

Mackerel (*Scomber scombrus*) in subareas 1–8 and 14, and in Division 9.a (Northeast Atlantic and adjacent waters)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 782 066 tonnes.

Stock development over time

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

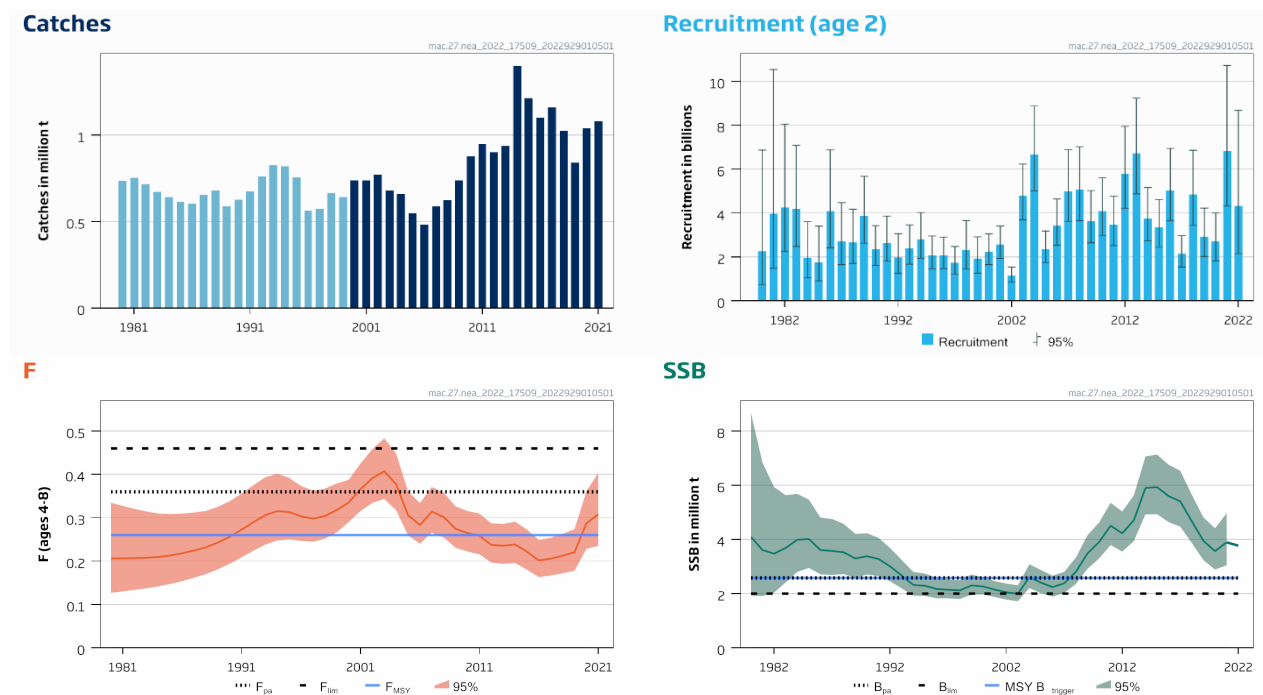


Figure 1 Mackerel in subareas 1–8 and 14, and in Division 9.a. Summary of the stock assessment. Catches prior to 2000 have been down-weighted in the assessment because of the considerable underreporting suspected to have taken place in this period. Abundance estimates of age 0 and 1 from the assessment model poorly reflect year-class strength and therefore recruitment is shown at age 2.

Catch scenarios

Table 1 Mackerel in subareas 1–8 and 14, and in Division 9.a. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 4-8}$ (2022)	0.36	From the forecast for 2022, based on assumed catch in 2022
SSB (2022) at spawning time	3 769 326	From the forecast for 2022; in tonnes
$R_{age\ 0}$ (2022–2023)	4 497 060	Geometric mean of the abundance at age 0 (1990–2020); in thousands
Total catch (2022)	1 131 416	Sum of expected landings and discards, accounting for the interannual transfers from 2021; in tonnes

Table 2 Mackerel in subareas 1–8 and 14, and in Division 9.a. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch	F _{ages 4–8}	SSB at spawning time		% change		
	2023	2023–2024	2023	2024	SSB*	Catch**	Advice***
ICES advice basis							
MSY approach: $F = F_{MSY}$	782066	0.26	3676187	3649119	-1%	-31%	-2%
Other scenarios							
$F = 0$	0	0	3834187	4442903	16%	-100%	-100%
$Catch_{2023} = catch_{2022} - 20\%$	905133	0.31	3649147	3494839	-4%	-20%	14%
$Catch_{2023} = catch_{2022}$	1131416	0.40	3597636	3333051	-7%	0%	42%
$Catch_{2023} = catch_{2022} + 25\%$	1414270	0.52	3529667	3131128	-11%	25%	78%
$F = F_{2022}$	1046177	0.36	3617323	3393970	-6%	-8%	32%
F_{pa}	1042720	0.36	3618114	3397266	-6%	-8%	31%
F_{lim}	1284085	0.46	3561472	3169986	-11%	13%	62%
$SSB_{2024} = B_{lim}$	2654020	1.23	3168962	1995707	-37%	135%	234%
$SSB_{2024} = B_{pa}^{\wedge}$	1945604	0.78	3389356	2577596	-24%	72%	145%

* SSB 2024 relative to SSB 2023.

** Catch in 2023 relative to estimated catches in 2022 (1 131 416 tonnes). There is no internationally agreed TAC for 2022.

*** Advice value for 2023 relative to the advice value for 2022 (794 920 tonnes).

[^] SSB_{2024} values are the closest available approximation to B_{lim} and B_{pa} .

Basis of the advice

Table 3 Mackerel in subareas 1–8 and 14, and in Division 9.a. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no long-term management strategy for Northeast Atlantic (NEA) mackerel agreed by all parties involved in the mackerel fishery. In 2019 Coastal State delegations from Norway, the EU, and the Faroes requested ICES to review new harvest control rule (HCR) options for a management strategy. ICES delivered the advice from this evaluation in August 2020 (ICES, 2020a).

Quality of the assessment

The only available catch data from Russian Federation for 2021 was total catch by ICES division from ICES preliminary catch database, and no Russian catch samples were available. Historically, preliminary catches are comparable to ICES final estimated catch. There were adequate samples from other fishing nations operating in the same areas which were used to estimate catch-at-age and weight-at-age.

The inclusion of a new year of data modifies the relative weight of the different data sources in the assessment, which leads to revisions of the perception of the stock. In 2022, there has been an upwards revision of SSB and a downwards revision of fishing mortality for the period 2007 to 2017, and a revision in the opposite direction for the most recent SSB and F estimates (Figure 2). The relative weights of the data sources in the assessment are dependent on both the length of the time-series and the consistency of the information. With the new data included this year, the influence of the tagging data in the assessment model increased slightly.

The abundance index for age 0 from the IBTS surveys could not be updated, and no value was available for 2021; however, this has no effect on the advice.

The SSB index from the 2022 mackerel egg survey used in this year's assessment is a preliminary value, and it is 26% larger than the previous estimate in 2019. The final value will be used in next year's assessment.

The stock assessment and the short-term forecast include ages from 0 to 12. The abundance estimates at ages 0 and 1 are highly uncertain, and year-class strength only becomes apparent when fish enter the fishery at age 2 to 3. Therefore, this year, recruitment is presented for age 2.

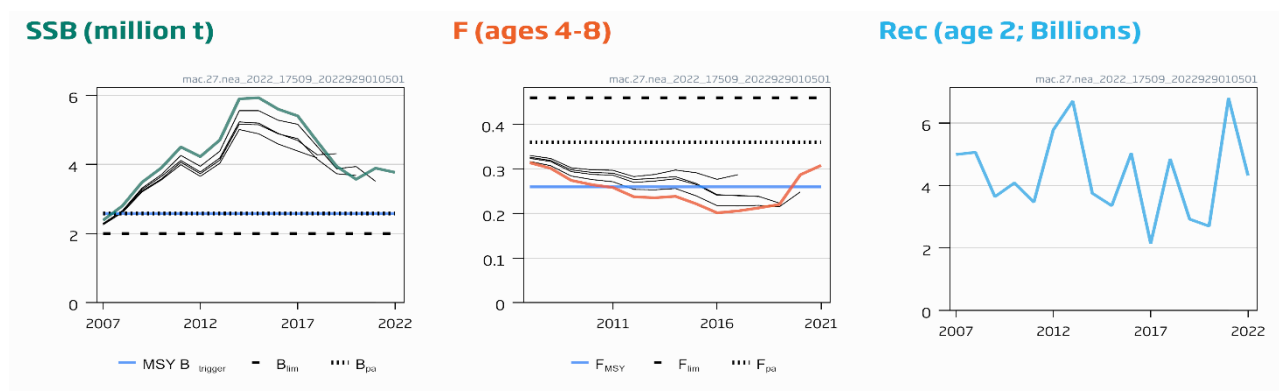


Figure 2 Mackerel in subareas 1–8 and 14, and in Division 9.a. Historical assessment results. Note that this year’s assessment presents recruitment at age 2. Prior to this, recruitment was presented as age 0 and is not shown.

Issues relevant for the advice

The sum of the unilateral quotas for mackerel and the resulting catches have exceeded the scientific advice by on average 41% since 2010. The F_{MSY} reference point that is used as a basis for the advice has been derived from an evaluation that assumed that annual catches would be aligned with the scientific advice based on the MSY approach, as the implementation error in the form of a consistent overshoot of the TAC was not included. Therefore, failing to adhere to the advised catches as derived from the application of the MSY approach may not be precautionary. Specifically, this may result in an increased risk for the stock to fall below B_{lim} , loss of catch in the long term, and unsustainable utilization of the resource.

ICES currently considers the NEA mackerel stock to consist of three spawning components – the western, southern, and North Sea (ICES, 2016) – although the stock structure and spawning behaviour is likely to be more dynamic (Jansen and Gislason, 2013). The existing management measures to ensure the protection of the North Sea component (i.e. no mackerel fishing in divisions 3.a and 4.b–c, except for Norway, where a limited amount of the TAC can be fished in Division 3.a; no mackerel fishing in Division 4.a during the period 15 February–31 July; and a 30 cm minimum conservation reference size) should remain in place for precautionary reasons. However, given the new knowledge on stock structure of mackerel that is currently becoming available, a review of the appropriateness of the use of stock components and the associated protection measures should be carried out.

Reference points

Table 4 Mackerel in subareas 1–8 and 14, and in Division 9.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	$MSY B_{trigger}$	2 580 000	B_{pa} ; in tonnes	ICES (2020b)
	F_{MSY}	0.26	Stochastic simulations	ICES (2020b)
Precautionary approach	B_{lim}	2 000 000	B_{loss} in 2003 from the 2019 WGWIDE assessment; in tonnes	ICES (2020b)
	B_{pa}	2 580 000	$B_{lim} \times \exp(1.645 \times \sigma)$, $\sigma = 0.15$; in tonnes	ICES (2020b)
	F_{lim}	0.46	The F that on average leads to B_{lim}	ICES (2020b)
	F_{pa}	0.36	The F that provides a 95% probability for SSB to be above B_{lim} (F_{p05}).	ICES (2020b)
Management plan	SSB_{mgt}			
	F_{mgt}			

Basis of the assessment

Table 5 Mackerel in subareas 1–8 and 14, and in Division 9.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2022a)
Assessment type	Age-based analytical model (SAM) that uses catches in the model and in the forecast
Input data	Catch data, steel tagging data ([L3182] 1980–2006) and RFID tagging data ([L5543] 2014–2021), and three survey indices: SSB index from the triennial egg survey ([I4189] 1992–2022), abundance indices from the IBTS survey (G1022, G1179, G3239, G4299, G4493, G4748, G4815, G7212 and G9527) (combined Q1 and Q4; age 0, 1998–2020), and from the IESSNS survey ([A7806] ages 3–11, 2010, 2012–2022). Catches prior to 2000 are given a very low weight in the assessment. Natural mortality (0.15 for all ages and years) is based on tagging studies from the early 1980s.
Discards	Discarding is known to take place (0.3% of the total catch in weight in 2021), but is only quantified for part of the fisheries; the proportion of the landings covered cannot be calculated. Partial discard estimates are included in the assessment and overall discarding in recent years is assumed negligible.
Indicators	None
Other information	Interbenchmarked in 2019 (IBPNEAMac; ICES, 2019), a long-term management strategy evaluation was conducted in 2020 (WKMSEMAC; ICES 2020b)
Working group	Working Group on Widely Distributed Stocks (WGWIDE ; ICES 2022b)

History of the advice, catch, and management

Table 6 Mackerel in subareas 1–8 and 14, and in Division 9.a. History of ICES advice, the TAC, and ICES estimates of catch. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	TAC *	Official landings	Discards and slipping	ICES catch
1987	Given by stock component		442000	616000	10789	654992
1988	Given by stock component		610000	622000	35566	680491
1989	Given by stock component		532000	576000	7090	585920
1990	Given by stock component		562000	580000	15600	626107
1991	Given by stock component		612000	609000	30700	675665
1992	Given by stock component		707000	729000	25000	760690
1993	Given by stock component		767000	784000	18180	824568
1994	Given by stock component		837000	794000	5370	819087
1995	Given by stock component		645000	729000	7721	756277
1996	Significant reduction in F	-	452000	509000	11415	563472
1997	Significant reduction in F	-	470000	517000	18864	573029
1998	F between 0.15 and 0.2	498000	549000	627000	8012	666316
1999	F of 0.15 consistent with PA	437000	562000	585000	n/a	640309
2000	F = 0.17: F _{pa}	642000	612000	655000	2084	738606
2001	F = 0.17: F _{pa}	665000	670000	660000	1188	737463
2002	F = 0.17: F _{pa}	694000	683000	685000	23774	771422
2003	F = 0.17: F _{pa}	542000	583000	600000	19427	679287
2004	F = 0.17: F _{pa}	545000	532000	587000	19962	660491
2005	F = 0.15 to 0.20	320000–420000	422000	447000	25788	549514
2006	F = 0.15 to 0.20	373000–487000	444000	420878	26594	481181
2007	F = 0.15 to 0.20	390000–509000	502000	511016	15444	586206
2008	F = 0.15 to 0.20	349000–456000	458000	547506	37075	623165
2009	F = 0.15 to 0.20	443000–578000	605000^^	631805	15934	737969
2010	Harvest control rule	527000–572000	885000^^^	831825	13045	877272
2011	See scenarios	529000–672000	959000^^^	926258	10894	948963
2012	Follow the management plan	586000–639000	927000^^^	876278	15174	899551
2013	Follow the management plan	497000–542000	906000^^^	935646	4732	938299
2014	Follow the management plan	927000–1011000	1392000^^^	1382772	6451	1401788
2015	Follow the management plan	831000–906000	1229000^^^	1202687	10431	1215827
2016	MSY approach	≤ 773842	1057000^^^	1088664	5971	1100135
2017	MSY approach	≤ 857185	1173000^^^	1170804	2832	1159641
2018	MSY approach	≤ 550948	998000^^^	990715	2890	1023144
2019	MSY approach	≤ 770358	864000^^^	828649	7807	839727
2020	MSY approach	≤ 922064	1090879^^^	1030161^	9280	1039513
2021	MSY approach	≤ 852284	1199103^^^	1075763^	3129	1081540
2022	MSY approach	≤ 794920	1131416^^^			
2023	MSY approach	≤ 782066				

n/a = not available.

* For all areas, except some catches in international waters in Subarea 2.

^ Preliminary.

^^ Does not include the unilateral Norway–Faroe Islands TAC, first declared in 2009, nor the Icelandic quota.

^^^ No internationally agreed quotas. Values presented are the sum of unilateral quotas (including quotas and transfers).

Table 7 Mackerel in subareas 1–8 and 14, and in Division 9.a. History of ICES advice, the TAC, and ICES estimates of catch for the **western component**. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	TAC*	Discards and slippage	ICES catch**
1987	SSB = 1.5 million t; TAC	380000	405000	11000	633000
1988	F = F _{0.1} ; TAC; closed area; landing size	430000	573000	36000	656000
1989	Halt SSB decline; TAC	355000	495000	7000	571000
1990	TAC; F = F _{0.1}	480000	525000	16000	606000
1991	TAC; F = F _{0.1}	500000	575000	31000	647000
1992	TAC for both 1992 and 1993	670000	670000	25000	742000
1993	TAC for both 1992 and 1993	670000	730000	18000	805000
1994	No long-term gains in increased F	831000 ***	800000	5000	796000
1995	20% reduction in F	530000	608000	8000	728000
1996	No separate advice	-	422000	11000	529000
1997	No separate advice	-	416000	19000	529000
1998	No separate advice	-	514000	8000	623000
1999	No separate advice	-	520000	0	597000
2000	No separate advice	-	573000	2000	703000
2001	No separate advice	-	630000	1000	694000
2002	No separate advice	-	642000	24000	723000
2003	No separate advice	-	548000	9000	644000
2004	No separate advice	-	500000	11000	615000
2005	No separate advice	-	397000	20000	494000
2006	No separate advice	-	418000	17000	420000
2007	No separate advice	-	472000	8000	519000
2008	No separate advice	-	431000	27000	552000
2009	No separate advice	-	569000	13000	627000
2010	No separate advice	-	^	4000	817000
2011	No separate advice	-	^	8000	920000
2012	No separate advice	-	^	11000	864000
2013	No separate advice	-	^	2000	910000
2014	No separate advice	-	^	6000	1342000
2015	No separate advice	-	^	3000	1161000
2016	No separate advice	-	^	3000	1058000
2017	No separate advice	-	^	3000	1120298
2018	No separate advice	-	^	2372	984775
2019	No separate advice	-	^	6794	792652
2020	No separate advice	-	^	9083	951176
2021	No separate advice	-	^	2855	1041882
2022	No separate advice	-	^		
2023	No separate advice	-			

* TAC for mackerel taken in all divisions and subareas 6, 7, 8.a, 8.b, 8.d, 5.b, 2.a, 3.a, and 4.a.

** Landings and discards of the western component; includes some catches from the North Sea component.

*** Catch at *status quo* F.

^ No internationally agreed TAC.

Table 8 Mackerel in subareas 1–8 and 14, and in Division 9.a. History of ICES advice, the TAC, and ICES estimates of catch for the **North Sea component**. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice*	TAC**	ICES catch
1987	Lowest practical level (LPL)	LPL	55000	3000
1988	Closed areas and seasons; min. landing size; bycatch regulations	LPL	55000	6000
1989	Closed areas and seasons; min. landing size; bycatch regulations	LPL	49200	7000
1990	Closed areas and seasons; min. landing size; bycatch regulations	LPL	45200	10000
1991	Closed areas and seasons; min. landing size; bycatch regulations	LPL	65500	n/a
1992	Closed areas and seasons; min. landing size; bycatch regulations	LPL	76300	n/a
1993	Maximum protection; closed areas and seasons; min. landing size	LPL	83100	n/a
1994	Maximum protection; closed areas and seasons; min. landing size	LPL	95700	n/a
1995	Maximum protection; closed areas and seasons; min. landing size	LPL	76300	n/a
1996	Maximum protection; closed areas and seasons; min. landing size	LPL	52800	n/a
1997	Maximum protection; closed areas and seasons; min. landing size	LPL	52800	n/a
1998	Maximum protection; closed areas and seasons; min. landing size	LPL	62500	n/a
1999	Maximum protection; closed areas and seasons; min. landing size	LPL	62500	n/a
2000	Maximum protection; closed areas and seasons; min. landing size	LPL	69700	n/a
2001	Maximum protection; closed areas and seasons; min. landing size	LPL	71400	n/a
2002	Maximum protection; closed areas and seasons; min. landing size	LPL	72900	n/a
2003	Maximum protection; closed areas and seasons; min. landing size	LPL	62500	n/a
2004	Maximum protection; closed areas and seasons; min. landing size	LPL	57700	n/a
2005	Maximum protection; closed areas and seasons; min. landing size	LPL	44900	n/a
2006	Maximum protection; closed areas and seasons; min. landing size	LPL	47100	n/a
2007	Maximum protection; closed areas and seasons; min. landing size	LPL	53100	n/a
2008	Maximum protection; closed areas and seasons; min. landing size	LPL	48600	n/a
2009	Maximum protection; closed areas and seasons; min. landing size	LPL	63800	n/a
2010	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2011	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2012	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2013	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2014	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2015	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2016	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2017	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2018	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2019	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2020	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2021	Maximum protection; closed areas and seasons; min. landing size	LPL	-	n/a
2022	Maximum protection; closed areas and seasons; min. landing size	LPL	-	
2023	Maximum protection; closed areas and seasons; min. landing size	LPL	-	

LPL = Lowest practical level.

n/a = not available.

* Subarea 4 and Division 3.a.

** TAC for Subarea 4, divisions 3.a and 3.b–d (EU zone), and Division 2.a (EU zone).

Table 9 Mackerel in subareas 1–8 and 14, and in Division 9.a. History of ICES advice, the agreed TAC, and ICES estimates of catch for the **southern component**. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	TAC *	ICES catch
1987	Reduce juvenile exploitation	-	36570	22000
1988	Reduce juvenile exploitation	-	36570	25000
1989	No advice	-	36570	18000
1990	Reduce juvenile exploitation	-	36570	21000
1991	Reduce juvenile exploitation	-	36570	21000
1992	No advice	-	36570	18000
1993	No advice	-	36570	20000
1994	No advice	-	36570	25000
1995	No advice	-	36570	28000
1996	No separate advice	-	30000	34000
1997	No separate advice	-	30000	41000
1998	No separate advice	-	35000	44000
1999	No separate advice	-	35000	44000
2000	No separate advice	-	39200	36000
2001	No separate advice	-	40180	43000
2002	No separate advice	-	41100	50000
2003	No separate advice	-	35000	26000
2004	No separate advice	-	32310	35000
2005	No separate advice	-	24870	50000
2006	No separate advice	-	26180	53000
2007	No separate advice	-	29610	63000
2008	No separate advice	-	27010	60000
2009	No separate advice	-	35830	108000
2010	No separate advice	-	33880	55466
2011	No separate advice	-	37140	28145
2012	No separate advice	-	36740	33240
2013	No separate advice	-	31160	27322
2014	No separate advice	-	56640	57875
2015	No separate advice	-	48140	50869
2016	No separate advice	-	40920	42276
2017	No separate advice	-	46631	36739
2018	No separate advice	-	37305	34279
2019	No separate advice	-	29844	24764
2020	No separate advice	-	38895	37529
2021	No separate advice	-	36306	31928
2022	No separate advice	-		
2023	No separate advice	-		

* Division 8.c, subareas 9 and 10, and CECAF Division 34.1.1 (EU waters only).

History of the catch and landings

Table 10 Mackerel in subareas 1–8 and 14, and in Division 9.a. Landings distribution by fleet and discards, as estimated by ICES.

Catch (2021)	Landings			Discards
	Pelagic trawl 74.6%	Purse-seine 25.1%	Others 0.3%	
1 081 540 tonnes	1 078 411 tonnes			3129 tonnes*

* Only quantified for part of the fisheries.

Table 11 Mackerel in subareas 1–8 and 14, and in Division 9.a. History of commercial catch and landings; the official values are presented by country. All weights are in tonnes. “Misreported” refers to assumed area misreporting between divisions 4.a and 6.a, and “Unallocated” indicates differences between official reported values and ICES estimates.

Country	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Belgium	20	37		125	102	191	351	106	62	114	125	177	146	97	22	2
Denmark	36853	34264	35800	41505	42164	42502	50142	36780	28526	21971	27416	30011	29177	22522	34376	27900
Estonia					616		3302	2286	3741	4422	7356	3595	2673	219		
Faroe Islands	2622	5032	10000	11131	3347	12575	21568	31199	16851	11513	11229	11620	21023	24184	19768	14014
France	10706	14911	19000	6480	962	3836	11573	11782	15663	20916	17835	16367	19445	20956	21878	22906
Germany, Fed. Rep.	16457	22512	21600	14537	13719	13236	26508	24415	16227	15374	21412	19949	22979	25307	26532	24061
Germany, Dem. Rep.		2409														
Greenland																
Guernsey																
Iceland									92	925	357				53	122
Ireland	85800	69980	74300	30138	35088	36982	89028	78534	54313	53129	66650	59675	71233	70452	72172	67355
Jersey																
Latvia					311	4700	1508	389	233							
Lithuania													2085			
Netherlands	28664	31343	38200	69418	82860	89543	44335	35789	36760	23700	30163	28621	32385	36095	33444	30424
Norway	163450	150400	151700	208266	239965	257800	258094	202205	136436	137523	158177	160738	174098	180372	184291	163406
Poland						600				22						
Portugal	4388	3112	3819	2789	3576	2015	2158	2893	3023	2080	2897	2002	2253	3119	2934	2749
Romania							2903									
Spain	21884	16609	17892	22011	17234	20864	27113	29165	33371	46470	44607	45915	38321	44142	50123	23762
Sweden	1003	6601	6400	4227	5100	5934	7099	6285	5307	4714	5146	5233	4994	5098	5232	445
United Kingdom	210815	187760	193900	200019	232829	256275	237841	212147	146205	321821	185948	160152	184902	192631	194045	183008
USSR/Russian Federation	27924	12088	28900	13361	42440	49600	28041	44537	44545	53732	67836	51348	50772	41567	45811	40026
Misreported							109625	18647				-211	4816		6009	
Unallocated	34330	25361	8100	12956	15038		4632	29228	10839	5679	11498	38996	66235	62825	50543	59172
Discards	35576	7090	15600	30750	25000	18380	5370	7721	11415	18864	8030		3832	1188	23774	9481
Total	680492	589509	625211	667713	760351	815033	931194	774108	563610	742969	666682	634545	731459	730774	771007	668833

Table 11 (cont.)

Country	2004	2005	2006	2007	2008	2009	2010*	2011	2012	2013	2014	2015	2016	2017	2018 **	2019 **	2020	2021
Belgium	5	1	3	1	2	3	29	21	39	62	56	52	143	128	168	66	124	110
Denmark	25665	23212	24219	25223	26726	23491	41445	35958	36501	33218	42222	46871	41139	40028	30690	30563	38485	32796
Estonia										1367								
Faroe Islands	13030	9769	12067	13430	11289	14062	70987	122050	107630	143001	150236	108412	93267	99667	81079	62665	69064	105096
France	20266	16338	14953	20038	15602	18340	11379	12766	20467	14643	21719	25704	20189	22950	21471	17869	21878	16442
Germany, Fed. Rep	23244	19040	16608	18221	15502	22703	19055	24083	18944	20931	28456	28257	23411	24858	19883	16904	25030	11996
Germany, Dem. Rep																		
Greenland								62	7402	54148	78581	30351	36142	46388	62973	30241	26577	33360
Guernsey			10					10	5	9	9	4			12	9		
Iceland		363	4222	36706	112286	116160	121008	159263	149282	151235	172960	169333	170374	167366	168330	128077	151534	132109
Ireland	61102	45687	40664	49259	44760	61056	57994	61596	63049	56511	103178	88744	76526	84915	66747	53312	74114	60752
Jersey		9	8	6	7	8	6	7	8	8	7	3	3		3	2	5	
Latvia																		
Lithuania			95	7				23			9598	554	2540				815	6655
Netherlands	27532	22734	24157	24244	19972	23568	23088	28395	25817	21159	46665	39807	37929	43766	30392	22698	30321	24594
Norway	157363	119678	121993	131691	121524	121229	233952	208065	176023	164607	277731	242231	209352	222356	187207	159107	211672	270653
Poland		570	1368	978								24		1	4057	3706	5302	1779
Portugal	2289	1509	2620	2605	2381	1753	4120*	3263*	5691*	5388*	7950*	8295*	6688*	4331*	4565*	3940*	4799	4723
Romania																		
Spain			54136	62946	64637	114074	52737	18725	19386	16414	37806	34530	30036	32885	30036	21112	34307	27783
Sweden	4437	3204	3209	3858	3664	7303	3429	3248	4564	2906	4422	3930	3663	3701	3966	2958	3671	3513
United Kingdom	214771	152801	95815	133688	112394	157010	160417	180972	169745	163807	287851	247986	217638	225409	190028	152146	203716	209876
USSR/Russian Federation	49489	40495	33580	35408	32728	41414	59310	73601	74587	80817	116433	128433	121644	138061	118255	126544	128817	136176
Misreported																		
Unallocated	41335	68414	4954	12453	1069	-139	5271	5961	5237	3336	9457	1876	3480		392			
Discards	19962	25788	26594	15444	37075	15934	13045	10894	15174	4732	6451	10430	5971	2832	2890	7807	9280	3129
Total	660491	549514	481276	586206	621618	737969	877272	948963	899551	938299	140178	121582	110013	115964	102314	839727	103951	108154

* Catch data revised in 2021.

** Catch and discards data revised in 2021.

Table 12 Mackerel in subareas 1–8 and 14, and in Division 9.a. History of catch and landings; the ICES estimates are presented by area. All weights are in tonnes.

Year	Subarea 6			Subarea 7 and divisions 8.a, 8.b, 8.d, and 8.e			Subareas 3 and 4			Subareas 1, 2, 5, and 14			Divisions 8.c and 9.a			Total		
	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch
1969	4800		4800	47404		47404	739175		739175	7		7	42526		42526	833912		833912
1970	3900		3900	72822		72822	322451		322451	163		163	70172		70172	469508		469508
1971	10200		10200	89745		89745	243673		243673	358		358	32942		32942	376918		376918
1972	13000		13000	130280		130280	188599		188599	88		88	29262		29262	361229		361229
1973	52200		52200	144807		144807	326519		326519	21600		21600	25967		25967	571093		571093
1974	64100		64100	207665		207665	298391		298391	6800		6800	30630		30630	607586		607586
1975	64800		64800	395995		395995	263062		263062	34700		34700	25457		25457	784014		784014
1976	67800		67800	420920		420920	305709		305709	10500		10500	23306		23306	828235		828235
1977	74800		74800	259100		259100	259531		259531	1400		1400	25416		25416	620247		620247
1978	151700	15100	166800	355500	35500	391000	148817		148817	4200		4200	25909		25909	686126	50600	736726
1979	203300	20300	223600	398000	39800	437800	152323	500	152823	7000		7000	21932		21932	782555	60600	843155
1980	218700	6000	224700	386100	15600	401700	87931		87931	8300		8300	12280		12280	713311	21600	734911
1981	335100	2500	337600	274300	39800	314100	64172	3216	67388	18700		18700	16688		16688	708960	45516	754476
1982	340400	4100	344500	257800	20800	278600	35033	450	35483	37600		37600	21076		21076	691909	25350	717259
1983	320500	2300	322800	235000	9000	244000	40889	96	40985	49000		49000	14853		14853	660242	11396	671638
1984	306100	1600	307700	161400	10500	171900	43696	202	43898	98222		98222	20208		20208	629626	12302	641928
1985	388140	2735	390875	75043	1800	76843	46790	3656	50446	78000		78000	18111		18111	606084	8191	614275
1986	104100		104100	128499		128499	23309	7431	243740	101000		101000	24789		24789	594697	7431	602128
1987	183700		183700	100300		100300	290829	10789	301618	47000		47000	22187		22187	644016	10789	654805
1988	115600	3100	118700	75600	2700	78300	308550	29766	338316	120404		120404	24772		24772	644926	35566	680492
1989	121300	2600	123900	72900	2300	75200	279410	2190	281600	90488		90488	18321		18321	582419	7090	589509
1990	114800	5800	120600	56300	5500	61800	300800	4300	305100	118700		118700	21311		21311	611911	15600	627511
1991	109500	10700	120200	50500	12800	63300	358700	7200	365900	97800		97800	20683		20683	637183	30700	667883
1992	141906	9620	151526	72153	12400	84553	364184	2980	367164	139062		139062	18046		18046	735351	25000	760351
1993	133497	2670	136167	99828	12790	112618	387838	2720	390558	165973		165973	19720		19720	806856	18180	825036
1994	134338	1390	135728	113088	2830	115918	471247	1150	472397	72309		72309	25043		25043	816025	5370	821395
1995	145626	74	145700	117883	6917	124800	321474	730	322204	135496		135496	27600		27600	748079	7721	755800
1996	129895	255	130150	73351	9773	83124	211451	1387	212838	103376		103376	34123		34123	552196	11415	563611
1997	65044	2240	67284	114719	13817	128536	226680	2807	229487	103598		103598	40708		40708	550749	18864	569613
1998	110141	71	110212	105181	3206	108387	264947	4735	269682	134219		134219	44 164		44164	658652	8012	666664
1999	116362		116362	94290		94290	313014		313014	72848		72848	43796		43796	640311		640311
2000	187595	1	187595	115566	1918	117484	285567	165	304898	92557		92557	36074		36074	736524	2084	738608
2001	143142	83	143142	142890	1081	143971	327200	24	339971	67097		67097	43198		43198	736274	1188	737462
2002	136847	12931	149778	102484	2260	104744	375708	8583	394878	73929		73929	49576		49576	749131	23774	772905
2003	135690	1399	137089	90356	5712	96068	354109	11785	365894	53883		53883	25823	531	26354	659831	19427	679288

Year	Subarea 6			Subarea 7 and divisions 8.a, 8.b, 8.d, and 8.e			Subareas 3 and 4			Subareas 1, 2, 5, and 14			Divisions 8.c and 9.a			Total		
	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch	Land.	Disc.	Catch
2004	134033	1705	134738	103703	5991	109694	306040	11329	317369	62913	9	62922	34840	928	35769	640529	19962	660491
2005	79960	8201	88162	90278	12158	102436	249741	4633	254374	54129		54129	49618	796	50414	523726	25788	549514
2006	88077	6081	94158	66209	8642	74851	200929	8263	209192	46716		46716	52751	3607	56358	454587	26594	481181
2007	110788	2450	113238	71235	7727	78962	253013	4195	257208	72891		72891	62834	1072	63906	570762	15444	586206
2008	76358	21889	98247	73954	5462	79416	227252	8862	236113	148669	112	148781	59859	750	60609	586090	37075	623165
2009	135468	3927	139395	88287	2921	91208	226928	8120	235049	163604		163604	107747	966	108713	722035	15934	737969
2010*	106732	2904	109636	104128	4614	108741	246818	883	247700	355725	5	355729	50826	4640	55466	864229	13045	877272
2011*	160756	1836	162592	51098	5317	56415	301746	1906	303652	398132	28	398160	26337	1807	28144	938070	10894	948963
2012*	121115	952	122067	65728	9701	75429	218400	1089	219489	449325	1	449326	29809	3431	33240	884377	15174	899551
2013*	132062	273	132335	49871	1652	51523	260921	337	261258	465846	15	465861	24867	2455	27322	933567	4732	938299
2014*	180068	340	180408	93709	1402	95111	383887	334	384221	684082	91	684173	53591	4284	57875	1395337	6451	1401788
2015*	134728	30	134757	98563	3155	101718	295877	34	295911	632493	78	632571	43735	7133	50869	1205396	10431	1215827
2016*	206326	200	206526	37300	1927	39227	248041	570	248611	563440	54	563494	39056	3220	42276	1094163	5971	1100135
2017*	225959	151	226110	21128	1992	23119	269404	400	269804	603806	62	603869	36512	227	36739	1156809	2832	1159641
2018*	157239	90	157329	32037	1611	33649	341527	620	342147	455689	51	455740	33761	518	34279	1020254	2890	1023144
2019*	122995	144	123139	32840	5902	38742	307235	812	308047	345019	18	345037	23832	931	24763	831920	7807	839727
2020*	130577	341	130918	48806	8065	56871	456479	732	457211	356985		356985	37386	143	37529	1030233	9280	1039513
2021	146519	117	146635	15901	2524	18425	221019	423	221442	663111		663111	31862	65	31928	1078411	3129	1081540

* Catch data revised in 2021

Table 13 Mackerel in subareas 1–8 and 14, and in Division 9.a. Catches inside and outside the NEAFC Regulatory Area (RA), as estimated by ICES, as well as total catches. Weights are in tonnes.

Year	Inside the NEAFC RA	Outside the NEAFC RA	Total catch	Percentage inside the NEAFC RA
2018	213608	809536	1023144	21%
2019	207200	632527	839727	25%
2020	247901	791612	1039513	24%
2021*	195938	749427	945365	21%

* Without catches from the Russian Federation, as it did not report catches inside/outside the NEAFC RA for 2021. In the past, around 90% of Russian catches were taken inside the NEAFC RA.

Summary of the assessment

Table 14 Mackerel in subareas 1–8 and 14, and in Division 9.a. Assessment summary. Weights are in tonnes and recruitment in thousands.

Year	Recruitment (age 2)			SSB at spawning time			Total catch	F (ages 4–8)		
	Low	Value	High	Low	Value	High		Low	Value	High
1980	741662	2256379	6864651	1931692	4095763	8684237	734950	0.13	0.21	0.33
1981	1483866	3954164	10536946	1908690	3610917	6831242	754045	0.13	0.21	0.33
1982	2251174	4258180	8054508	2034611	3475244	5935937	716987	0.13	0.21	0.32
1983	2476430	4189394	7087228	2412006	3685894	5632577	672283	0.14	0.21	0.31
1984	1048672	1945021	3607518	2800858	3989717	5683201	641928	0.14	0.21	0.31
1985	911867	1761799	3403932	2949017	4015844	5468602	614371	0.15	0.21	0.31
1986	2414771	4075432	6878145	2709488	3608231	4805089	602201	0.15	0.22	0.31
1987	1645418	2713304	4474253	2689623	3575982	4754438	654992	0.16	0.22	0.31
1988	1704717	2668074	4175837	2719049	3526114	4572730	680491	0.17	0.23	0.32
1989	2626296	3859714	5672396	2586241	3297725	4204941	585920	0.18	0.24	0.33
1990	1615372	2352987	3427412	2703312	3381620	4230127	626107	0.19	0.26	0.34
1991	1806495	2640685	3860081	2648612	3278987	4059393	675665	0.21	0.27	0.36
1992	1255408	1959426	3058250	2453803	3005914	3682253	760690	0.22	0.29	0.38
1993	1667703	2400478	3455227	2192074	2665757	3241797	824568	0.24	0.31	0.39
1994	1937535	2792997	4026163	1924591	2323071	2804054	819087	0.25	0.32	0.40
1995	1447844	2068160	2954245	1914732	2290278	2739483	756277	0.25	0.31	0.39
1996	1465444	2062647	2903224	1825764	2174598	2590081	563472	0.25	0.30	0.37
1997	1220370	1738105	2475486	1824264	2144607	2521204	573029	0.24	0.30	0.36
1998	1445736	2299083	3656118	1799608	2120261	2498049	666316	0.25	0.30	0.37
1999	1262250	1918742	2916672	1958221	2301530	2705027	640309	0.27	0.32	0.38
2000	1646261	2242303	3054147	1970480	2266622	2607272	738606	0.29	0.34	0.39
2001	1930231	2565296	3409305	1874159	2147511	2460732	737463	0.32	0.37	0.43
2002	863381	1152032	1537189	1778419	2054100	2372516	771422	0.33	0.39	0.46
2003	3687488	4794496	6233834	1718635	1993516	2312361	679287	0.34	0.41	0.48
2004	5011045	6668900	8875242	2204914	2608232	3085323	660491	0.32	0.38	0.45
2005	1745850	2356809	3181573	2013569	2404435	2871174	549514	0.26	0.31	0.36
2006	2532416	3427824	4639829	1888395	2242585	2663208	481181	0.24	0.28	0.33
2007	3624149	4994825	6883900	2021689	2380749	2803579	586206	0.27	0.31	0.37
2008	3651784	5064453	7023604	2354473	2800351	3330667	623165	0.25	0.30	0.36
2009	2640841	3641939	5022536	2915680	3480016	4153581	737969	0.23	0.27	0.33
2010	2971798	4083427	5610870	3290915	3901258	4624797	877272	0.22	0.26	0.32
2011	2520467	3464819	4762994	3791504	4504765	5352206	948963	0.22	0.26	0.31
2012	4214540	5786958	7946034	3548472	4225513	5031731	899551	0.20	0.24	0.29
2013	4871399	6709016	9239829	3935828	4705814	5626437	938299	0.19	0.24	0.29
2014	2729554	3753792	5162367	4924869	5898500	7064615	1401788	0.20	0.24	0.29
2015	2437757	3352679	4610983	4928398	5928946	7132621	1215827	0.18	0.22	0.27
2016	3652137	5035066	6941658	4638104	5598144	6756902	1100135	0.16	0.20	0.25

Year	Recruitment (age 2)			SSB at spawning time			Total catch	F (ages 4–8)		
	Low	Value	High	Low	Value	High		Low	Value	High
2017	1541675	2141687	2975221	4469022	5404599	6536037	1159641	0.17	0.21	0.25
2018	3434902	4853899	6859101	3859967	4667166	5643167	1023144	0.17	0.21	0.26
2019	2020927	2923019	4227783	3233573	3945436	4814014	839727	0.18	0.22	0.27
2020	1816780	2698510	4008168	2888782	3570188	4412324	1039513	0.23	0.29	0.36
2021	4313470	6801162	10723570	3044947	3891546	4973528	1081540	0.23	0.31	0.40
2022	2148239	4317473	8677141		3769326†					

† Estimated value from the forecast.

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