

9.3.25 Mackerel (*Scomber scombrus*) in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a (Northeast Atlantic)

ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2016 should be no more than 773 842* tonnes.

ICES further advises that the existing measures to protect the North Sea spawning component should remain in place.

Stock development over time

The Spawning Stock Biomass (SSB) is estimated to have increased since the early 2000s and has been above MSY- $B_{trigger}$ since 2009. The Fishing Mortality (F) has been declining since the mid-2000s, but remains above F_{pa} (or F_{msy}). The Recruitment (R) has been overall higher since the early 2000s, with several large year classes in this period.†

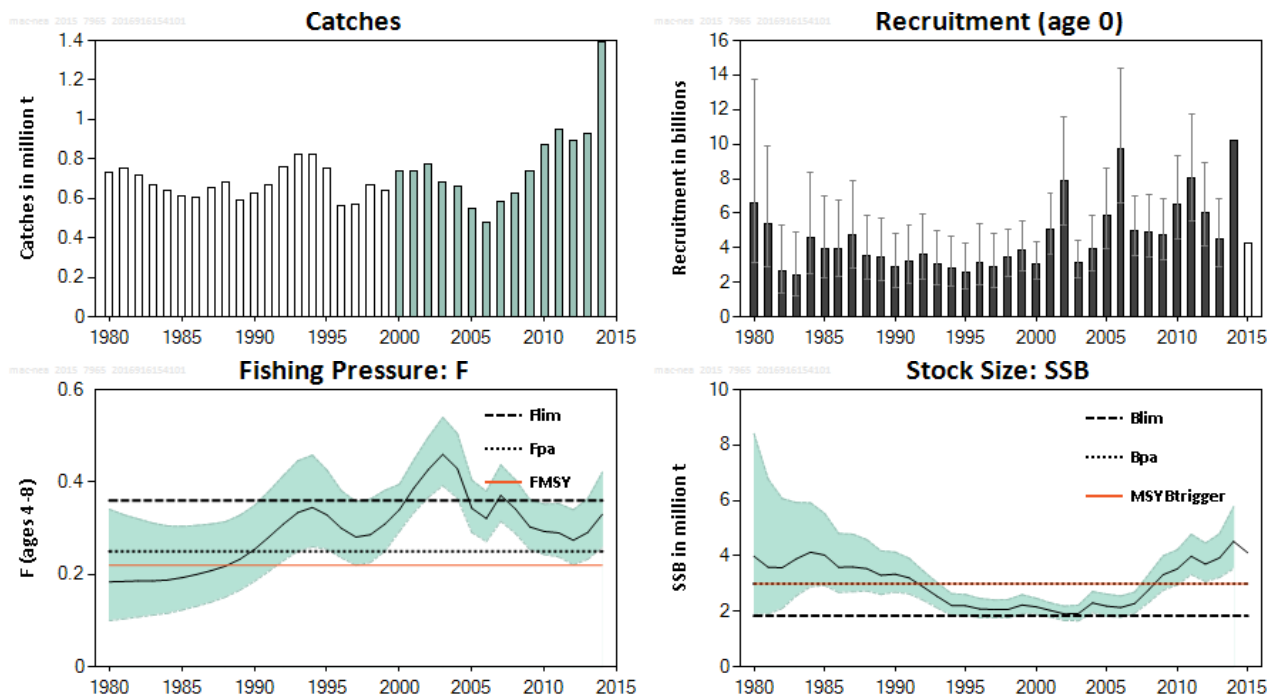


Figure 9.3.25.1 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. Summary of stock assessment. The unshaded catches prior to 2000 are the years that have been down-weighted in the assessment due to the considerable underreporting that is suspected to have taken place. The recruitment value for 2014 is from RCT3 and the unshaded recruitment value for 2015 is the geometric mean of 1990–2013. Confidence intervals (95%) are included in the R, F, and SSB plots.‡

* Version 2: value corrected. The IBTS Recruitment index was used incorrectly in the 2015 mackerel assessment. This advice is based on the corrected 2015 assessment. The correction results in a 14% upwards revision of the SSB value in 2015 and a 3% downwards revision of the F value in 2014 relative to the advice released in September 2015. Applying the MSY approach results in a 16% upwards revision of the catch advice for 2016.

† Version 2: text on recruitment updated to reflect the result of the corrected assessment.

‡ Version 2: plots and legend updated to reflect the corrected assessment.

Stock and exploitation status

Table 9.3.25.1 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size				
		2012	2013	2014		2013	2014	2015		
Maximum sustainable yield	F_{MSY}	✘	✘	✘	Above	MSY	✔	✔	✔	Above trigger
Precautionary approach	F_{pa} , F_{lim}	○	○	○	Increased risk	B_{pa} , B_{lim}	✔	✔	✔	Full reproductive capacity
Management plan	F_{MGT}	-	-	-	Not applicable	SSB_{MGT}	-	-	-	Not applicable

Catch options

Table 9.3.25.2 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. The basis for the catch options.[§]

Variable	Value	Source	Notes
F ages 4–8 (2015)	0.34	ICES (2016)	Based on the assumed catches for 2015
SSB (2015)	4113187 t		Based on the assumed catches for 2015
R_{age0} (2015)	4265024		Geometric mean of the recruitment estimates (1990–2013) in thousands
R_{age0} (2016)	4265024		
R_{age0} (2017)	4265024		
Total catch (2015)	1235608 t	ICES (2015a)	Sum of declared quotas corrected by the interannual transfers

Table 9.3.25.3 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. The catch options.[§]

Rationale	Catch (2016)	F (2016 & 2017)	Basis	SSB (2016) Spawning time	SSB (2017) Spawning time	SSB change*	Catch change**
MSY framework	773842	0.22	F_{MSY}	3800656	3726052	-2%	-37%
Precautionary approach	868150	0.25	F_{pa}	3783286	3638387	-4%	-30%
Zero catch	0	0	$F = 0$	3931353	4468514	14%	-100%
Other options	543846	0.15		3841604	3942485	3%	-56%
	611018	0.17		3829844	3878893	1%	-51%
	709573	0.20		3812295	3786158	-1%	-43%
	741849	0.21		3806470	3755936	-1%	-40%
	805554	0.23		3794854	3696502	-3%	-35%
	836989	0.24		3789064	3667282	-3%	-32%
	899038	0.26		3777520	3609814	-4%	-27%
	929657	0.27		3771765	3581558	-5%	-25%
960009	0.28		3766022	3553616	-6%	-22%	
	1235608	0.38	catch 2016 = catch 2015	3712034	3303038	-11%	0%

Weights in tonnes.

* SSB 2017 relative to SSB 2016.

** Catch in 2016 relative to estimated catches in 2015. There is no internationally agreed TAC for 2015.

Basis of the advice

Table 9.3.25.4 Mackerel in Subareas 1-7 and 14 and Divisions 8.a–e and 9.a. The basis of the advice.

Advice basis	MSY approach.
Management plan	There is currently no agreed long-term management plan for this stock.

[§] Version 2: table values corrected.

Quality of the assessment

The assessment is unstable, which is a source of concern. One major source of concern is the short time series for the IESSNS survey.

The assessment this year is more uncertain than last year, because it is now two years after the last triennial egg survey data point. A new preliminary survey value will be available for next year’s assessment.

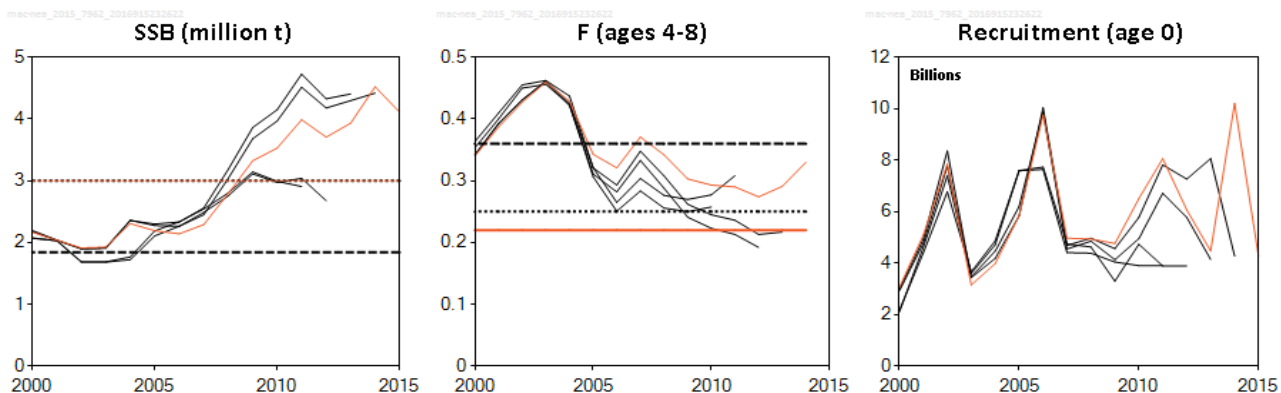


Figure 9.3.25.2 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. Historical assessment results (final-year recruitment estimates included).**

Issues relevant for the advice

Prior to the late 1960s, spawning biomass of North Sea mackerel was estimated to be above 3 million tonnes. Subsequently, overexploitation occurred and recruitment has failed since 1969, leading to a marked decline in the size of the North Sea component. The measures advised by ICES have been aimed at protecting the North Sea spawning component and promoting stock recovery. There was a small increase in the North Sea spawning in 2002; the SSB has remained low (the latest North Sea egg survey data available are from 2015).

Reference points

Table 9.3.25.5 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	3 million t	B_{pa}	ICES (2015c)
	F_{MSY}	0.22	Stochastic simulation.	ICES (2015c)
Precautionary approach	B_{lim}	1.84 million t	B_{loss} in 2002 from 2014 benchmark assessment.	
	B_{pa}	3 million t	$\exp(1.654 \times \sigma) \times B_{lim}$, $\sigma = 0.30$.	ICES (2015c)
	F_{lim}	0.36	The F that on average leads to B_{lim} .	ICES (2015c)
	F_{pa}	0.25	The F that on average leads to B_{pa} .	ICES (2015c)

** Version 2: plots corrected.

Basis of the assessment

Table 9.3.25.6 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. The basis of the assessment.

ICES stock data category	1 (ICES, 2015b).
Assessment type	1.0 age-based analytical model (SAM: ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Catch data, tagging data (1980–2005 recapture year), and three survey indices: SSB index from the triennial egg survey (1992–2013), abundance indices from the IBTS survey (combined Q1 and Q4; age 0, 1998–2014), and from the IESSNS survey (ages 6–11, 2007, 2010–2015). Catches prior to 2000 are given a very low weight in the assessment.
Discards	Discards are known to take place, but are only quantified for part of the fisheries (0.5% in weight in 2014), the proportion of the landings covered cannot be calculated. Discards are considered negligible.
Indicators	None.
Other information	Benchmarked in 2014 (WKPELA; ICES, 2014). A benchmark is planned for 2017.
Working group	Working Group on Widely Distributed Stocks (WGWIDE).

Information from stakeholders

Over the last seven years the pelagic industry has encountered large shoals of mackerel over the entire distribution area which has expanded both south and north. Based upon this observation the industry believes the stock size has greatly increased. This increase in the stock is not confined to one area or observed by one fleet. The industry also sees signs of good recruitment (above average) over the last number of years. Mackerel is also caught in substantial amounts outside of the directed mackerel fishery and in places where it has not been caught in recent years (e.g. during the herring fishery in the North Sea). Danish fishers have reported catches of spawning mackerel in the sandeel fishery.

History of advice, catch, and management

Table 9.3.25.7 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of catch.

Year	ICES advice	Predicted catch corresp. to advice	Total agreed TAC*	Official landings**	Disc.*** & slipping	ICES catch
1987	Given by stock component		442	616	11	655
1988	Given by stock component		610	622	36	680
1989	Given by stock component		532	576	7	590
1990	Given by stock component		562	580	16	628
1991	Given by stock component		612	609	31	668
1992	Given by stock component		707	729	25	760
1993	Given by stock component		767	784	18	825
1994	Given by stock component		837	794	5	821
1995	Given by stock component		645	729	8	756
1996	Significant reduction in F	-	452	509	11	564
1997	Significant reduction in F	-	470	517	19	570
1998	F between 0.15 and 0.2	498	549	627	8	667
1999	F of 0.15 consistent with PA	437	562	585	n/a	640
2000	F = 0.17: F _{pa}	642	612	655	2	738
2001	F = 0.17: F _{pa}	665	670	660	1	737
2002	F = 0.17: F _{pa}	694	683	685	24	773
2003	F = 0.17: F _{pa}	542	583	600	9	670
2004	F = 0.17: F _{pa}	545	532	587	11	650
2005	F = 0.15 to 0.20	[320–420]	422	447	20	543
2006	F = 0.15 to 0.20	[373–487]	444	318^	18	473
2007	F = 0.15 to 0.20	[390–509]	502	558	8	579
2008	F = 0.15 to 0.20	[349–456]	458	420	27	611
2009	F = 0.15 to 0.20	[443–578]	605^^	442	13	735
2010	harvest control rule	[527–572]	885^^^	862	7	869
2011	See scenarios	[529–672]	959^^^	930	9	939
2012	Follow the management plan	[586–639]	927^^^	877	15	893
2013	Follow the management plan	[497–542]	906^^^	927	5	932
2014	Follow the management plan	[927–1011]	1396^^^	1388	6	1393
2015	Follow the management plan	[831–906]	1235^^^			
2016	MSY approach	≤ 773.842 ⁺⁺				

Weights in thousand tonnes.

n/a: not available.

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

*** Data on discards and slipping from only two fleets.

** Updated with ICES FishStat data.

^ Incomplete.

^^ 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.

⁺⁺ Version 2: value corrected.

Table 9.3.25.8 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of catch for the Western component.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	Disc. & slipping	ICES catch**
1987	SSB = 1.5 mill. t; TAC	380	405	11	633
1988	F = $F_{0.1}$; TAC; closed area; landing size	430	573	36	656
1989	Halt SSB decline; TAC	355	495	7	571
1990	TAC; F = $F_{0.1}$	480	525	16	606
1991	TAC; F = $F_{0.1}$	500	575	31	647
1992	TAC for both 1992 and 1993	670	670	25	742
1993	TAC for both 1992 and 1993	670	730	18	805
1994	No long-term gains in increased F	831***	800	5	796
1995	20% reduction in F	530	608	8	728
1996	No separate advice	-	422	11	529
1997	No separate advice	-	416	19	529
1998	No separate advice	-	514	8	623
1999	No separate advice	-	520	0	597
2000	No separate advice	-	573	2	703
2001	No separate advice	-	630	1	694
2002	No separate advice	-	642	24	723
2003	No separate advice	-	548	9	644
2004	No separate advice	-	500	11	615
2005	No separate advice	-	397	20	494
2006	No separate advice	-	418	17	420
2007	No separate advice	-	472	8	519
2008	No separate advice	-	431	27	552
2009	No separate advice	-	569	13	627
2010	No separate advice	-	^	4	817
2011	No separate advice	-	^	8	920
2012	No separate advice	-	^	11	864
2013	No separate advice	-	^	2	910
2014	No separate advice	-	^	6	1342
2015	No separate advice	-	^		
2016	No separate advice	-			

Weights in thousand tonnes.

* TAC for mackerel taken in all Divisions and Subareas 6, 7, 8.a,b,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 9.3.25.9 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of catch for the North Sea component.

Year	ICES advice	Predicted catch corresp. to advice*	Agreed TAC**	ICES catch
1987	Lowest practical level	LPL	55	3
1988	Closed areas and seasons; min. landing size; bycatch regulations	LPL	55	6
1989	Closed areas and seasons; min. landing size; bycatch regulations	LPL	49.2	7
1990	Closed areas and seasons; min. landing size; bycatch regulations	LPL	45.2	10
1991	Closed areas and seasons; min. landing size; bycatch regulations	LPL	65.5	n/a
1992	Closed areas and seasons; min. landing size; bycatch regulations	LPL	76.3	n/a
1993	Maximum protection; closed areas and seasons; min. landing size	LPL	83.1	n/a
1994	Maximum protection; closed areas and seasons; min. landing size	LPL	95.7	n/a
1995	Maximum protection; closed areas and seasons; min. landing size	LPL	76.3	n/a
1996	Maximum protection; closed areas and seasons; min. landing size	LPL	52.8	n/a
1997	Maximum protection; closed areas and seasons; min. landing size	LPL	52.8	n/a
1998	Maximum protection; closed areas and seasons; min. landing size	LPL	62.5	n/a
1999	Maximum protection; closed areas and seasons; min. landing size	LPL	62.5	n/a
2000	Maximum protection; closed areas and seasons; min. landing size	LPL	69.7	n/a
2001	Maximum protection; closed areas and seasons; min. landing size	LPL	71.4	n/a
2002	Maximum protection; closed areas and seasons; min. landing size	LPL	72.9	n/a
2003	Maximum protection; closed areas and seasons; min. landing size	LPL	62.5	n/a
2004	Maximum protection; closed areas and seasons; min. landing size	LPL	57.7	n/a
2005	Maximum protection; closed areas and seasons; min. landing size	LPL	44.9	n/a
2006	Maximum protection; closed areas and seasons; min. landing size	LPL	47.1	n/a
2007	Maximum protection; closed areas and seasons; min. landing size	LPL	53.1	n/a
2008	Maximum protection; closed areas and seasons; min. landing size	LPL	48.6	n/a
2009	Maximum protection; closed areas and seasons; min. landing size	LPL	63.8	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		
2016	Maximum protection; closed areas and seasons; min. landing size	LPL		

Weights in thousand tonnes.

LPL = Lowest Practical Level.

* Subarea IV and Division 3.a.

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

n/a: no information available.

Table 9.3.25.10 Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of catch for the Southern component.

Year	ICES advice	Predicted catch corresp. to advice	Agreed TAC*	ICES catch
1987	Reduce juvenile exploitation	-	36.57	22
1988	Reduce juvenile exploitation	-	36.57	25
1989	No advice	-	36.57	18
1990	Reduce juvenile exploitation	-	36.57	21
1991	Reduce juvenile exploitation	-	36.57	21
1992	No advice	-	36.57	18
1993	No advice	-	36.57	20
1994	No advice	-	36.57	25
1995	No advice	-	36.57	28
1996	No separate advice	-	30.00	34
1997	No separate advice	-	30.00	41
1998	No separate advice	-	35.00	44
1999	No separate advice	-	35.00	44
2000	No separate advice	-	39.20	36
2001	No separate advice	-	40.18	43
2002	No separate advice	-	41.10	50
2003	No separate advice	-	35.00	26
2004	No separate advice	-	32.31	35
2005	No separate advice	-	24.87	50
2006	No separate advice	-	26.18	53
2007	No separate advice	-	29.61	63
2008	No separate advice	-	27.01	60
2009	No separate advice	-	35.83	108
2010	No separate advice	-	33.88	52
2011	No separate advice	-	37.14	19
2012	No separate advice	-	36.74	29
2013	No separate advice	-	31.16	22
2014	No separate advice	-	56.64	51
2015	No separate advice	-		
2016	No separate advice	-		

Weights in thousand tonnes.

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

History of catch and landings

Table 9.3.25.11 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. Catch distribution by fleet in 2014 as estimated by ICES.

Total catch	Landings		Discards
	% pelagic trawl	% purse-seine nets	
1 394 454 t	78%	22%	Are known to take place but are only quantified for part of the fisheries (0.5% in weight in 2014)
	1 388 003 t		

Table 9.3.25.12 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of catch and landings, both the official and ICES estimated values are presented by country (combined Southern, Western, and North Sea spawning components).

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

Table 9.3.25.12 (continued) Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of catch and landings, both the official and ICES estimated values are presented by country (combined Southern, Western, and North Sea spawning components).

Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Belgium	97	22	2	5	1	3	1	2	3	29	21	39	62	56
Denmark	22522	34376	27900	25665	23212	24219	25223	26726	23491	41445	35958	36501	33218	42222
Estonia	219												1367	
Faroe Islands	24184	19768	14014	13030	9769	12067	13430	11289	14062	70987	122050	107630	143001	150236
France	20956	21878	22906	20266	16338	14953	20038	15602	18340	11379	12766	20467	14643	21719
Germany, Fed. Rep.	25307	26532	24061	23244	19040	16608	18221	15502	22703	19055	24083	18944	20931	28456
Germany, Dem. Rep.														
Greenland											62	7402	54148	78581
Guernsey						10					10	5	9	9
Iceland		53	122		363	4222	36706	112286	116160	121008	159263	149282	151235	172960
Ireland	70452	72172	67355	61102	45687	40664	49259	44760	61056	57994	61596	63049	56511	103178
Jersey					9	8	6	7	8	6	7	8	8	7
Latvia														
Lithuania						95	7				23			9598
Netherlands	36095	33444	30424	27532	22734	24157	24244	19972	23568	23088	28395	25817	21159	46665
Norway	180372	184291	163406	157363	119678	121993	131691	121524	121229	233952	208065	176023	164607	277731
Poland					570	1368	978							
Portugal	3119	2934	2749	2289	1509	2620	2605	2381	1753	2363	962	824	254	618
Romania														
Spain	44142	50123	23762			54136	62946	64637	114074	52737	18725	19386	16414	37806
Sweden	5098	5232	445	4437	3204	3209	3858	3664	7303	3429	3248	4564	2906	4422
United Kingdom	192631	194045	183008	214771	152801	95815	133688	1123941	157010	160417	180972	169745	163807	287851
USSR/Russia	41567	45811	40026	49489	40495	33580	35408	32728	41414	59310	73601	74587	80817	116433
Misreported		6009												
Unallocated	62825	50543	59172	41335	68414	4954	12453	1069	-139	5271	5961	5237	3336	9457
Discards	1188	23774	9481	19962	25788	26594	15444	37075	15934	13045	10894	15174	4732	6451
Total	730774	771007	668833	660491	549514	481276	586206	623165	737969	875515	946661	894684	933165	1394454

Table 9.3.25.13 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. History of catch and landings, both the official and ICES estimated values are presented by area.

YEAR	SUBAREA VI			SUBAREA VII AND DIVISIONS VIIIABDE			SUBAREAS III AND IV			SUBAREAS I,II,V AND XIV			DIVISIONS VIII C AND IX A			TOTAL		
	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	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	7670351
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
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	49068	4640	53708	862470	13045	875515
2011	160756	1836	162592	51098	5317	56415	301746	1906	303652	398132	28	398160	24036	1807	25843	935767	10894	946661
2012	121115	952	122067	65728	9701	75429	218400	1089	219489	449325	1	449326	24941	3431	28372	879510	15174	894684
2013	132062	273	132335	49871	1652	51523	260921	337	261258	465714	15	465729	19733	2455	22188	928433	4732	933165
2014	180068	340	180408	93709	1402	95111	383887	334	384221	684082	91	684173	46257	4284	50541	1388003	6451	1394454

Summary of the assessment

Table 9.3.25.14 Mackerel in Subareas 1–7 and 14 and Divisions 8.a–e and 9.a. Assessment summary with weights (in tonnes). **

Year	Recruitment (Age 0)	High	Low	SSB	High	Low	Landings	Discards	Mean F (Ages 4–8)	High	Low
1980	6569840	13728712	3143980	3988796	8406199	1892710	713311	21600	0.184	0.341	0.1
1981	5352102	9870884	2901969	3594804	6773307	1907874	708960	45516	0.185	0.329	0.104
1982	2695246	5313387	1367179	3576875	6067881	2108484	691909	25350	0.186	0.32	0.108
1983	2419327	4944963	1183658	3898101	5926711	2563848	660242	11396	0.186	0.311	0.112
1984	4583622	8387894	2504751	4135009	5916763	2889806	629626	12302	0.188	0.305	0.116
1985	3968902	6973306	2258926	4032915	5537978	2936885	606084	8191	0.193	0.304	0.123
1986	3968902	6780084	2323302	3594804	4811118	2685990	594697	7431	0.2	0.306	0.131
1987	4709065	7899895	2807037	3602001	4787218	2710219	644016	10789	0.208	0.309	0.14
1988	3551924	5871144	2148843	3544827	4588024	2738826	644926	35566	0.218	0.314	0.151
1989	3460764	5726872	2091349	3305175	4184007	2610938	582419	7090	0.233	0.328	0.166
1990	2867640	4865500	1690137	3341733	4141216	2696594	611911	15600	0.254	0.349	0.185
1991	3246214	5338739	1973857	3210701	3915243	2632941	637183	30700	0.281	0.38	0.207
1992	3609212	5953560	2188003	2882014	3454540	2404374	735351	25000	0.309	0.414	0.23
1993	3038881	4988072	1851377	2538287	3034788	2123015	806856	18180	0.334	0.446	0.25
1994	2847637	4649638	1744014	2215525	2639120	1859920	816025	5370	0.345	0.458	0.26
1995	2594748	4264093	1578933	2202272	2608469	1859329	748079	7721	0.329	0.426	0.255
1996	3131429	5388621	1819732	2090680	2468665	1770570	552196	11415	0.3	0.381	0.236
1997	2882014	4806117	1728216	2069878	2414160	1774693	550749	18864	0.281	0.358	0.22
1998	3446949	5047885	2353749	2069878	2425713	1766241	658652	8012	0.286	0.363	0.226
1999	3843908	5545737	2664322	2233320	2601732	1917077	640311	0	0.309	0.382	0.25
2000	3063290	4358158	2153145	2167316	2476290	1896893	736524	2084	0.34	0.395	0.293
2001	5091077	7138263	3631005	2037023	2308499	1797472	736274	1188	0.387	0.448	0.334
2002	7849811	11585212	5318809	1912649	2187413	1672400	749131	23774	0.427	0.497	0.367
2003	3150274	4442732	2233812	1924160	2228341	1661501	659831	19427	0.46	0.54	0.392
2004	3976848	5897387	2681750	2305942	2715031	1958493	640529	19962	0.429	0.505	0.365
2005	5844432	8642997	3952030	2191288	2623878	1830017	523726	25788	0.343	0.404	0.291
2006	9761923	14395986	6619564	2141463	2553665	1795798	454587	26594	0.321	0.38	0.271
2007	4965378	7034379	3504926	2289857	2699335	1942495	570762	15444	0.371	0.437	0.315
2008	4935675	7059607	3450743	2794042	3349354	2330800	586090	37075	0.342	0.405	0.289
2009	4761151	6875672	3296922	3325066	4003846	2761360	722035	15934	0.303	0.362	0.254
2010	6510976	9350122	4533931	3530676	4216998	2956055	862470	13045	0.293	0.352	0.243
2011	8064643	11701177	5558284	3988796	4781993	3327168	935767	10894	0.29	0.353	0.238
2012	6070794	8899984	4140967	3707988	4464081	3079956	877390	14963	0.274	0.34	0.221
2013	4470452	6865641	2910863	3933342	4796975	3225195	927067	4664	0.291	0.364	0.233
2014	10211244*	17091982	6100492	4524420	5775180	3544544	1388003	6451	0.33	0.421	0.259
2015	4265024**			4113187							
Average	4605037	7362411	2926016	3028189	3939535	2332299	702963	16097	0.292	0.381	0.227

Recruitment in thousands.

*RCT3 estimate.

** Geometric mean 1990–2013.

** Version 2: table values corrected.

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^{§§} Version 2: reference added.