	1641	81557
2022	MSY approach	≤ 71138	71138			
2023	MSY approach	0				

* EU and UK TAC.
** Division 8.c is not included prior to 2005.
*** Division 8.c is not included prior to 2003.

History of the catch and landings

Table 7   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Landings distribution by fleet in 2021 as estimated by ICES.

Catch (2021)	Landings				Discards
	Pelagic trawl 45%	Otter trawl 3%	Purse seine 18%	Unspecified and other gears* 33%	
81 557					1641 tonnes
	79 916 tonnes				

* Most of those catches are taken by pelagic trawls.

Table 8   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. History of commercial catch and landings; official landing values presented by area and ICES estimated discards. All weights are in tonnes.

Year	ICES divisions						Discards	Total western stock
	2.a and 5.b	3.a***	4.a	6.a–b	7.a–c and 7.e–k	8.a–e		
1982	-		-	6283	32231	22683	-	61197
1983	412		-	24881	36926	28223	-	90442
1984	23		94	31716	38782	25629	500	96744
1985	79		203	33025	35296	27740	7500	103843
1986	214		776	20343	72761	43405	8500	145999
1987	3311		11185	35197	99942	37703	-	187338
1988	6818		42174	45842	81978	34177	3740	214729
1989	4809		85304*	34870	131218	38686	1150	296037
1990	11414	14878	112753*	20794	182580	46302	9930	398645
1991	3200	2725	56157*	29726	149975	42840	5440	290063
1992	13457	2374	103725	39061	182770	54172	1820	397379
1993		850	141220	65397	193291	44726	8600	454084
1994	759	2492	106911	69616	193689	35501	3935	412903
1995	13151	128	92728	83568	320329	28707	2046	540657

Year	ICES divisions						Discards	Total western stock
	2.a and 5.b	3.a***	4.a	6.a–b	7.a–c and 7.e–k	8.a–e		
1996	3366	0	16783	81311	254049	48360	16870	420739
1997	2601	2037	63646	40145	321017	40806	158	470410
1998	2544**	3693	17001	35073	284529	38571	913	382324
1999	2557^	2095	47315	40381	158733	48350		299431
2000	919^^	1014	4314	20735	121171	54197	382	202732
2001	310	134	11438	24839	117038	75067	254	229081
2002	1324	174	36221	14843	87354	55897	307	196120
2003	36	1843	21272	23772	102379	41711	842	191856
2004	42	48	11708	22177	99284	24126	2356	159746
2005	176	284	24983	22053	91211	41491	1802	182001
2006	27	58	27156	15722	77394	34121	1353	155827
2007	366	110	4940	25949	63224	28396	370	123356
2008	572^^^	2.98	12107	25867	70570	33756	474	143349
2009	1847	17	58738	17775	71378	33580	447	183782
2010	1667	88	11442	23199	126624	39659	432	203112
2011	648	0.23	14723	39496	103156	35245	430	193698
2012	66	8.9	3311	44971	101012	17209	3279	169858
2013	30	10.0	6702	43266	83684	26983	4582	165258
2014	424	4096	10573	32444	56081	30844	1896	136360
2015	10	65	9078	24153	41063	19822	4228	98419
2016	45	0	8960	32186	35692	17511	4417	98811
2017	5	697	9332	28170	22510	18307	3939	82961
2018	718	380	8547	38896	27140	23393	2609	101682
2019	867	490	8314	47351	35144	29640	3141	124947
2020	290	96	10387	19037	24232	19639	2740	76422
2021	12	12	3751	13726	42813	19602	1641	81557

* Norwegian catches from Division 4.b included.

** Includes 1937 t from Division 5.b.

*** Catches in the western part of Division 3.a are allocated to horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k.

^ Includes 132 t from Division 5.b.

^^ Includes 250 t from Division 5.b.

^^^ All from Division 5.b.

Summary of the assessment

Table 9   Horse mackerel in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. Assessment summary. High and low refer to 95% confidence intervals. All weights are in tonnes and recruitment in thousands. F is the fishing mortality weighted by population numbers.

Year	Recruitment			SSB			Total Catch	F		
	Low	Value at age 0	High	Low	Value	High		Low	Mean ages 1–10	High
1982	38491699	47973500	59790988	1680611	2351030	3021449	61197	0.0127	0.0183	0.0239
1983	498387	1409080	3983863	1791394	2477960	3164526	90442	0.0177	0.0251	0.0324
1984	5520183	1529300	4236742	1892698	2600980	3309262	96744	0.0165	0.0227	0.0290
1985	814160	2061350	5219076	2327714	3044610	3761506	103843	0.0139	0.0187	0.0236
1986	1098775	2605390	6177841	3477237	4307560	5137883	145999	0.0174	0.0230	0.0285
1987	2634346	5209590	10302300	4091365	5036810	5982255	187338	0.0224	0.0289	0.0355
1988	1057169	2733740	7069193	4113947	5073630	6033313	214729	0.0252	0.0322	0.0391
1989	1311134	3106180	7358786	3940293	4865000	5789707	296037	0.0259	0.0329	0.0398
1990	873850	2128810	5186053	3737157	4599300	5461443	398645	0.0363	0.0458	0.0553
1991	1963772	3848570	7542369	3497870	4282640	5067410	290063	0.0410	0.0517	0.0624
1992	4749191	7613940	12206729	3214272	3922920	4631568	397379	0.0625	0.0789	0.0952
1993	4361982	6952140	11080343	2808567	3443150	4077733	454084	0.0820	0.104	0.126
1994	4154507	6397130	9850332	2364242	2930260	3496278	412903	0.0849	0.108	0.131
1995	2333578	3888900	6480839	2069738	2568610	3067481	540657	0.126	0.160	0.195
1996	1145261	2130800	3964433	1822011	2258940	2695869	420739	0.110	0.140	0.170
1997	748259	1455050	2829462	1737772	2130370	2522968	470410	0.154	0.198	0.241
1998	1532223	2488060	4040171	1526143	1887400	2248657	382324	0.104	0.135	0.165
1999	1703261	2653150	4132782	1410359	1751820	2093281	299431	0.104	0.136	0.168
2000	1192835	1952630	3196389	1233816	1556520	1879224	202732	0.0774	0.102	0.126
2001	9488813	11569200	14105704	1108372	1411810	1715248	229081	0.0950	0.126	0.156
2002	1190639	1982640	3301472	973007	1257880	1542753	196120	0.0867	0.116	0.145
2003	614023	988367	1590932	898410	1167000	1435590	191856	0.0856	0.114	0.142
2004	1197612	1801970	2711309	917128	1171620	1426112	159746	0.0688	0.0908	0.113
2005	878020	1366060	2125374	1106949	1362250	1617551	182001	0.0766	0.0998	0.123
2006	720700	1137640	1795789	1160114	1418690	1677266	155827	0.0667	0.0859	0.105
2007	1432072	2071850	2997450	1108107	1359080	1610053	123356	0.0550	0.070	0.0850
2008	3614561	4713810	6147360	1051919	1290160	1528401	143349	0.0678	0.0859	0.104
2009	798308	1196590	1793578	959598	1183320	1407042	183782	0.0945	0.121	0.147
2010	567831	893847	1407042	830953	1039260	1247567	203112	0.114	0.148	0.182
2011	189719	338534	604077	733910	928577	1123245	193698	0.119	0.156	0.194
2012	1594164	2277900	3254889	691985	880027	1068069	169858	0.113	0.152	0.191
2013	655327	982006	1471534	618889	803142	987395	165258	0.122	0.168	0.215
2014	2252754	3140900	4379197	502560	679877	857194	136360	0.111	0.159	0.208
2015	1438809	2138820	3179400	406998	576525	746052	98419	0.0846	0.126	0.168
2016	1626934	2419130	3597066	374504	541909	709314	98811	0.0853	0.131	0.177
2017	1814679	2846550	4465169	357558	527801	698044	82961	0.0686	0.108	0.147
2018	1498203	2329200	3621119	385126	568172	751218	101682	0.0782	0.125	0.172
2019	779457	1260210	2037482	402220	604308	806396	124947	0.0889	0.147	0.205
2020	712122	1165290	1906838	399516	625449	851382	76422	0.0498	0.0850	0.120
2021	501332	816224	1328904	436761	693991	951221	81557	0.0489	0.0851	0.121
2022		2174351*		454253	739665	1025077				

* R (age 0) is the geometric mean of the time-series from 1983 to 2021.

Sources and references

ICES. 2017. Report of the Benchmark Workshop on Widely Distributed Stocks (WKWIDE), 30 January–3 February 2017, ICES HQ, Copenhagen, Denmark. ICES CM 2017/ACOM:36. 196 pp.

ICES. 2019. Report of the Inter-Benchmark Protocol on reference points for Western horse mackerel (*Trachurus trachurus*) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k (the Northeast Atlantic) (IBPWHM). ICES Scientific Reports, 2:95. 75 pp. https://doi.org/10.17895/ices.pub.7509

ICES. 2021. EU request to ICES on the assessment of a new rebuilding plan for western horse mackerel (*Trachurus trachurus*) in ICES Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c, and 7.e–k. *In* Report of the ICES Advisory Committee, 2021. ICES Advice 2021, sr.2021.04. https://doi.org/10.17895/ices.advice.8039

ICES. 2022a. Advice on fishing opportunities. *In* Report of the ICES Advisory Committee, 2022. ICES Advice 2022, Section 1.1.1. https://doi.org/10.17895/ices.advice.19928060

ICES. 2022b. Working Group on Widely Distributed Stocks (WGWIDE). ICES Scientific Reports. 4:73. 922 pp. http://doi.org/10.17895/ices.pub.21088804