ECOREGION **Widely distributed and migratory stocks**
STOCK **Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components)**

Updated advice for 2014

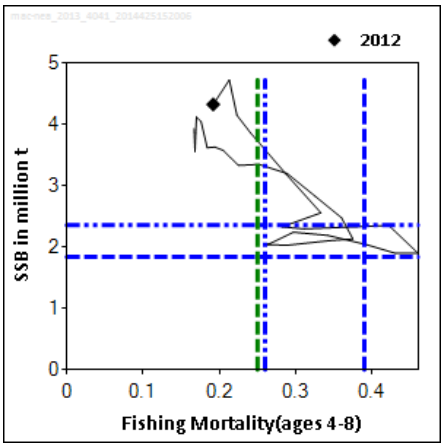
ICES has updated its Autumn 2013 advice and advises on the basis of the Norway, Faroe Islands, and EU management plan that catches in 2014 should be between 927 000 tonnes and 1 011 000 tonnes. ICES recommends that the management plan should be reviewed and possibly revised to reflect the new perception of the stock and the revised precautionary reference points.

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

Stock status

Fishing pressure	2010	2011	2012	
MSY (F_{MSY})	✓	✓	✓	Appropriate
Precautionary approach (F_{pa},F_{lim})	✓	✓	✓	Harvested sustainably
Management plan (F_{MGT})	o	✓	✓	Below target

Stock size	2011	2012	2013	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity
Management plan (SSB_{MGT})	✓	✓	✓	Above trigger



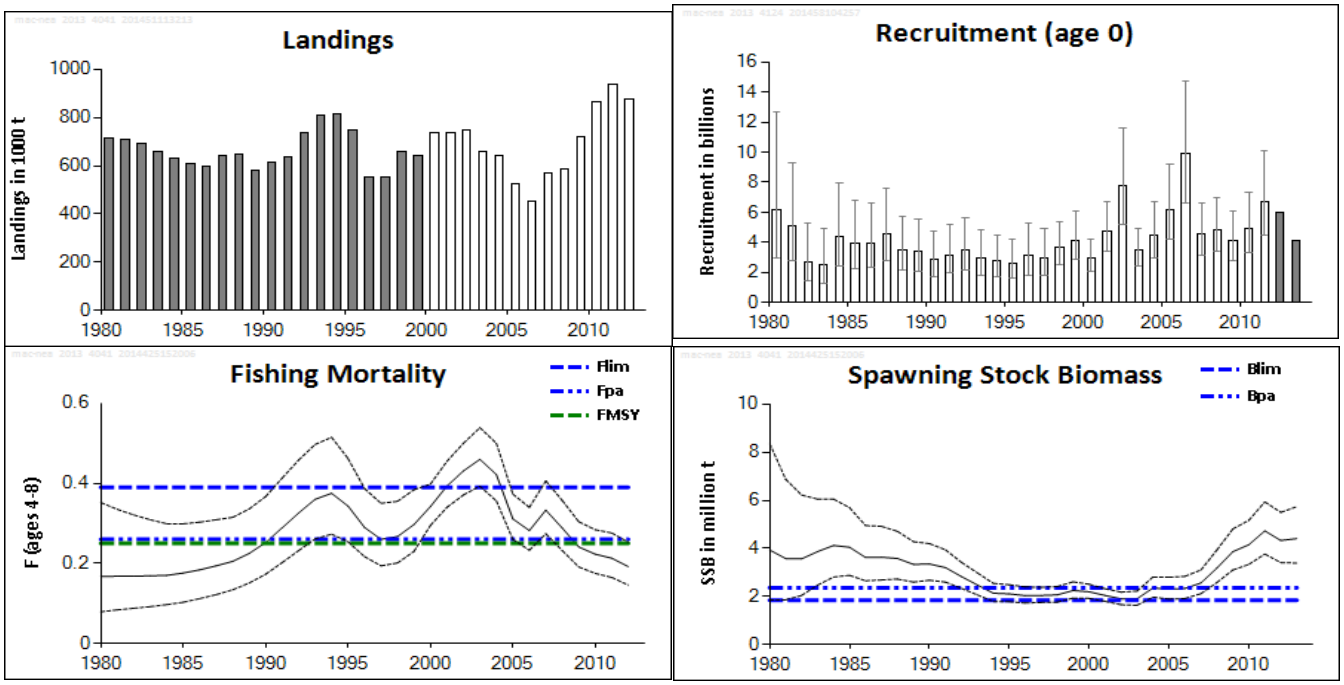


Figure 9.3.17a.1 Mackerel in the Northeast Atlantic. Summary of stock assessment. The shaded landings are the years that have been down-weighted in the assessment due to the considerable underreporting that is suspected to have taken place. The shaded recruitment values are from RCT3 in 2012 and the geometric mean of 1990–2011 for 2013. Bottom: SSB and F over the years. The black dotted lines represent the 95% confidence intervals.

Fishing mortality in 2012 is estimated to be 0.19, below F_{MSY} and F_{pa}. Fishing mortality was above F_{lim} during the early 2000s. SSB has increased considerably since 2002 and remains high, above B_{pa} and MSY $B_{trigger}$. The 2002 and 2006

year classes are the strongest year classes in the time-series. The incoming 2011 year class appears to be above average. There is insufficient information to reliably estimate the size of the 2012 year class in the last year of the assessment time-series and it is replaced by an RCT3 estimate.

Management plan

A management plan was agreed by Norway, Faroe Islands, and the EU in October 2008. ICES has evaluated the plan and concluded that it was precautionary (ICES, 2008). However, since 2009, there has been no international agreement on TAC. Advising according to new assessment using the management plan is still considered precautionary, even though the plan may no longer result in a long-term maximization of the yield. EU, Norway, and the Faroes have approached ICES with a draft request on a long-term management plan evaluation. ICES is currently organizing an evaluation.

Biology

Northeast Atlantic (NEA) mackerel is assessed as one stock, but comprises three spawning components: the combined southern and western components and a separate North Sea spawning component. Only the North Sea component is sufficiently distinct to be clearly identified as a separate spawning component.

Environmental influence on the stock

Catch and survey data from recent years indicate that the stock has expanded northwestwards during spawning and the summer feeding migration. This distributional change may reflect changes in food availability and may be linked to increased water temperature, and/or increased stock size.

The fisheries

Traditionally, the fishing areas with higher catches of mackerel have been in the northern North Sea (along the border of Divisions IVa and IIa), around the Shetland Islands, and off the west coast of Scotland and Ireland. The southern fishery off Spain's northern coast has also accounted for significant catches. In recent years, significant catches have also been taken in Icelandic and Faroese waters, areas where almost no catches were reported prior to 2008. In 2012, catches in this area constituted approximately half of the total reported landings. Catches from Greenland were reported for the first time in 2011, and have increased in 2012. In the Icelandic and Faroese fisheries, in the northwestern part of the distribution area, mackerel are caught together with herring. In the southern part of the distribution area, Atlantic mackerel (*Scomber scombrus*) can be caught together with Spanish mackerel (*Scomber colias*). Catches of both species are reported separately.

Catch distribution: Total catch (2012) = 893 kt, where ~98.3% are landings (pelagic trawls, purse-seine nets, and handlines) and 1.7% discards (the latter is only available from a limited number of fleets and considered to be an underestimate).

Effects of the fisheries on the ecosystem

There is relatively little bycatch of non-target species in the mackerel fishery, which tends to operate with pelagic trawl gear, purse-seine nets, and handlines.

Quality considerations

The assessment conducted in 2013 was not accepted for use in management due to the effect of highly uncertain catch information prior to 2000. The assessment was benchmarked in 2014 and new assessment models were evaluated to account for uncertainty in historical catches. The assessment now uses an analytical age-based assessment model (SAM) including new tuning series in addition to the egg survey index which provides an index of SSB. Age-disaggregated abundance indices are derived from the International Bottom Trawl Survey (IBTS) (age 0) and International Ecosystem Summer Survey in the Nordic Seas (IESSNS) (age 6+). The model also incorporates tagging and recapture data for fish tagged at age 2 and older.

Due to the lack of data for the years prior to 1992 (first egg survey point), the abundance and fishing mortality estimates for these years are more uncertain than those from later years (Figure 9.3.17a.1), and therefore are not used to give reference points or catch advice.

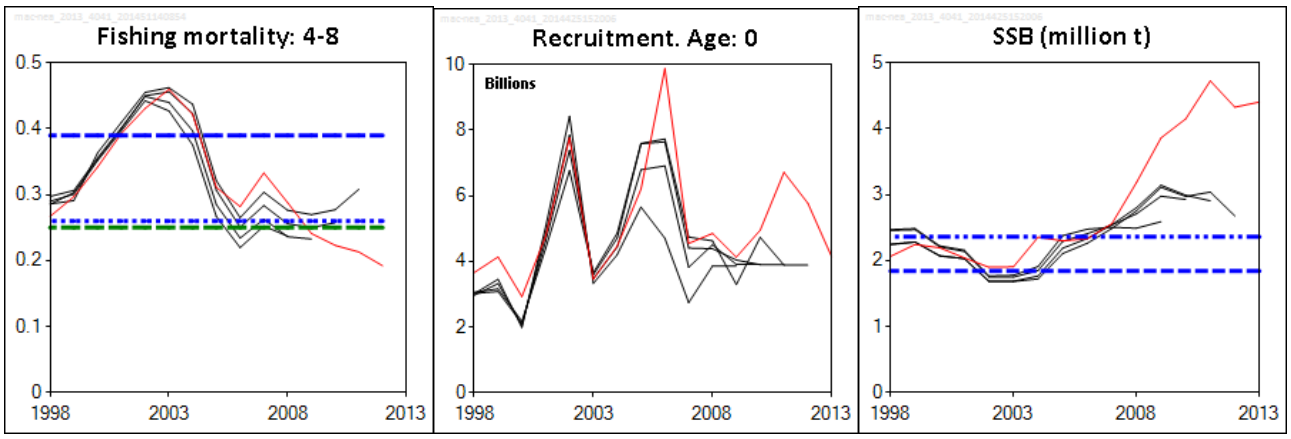


Figure 9.3.17a.2 Mackerel in the Northeast Atlantic. Historical assessment results (final-year recruitment estimates included). Horizontal lines represent reference points.

Scientific basis	
Stock data category	1 (ICES, 2014a).
Assessment type	1.0 Age-based analytical model (SAM).
Input data	Catch data, tagging data, and three survey indices: SSB index from triennial egg survey (1992–2013), age disaggregated abundance indices from IBTS survey (age 0, 1998–2012) for R in terminal year using RCT3 and from the IESSNS survey (age 6+, 2007, 2010–2013). Landings prior to 2000 are considered to be underestimated.
Discards	Discards data (since 1980) are included in the assessment, but are considered to be underestimated.
Indicators	None.
Other information	Spanish and French acoustic surveys and Radio Frequency Identification RFID tagging information.
Working group report	Working Group on Widely Distributed Stocks (WGWIDE, ICES, 2014b).

ECOREGION **Widely distributed and migratory stocks**
STOCK **Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components)**

Reference points

	Type	*Value*	*Technical basis*
Management plan	$SSB_{trigger}$	2.2 million t	Medium-term simulations conducted in 2008. **Revision required[1].**
	F_{target}	0.20–0.22	Medium-term simulations conducted in 2008. **Revision required[1].**
MSY approach	MSY $B_{trigger}$	2.36 million t	Proxy based on B_{pa}. **Revision required[2].**
	F_{MSY}	0.25	Stochastic simulation conducted at benchmark assessment in 2014.
Precautionary approach	B_{lim}	1.84 million t	B_{loss} in 2002 from 2014 benchmark assessment.
	B_{pa}	2.36 million t	$\exp(1.654*\sigma)*B_{lim}$, $\sigma = 0.15$.
	F_{lim}	0.39	F_{loss}, the F that on average leads to B_{lim}.
	F_{pa}	0.26	F that on average leads to B_{pa}.

(Last changed in: 2014)
[1] Under evaluation.
[2] To be revised at WGWIDE after the management plan evaluation.

Outlook for 2014

Basis: F (2013) = 0.188 (catch constraint); SSB (2013)[1] = 4 408; R (2012) = RCT3 = 6 009 598 millions; Catch (2013) = 895 (See *Additional considerations)*.
R (2013–2015) = GM (1990–2011) = 4 140 086 millions.

Rationale	Catch (2014)	F (2014 & 2015)	Basis	SSB (2014) Spawning time	SSB (2015) Spawning time	SSB change[2]	TAC change[3,4]
Management plan	1 011	0.22	F(management plan upper boundary) 0.22	4.652	4.378	−6%	13%
	969	0.21	F(management plan mid-point) 0.21	4.661	4.418	−5%	8%
	927	0.20	F(management plan lower boundary) 0.20	4.669	4.459	−4%	4%
MSY framework	1 134	0.25	F_{MSY}	4.628	4.261	−8%	27%
Precautionary approach	1 174	0.26	F_{pa}	4.62	4.223	−9%	31%
Zero catch	0	0	F = 0	4.838	5.371	11%	−100%
Other options	895	0.193	catch 2014 = catch 2013	4.675	4.489	−4%	0%
	1 240	0.277	EU–Norway–Faroes agreed quotas[5]	4.606	4.161	−10%	39%
	1 294	0.290	Declared quotas[6]	4.595	4.109	−11%	45%

Weights in thousand tonnes.
1) SSB at spawning time (early May).
2) SSB 2015 relative to SSB 2014.
3) TAC in 2014 relative to estimated catches in 2013.
4) There is no internationally agreed TAC for 2013.
5) Sum of EU, Faroes, Norway, and NEAFC quotas + the 15.6% set aside as Coastal States reserve.
6) Declared quotas EU, Faroes, Island, Norway, and Greenland, excluding unknown uptake on NEAFC quota.

Management plan

A management plan was agreed by Norway, Faroe Islands, and the EU in October 2008. ICES has evaluated the plan and concluded that it was precautionary (ICES, 2008). Advising according to new assessment using the management plan is still considered precautionary, even though the plan may no longer result in a long-term maximization of the yield.. The plan implies a TAC between 927 000 and 1 011 000 tonnes in 2014. This corresponds to a catch increase between 4% and 13% compared to the estimated catches in 2013. Such a TAC would lead to an estimated SSB in 2015 between 4.459 and 4.378 million tonnes. EU, Norway, and the Faroes have approached ICES with a draft request on a long-term management plan evaluation. ICES is currently organizing an evaluation.

MSY approach

Following the ICES MSY framework implies that fishing mortality can be increased to 0.25 (F_{MSY}), resulting in a total catch of 1 134 000 tonnes in 2014. This would lead to an estimated SSB in 2015 of 4.261 million tonnes. Because F is currently below F_{MSY}, following the transition scheme towards the ICES MSY Harvest Control would result in fishing at F_{MSY}.

Precautionary approach

Following the precautionary approach (PA) implies that fishing mortality in 2014 should be no higher than F_{pa} (F = 0.26), corresponding to a total catch of 1 174 000 tonnes in 2014. SSB in 2015 would remain above B_{pa}.

Additional considerations

Management considerations

The quotas below were all set prior to the availability of ICES advice based on the 2014 benchmark assessment. EU, Norway, and the Faroe Islands have agreed on a TAC of 1.24 million tonnes for 2014, of which 1 046 560 tonnes is reserved for the three parties. Greenland has declared a catch limit of 100 000 tonnes in its waters, and Iceland a catch limit of 147 721 tonnes for its fisheries. Further significant catches can also be assumed to be taken by Russia. ICES notes that both the agreed TAC and the sum of the declared catch limits exceed the advised fishing mortality based on F_{MSY} (F_{MSY} = 0.25) as well as the precautionary limit for F (F_{pa} = 0.26).

Uncertainties in the assessment and forecast

The period of uncertain catches is now accounted for in the new assessment and this means that the estimates of stock development (SSB and F) are more uncertain in the past than they are recently. The new assessment model is considered to give reliable information on the state of the stock and provides estimates of uncertainty in all stock parameters (see Figure 9.3.17a.1). The precision on F, SSB, and R in the most recent year is 25%, 28%, and 57%, respectively. Although uncertainty in the final-year estimates of population numbers is available, the forecast is still deterministic, and therefore this assessment uncertainty is not accounted for in the projected values. Further sources of uncertainty in the forecasts stem from the estimates of 2013 catch, the weights-at-age of fish in 2013, and the numbers of 0-year-old fish based on means over some years, and the 1-year-old fish that are based on an IBTS 0-group index and RCT3 proceedure.

Tagging data, including recaptures from 1980 up to 2005, are used in the assessment. Changes in the scanning and/or tagging methodology after 2005 have created unresolved problems interpreting the tag information for this latest period. ICES (2014a) recommends further investigation of the quality of these data since 2005.

The fishery

Mackerel is mainly exploited in a directed fishery for human consumption. This fishery tends to target bigger fish and there is evidence of discarding of smaller, less marketable fish.

Data and methods

This assessment includes catch numbers-at-age for the period 1980–2012, triennial mackerel egg survey estimates of SSB from 1992 to 2013, age-disaggregated area-standardized abundance indices from the International Ecosystem Summer Survey in the Nordic Seas (IESSNS) (2007, 2010–2013), tagging–recapture time-series (1980–2005), and a recruitment index (age 0) with time-series between 1998 and 2012 which is used with RCT3 to estimate age 1 in the final year of the assessment.

Limited sampling for discards has been carried out since 2000, despite a formal requirement initiated in the EU in

2002. Estimating the discarded and slipped proportions of catch is problematic in pelagic fisheries due to high variability in discard and slipping practices. In some fleets no sampling for discards is carried out, including those fleets for which discarding is illegal. The discards included in the catch in the assessment are an underestimate.

Information from the fishing industry

Over the last five 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 one fleet. The industry also sees signs of good recruitment (above average) over the last number of years, particularly in 2009, 2010, and 2011. The widespread distribution of the stock over the entire area sometimes creates problems with unwanted bycatches for some fleets targeting species other than mackerel. Stakeholders are actively seeking mechanisms that would include additional data collected by the fishing industry into the assessment, and are involved in a number of pilot projects in this regard. Industry has scaled up its participation in the mackerel RFID tagging project: processing plants in Denmark, Iceland, Ireland, and Scotland are now equipped to read mackerel tags, in addition to the existing tag reading facilities in Norway.

The industry expresses its concerns that reports from processors show that oil content and the average individual size of mackerel has decreased during the last years. The industry urges ICES to look into these changes and to consider if it is caused by density-dependent competion within the stock.

Comparison with previous assessment and advice

The last analytical assessment for NEA mackerel stock was carried out in 2012 (ICES, 2012). Compared to results of that assessment, the perception of the stock has changed. SSB from the 2014 benchmark is now estimated to have varied between 2 million tonnes in the late 1990s and early 2000s and 5 million tonnes in the recent years (Figure 9.3.17a.2), compared to 1.6 million tonnes and 3 million tonnes in the 2012 assessment.

The previous assessment in 2013 (based on trends in the egg survey) suggested that SSB was increasing, but that exploitation was unknown. Thus, the original catch advice for 2014 (September 2013) was based on the average catch in 2010–2012, corresponding to 889 886 t. The 2014 benchmark assessment also indicates that SSB is increasing and that F is decreasing and is now below F_{MSY}. Based on this new information on the state of the stock and exploitation rate, the current advice is for an increased catch of between 927 000 tonnes and 1 011 000 tonnes, representing an increase of 4% and 14%, respectively, compared to the originally recommended catch.

Sources

ICES. 2008. European Commission (EC) request on evaluation of management plan for NEA mackerel. In Report of the ICES Advisory Committee, 2008. ICES Advice 2008, Book 9, Section 9.3.2.1.

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ICES. 2014a. Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1.

ICES. 2014b. Report of the Benchmark Workshop on Pelagic Stocks (WKPELA). ICES CM 2014/ACOM: 43.

ICES. 2014c. Report of the WGWIDE subgroup for updated Mackerel advice for 2014, April 2014, by correspondence. ICES CM 2014/ACOM:48. 40 pp.

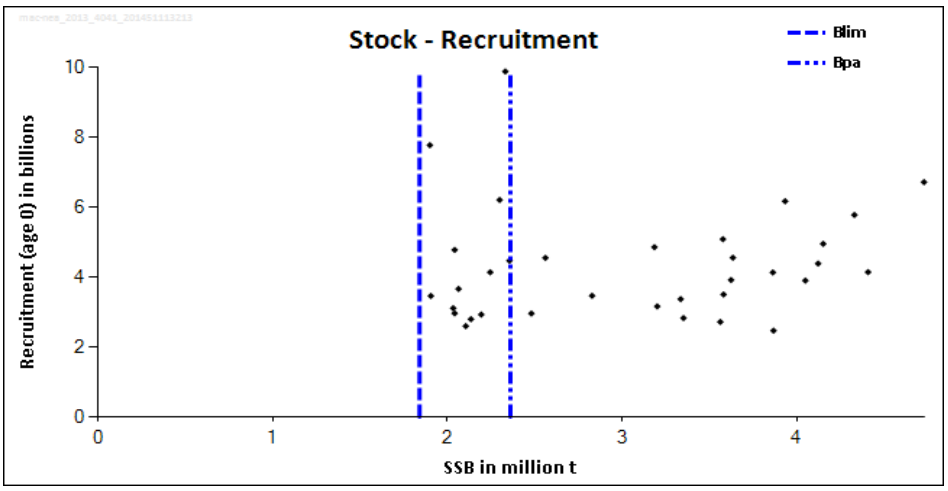

Figure 9.3.17a.3 Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components). Stock–recruitment plot.

Table 9.3.17a.1 Mackerel in the Northeast Atlantic. Advice, management, and catch data for the combined area.

Year	ICES Advice	Predicted catch corresp. to advice	Total agreed TAC[3]	Official landings[5]	Disc.[1] slip	ICES catch[2,4]
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[6]	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[7]	442	13	735
2010	harvest control rule	[527–572]	885[8]	862	7	869
2011	See scenarios	529–672	959[8]	930	9	939
2012	Follow the management plan	[586–639]	927[8]	877	15	893
2013	Follow the management plan	[497–542]	906[8]			
2014[9]	Follow the management plan	[927-1011]				

Weights in thousand tonnes.
[1]Data on discards and slipping from only two fleets.
[2]Landings and discards from Divisions and Subareas IIa, IIIa, IV, V, VI, VII, VIII, and IXa.
[3]For all areas, except some catches in international waters in Subarea II.
[4]Catches updated in 2003 with revisions from SGDRAMA in 2002.
[5] Updated with ICES FishStats data.
[6] Incomplete.
[7] Does not include the unilateral Norway/Faroe Islands TAC first declared in 2009, nor the Icelandic quota.
[8] No internationally agreed quotas. Values presented are the sum of unilateral quotas.
[9] Updated advice for 2014 provided in May 2014 .

Table 9.3.17a.2 Mackerel in the Northeast Atlantic. Advice, management, and catch data for the **Western component**.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC[1]	Disc. slip	ICES catch[2,4]
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[3]	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[5]	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	-	---[6]	4	817
2011	No separate advice	-	---[6]	8	920
2012	No separate advice	-	---[6]	11	864
2013	No separate advice	-	---[6]		
2014	No separate advice	-			

Weights in thousand tonnes.
[1]TAC for mackerel taken in all Divisions and Subareas VI, VII, VIIIa,b,d, Vb, IIa, IIIa, and IVa.
[2]Landings and discards of the Western component; includes some catches from the North Sea component.
[3]Catch at *status quo* F.
[4]Catches updated in 2003 with revisions from SGDRAMA in 2002.
[5]Revised from previous year (was 392).
[6] No internationally agreed TAC.

Table 9.3.17a.3 Mackerel in the Northeast Atlantic. Advice, management, and catch data for the **North Sea component.**

Year	ICES Advice	Predicted catch corresp. to advice[1]	Agreed TAC[2]	ICES catch[3]
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	-[4]
1992	Closed areas and seasons; min. landing size; bycatch regulations	LPL	76.3	-[4]
1993	Maximum protection; closed areas and seasons; min landing size	LPL	83.1	-[4]
1994	Maximum protection; closed areas and seasons; min landing size	LPL	95.7	-[4]
1995	Maximum protection; closed areas and seasons; min landing size	LPL	76.3	-[4]
1996	Maximum protection; closed areas and seasons; min landing size	LPL	52.8	-[4]
1997	Maximum protection; closed areas and seasons; min landing size	LPL	52.8	-[4]
1998	Maximum protection; closed areas and seasons; min landing size	LPL	62.5	-[4]
1999	Maximum protection; closed areas and seasons; min landing size	LPL	62.5	-[4]
2000	Maximum protection; closed areas and seasons; min landing size	LPL	69.7	-[4]
2001	Maximum protection; closed areas and seasons; min landing size	LPL	71.4	-[4]
2002	Maximum protection; closed areas and seasons; min landing size	LPL	72.9	-[4]
2003	Maximum protection; closed areas and seasons; min landing size	LPL	62.5	-[4]
2004	Maximum protection; closed areas and seasons; min landing size	LPL	57.7	-[4]
2005	Maximum protection; closed areas and seasons; min landing size	LPL	44.9	-[4]
2006	Maximum protection; closed areas and seasons; min landing size	LPL	47.1	-[4]
2007	Maximum protection; closed areas and seasons; min landing size	LPL	53.1	-[4]
2008	Maximum protection; closed areas and seasons; min landing size	LPL	48.6	-[4]
2009	Maximum protection; closed areas and seasons; min landing size	LPL	63.8	-[4]
2010	Maximum protection; closed areas and seasons; min landing size	LPL	-	-[4]
2011	Maximum protection; closed areas and seasons; min landing size	LPL	-	-[4]
2012	Maximum protection; closed areas and seasons; min landing size	LPL	-	-[4]
2013	Maximum protection; closed areas and seasons; min landing size	LPL	-	-[4]
2014	Maximum protection; closed areas and seasons; min landing size	LPL	-	

Weights in thousand tonnes.
[1]Subarea IV and Division IIIa.
[2]TAC for Subarea IV, Divisions IIIa, IIIb,c,d (EU zone), and Division IIa (EU zone).
[3]Estimated landings of the North Sea component.
[4]No information.
LPL = Lowest Practical Level.

Table 9.3.17a.4 Mackerel in the Northeast Atlantic. Advice, management, and catch data for the **Southern component**.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC[1]	ICES Catch[2]
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	
2014	No separate advice	-		

Weights in thousand tonnes.
[1]Division VIIIc, Subareas IX and X, and CECAF Division 34.1.1 (EU waters only).
[2]Catches updated in 2003 with revisions from SGDRAMA in 2002.

Table 9.3.17a.5a Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components). Catches (in tonnes) by country 1988–2012 (data submitted by Working Group members).

Country	1	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Belgium	20	37		125	102	191	351	106	62	114	125	177	146	97
Denmark	36	34264	35800	41505	42164	42502	50145	36780	28526	21971	27416	30011	29177	22522
Estonia					616		3302	2286	3741	4422	7356	3595	2673	219
Faroe Islands	2	5032	10000	11131	3347	12575	21568	31199	16851	11513	11229	11620	21023	24184
France	10	14911	19000	6480	962	3836	11573	11782	15663	20916	17835	16367	19445	20956
Germany, Fed. Rep.	16	22512	21600	14537	13719	13236	26508	24415	16227	15374	21412	19949	22979	25307
Germany, Dem. Rep.		2409												
Guernsey														
Iceland									92	925	357	357		
Ireland	85800	69980	74300	30138	35088	36982	89028	78534	54313	53129	66650	59675	71233	70452
Jersey														
Latvia					311	4700	1508	389	233					
Lithuania													2085	
Netherlands	28664	31343	38200	69418	82860	89543	44335	35789	36760	23700	30163	28621	32385	36095
Norway	163450	150400	151700	208266	239965	257800	258094	202205	136436	137523	158177	160738	174098	180372
Poland						600				22				
Portugal	4388	3112	3819	2789	3576	2015	2158	2893	3023	2080	2897	2002	2253	3119
Romania							2903							
Spain	21884	16609	17892	22011	17234	20864	27113	29165	33371	46470	44607	45915	38321	44142
Sweden	1003	6601	6400	4227	5100	5934	7099	6285	5307	4714	5146	5233	4994	5098
United Kingdom	210815	187760	193900	200019	232829	256275	237841	212147	146205	321821	185948	160152	184902	192631
Russia/USSR	27924	12088	28900	13361	42440	49600	28041	44537	44545	53732	67836	51348	50772	41567
Misreported							109625	18647				−211	4816	
Unallocated	34330	25361	8100	12956	15038		4632	29228	10839	5679	11498	38996	66325	62825
Discards	35576	7090	15600	30750	25000	18380	5370	7721	11415	18864	8030		3832	1188
Total	680492	589509	625211	667713	760351	815033	931194	774108	563610	742969	666682	634545	731459	730774

Table 9.3.17a.5b Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components). Catches (in tonnes) by country 1988–2012 (cont.) (data submitted by Working Group members).

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Belgium	22	2	5	1	3	1	2	3	29	21	39
Denmark	34376	27900	25665	23212	24219	25223	26726	23491	41445	35958	36501
Estonia											
Faroe Islands	19768	14014	13029	9769	12067	13429	11289	14062	70987	122050	107630
France	21878	22906	20266	16338	14953	20038	15602	18340	11379	12766	20467
Germany, Fed.	26532	24061	23244	19040	16608	18221	15502	22703	19055	24083	18944
Germany, Dem. Rep.											
Greenland										62	528
Guernsey					10					10	5
Iceland	53	122		363	4222	36706	112286	116160	121008	159263	149282
Ireland	72172	67355	61102	45687	40664	49260	44759	61056	57994	61596	63049
Jersey				9	8	6	7	8	6	7	
Latvia											
Lithuania					95	7				23	
Netherlands	33444	30424	27532	25127	24157	24234	19972	23568	23089	28395	25817
Norway	184291	163406	157364	119678	121993	131691	121524	121229	233952	208065	176023
Poland				570		978					
Portugal	2934	2749	2289	1509	2620	2605	2381	1753	2363	962	824
Romania											
Spain	50123	23762	34455	52753	54136	62946	64648	114074	52845	18725	24623
Sweden	5232	445	4437	3204	3209	3858	3664	7303	3428	3249	4564
United Kingdom	194045	183008	174730	152801	95815	133688	112149	157010	160403	180971	169734
Russia/USSR (Russia from	45811	40026	49489	40495	33580	35408	32728	41414	59292	73601	74587
Misreported	6009		31								
Unallocated	50543	59172	46596	13171	4954	12453	1069	−139	5163		5236
Discards	23774	9481	10972	19760	17970	8615	26766	12854	6977	9012	15380
Total	771007	668833	651206	543487	471283	579367	611074	734889	880671	938819	892762

Table 9.3.17a.6 Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components). Catches by area. Discards not estimated prior to 1978 (data submitted by Working Group members).

Year	Subarea VI			Subarea VII and Divisions VIIIab de			Subarea III[1] and IV			Subarea I,II,V and XIV[2]			Divisions VIIIc and IXa			Total		
	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch	Ldg	Disc	Catch
1969	4,800		4,800	47,404		47,404	739,175		739,175	7		7	42,526		42,526	833,912		833,912
1970	3,900		3,900	72,822		72,822	322,451		322,451	163		163	70,172		70,172	469,508		469,508
1971	10,200		10,200	89,745		89,745	243,673		243,673	358		358	32,942		32,942	376,918		376,918
1972	13,000		13,000	130,280		130,280	188,599		188,599	88		88	29,262		29,262	361,229		361,229
1973	52,200		52,200	144,807		144,807	326,519		326,519	21,600		21,600	25,967		25,967	571,093		571,093
1974	64,100		64,100	207,665		207,665	298,391		298,391	6,800		6,800	30,630		30,630	607,586		607,586
1975	64,800		64,800	395,995		395,995	263,062		263,062	34,700		34,700	25,457		25,457	784,014		784,014
1976	67,800		67,800	420,920		420,920	305,709		305,709	10,500		10,500	23,306		23,306	828,235		828,235
1977	74,800		74,800	259,100		259,100	259,531		259,531	1,400		1,400	25,416		25,416	620,247		620,247
1978	151,700	15,100	166,800	355,500	35,500	391,000	148,817		148,817	4,200		4,200	25,909		25,909	686,126	50,600	736,726
1979	203,300	20,300	223,600	398,000	39,800	437,800	152,323	500	152,823	7,000		7,000	21,932		21,932	782,555	60,600	843,155
1980	218,700	6,000	224,700	386,100	15,600	401,700	87,931		87,931	8,300		8,300	12,280		12,280	713,311	21,600	734,911
1981	335,100	2,500	337,600	274,300	39,800	314,100	64,172	3,216	67,388	18,700		18,700	16,688		16,688	708,960	45,516	754,476
1982	340,400	4,100	344,500	257,800	20,800	278,600	35,033	450	35,483	37,600		37,600	21,076		21,076	691,909	25,350	717,259
1983	320,500	2,300	322,800	235,000	9,000	244,000	40,889	96	40,985	49,000		49,000	14,853		14,853	660,242	11,396	671,638
1984	306,100	1,600	307,700	161,400	10,500	171,900	43,696	202	43,898	98,222		98,222	20,208		20,208	629,626	12,302	641,928
1985	388,140	2,735	390,875	75,043	1,800	76,843	46,790	3,656	50,446	78,000		78,000	18,111		18,111	606,084	8,191	614,275
1986	104,100		104,100	128,499		128,499	236,309	7,431	243,740	101,000		101,000	24,789		24,789	594,697	7,431	602,128
1987	183,700		183,700	100,300		100,300	290,829	10,789	301,618	47,000		47,000	22,187		22,187	644,016	10,789	654,805
1988	115,600	3,100	118,700	75,600	2,700	78,300	308,550	29,766	338,316	120,404		120,404	24,772		24,772	644,926	35,566	680,492
1989	121,300	2,600	123,900	72,900	2,300	75,200	279,410	2,190	281,600	90,488		90,488	18,321		18,321	582,419	7,090	589,509
1990	114,800	5,800	120,600	56,300	5,500	61,800	300,800	4,300	305,100	118,700		118,700	21,311		21,311	611,911	15,600	627,511
1991	109,500	10,700	120,200	50,500	12,800	63,300	358,700	7,200	365,900	97,800		97,800	20,683		20,683	637,183	30,700	667,883
1992	141,906	9,620	151,526	72,153	12,400	84,553	364,184	2,980	367,164	139,062		139,062	18,046		18,046	735,351	25,000	760,351
1993	133,497	2,670	136,167	99,828	12,790	112,618	387,838	2,720	390,558	165,973		165,973	19,720		19,720	806,856	18,180	825,036
1994	134,338	1,390	135,728	113,088	2,830	115,918	471,247	1,150	472,397	72,309		72,309	25,043		25,043	816,025	5,370	821,395
1995	145,626	74	145,700	117,883	6,917	124,800	321,474	730	322,204	135,496		135,496	27,600		27,600	748,079	7,721	755,800
1996	129,895	255	130,150	73,351	9,773	83,124	211,451	1,387	212,838	103,376		103,376	34,123		34,123	552,196	11,415	563,611
1997	65,044	2,240	67,284	114,719	13,817	128,536	226,680	2,807	229,487	103,598		103,598	40,708		40,708	550,749	18,864	569,613
1998	110141	71	110,212	105,181	3,206	108,387	264,947	4,735	269,682	134,219		134,219	44,164		44,164	658,652	8,012	666,664
1999[3]	116,362		116,362	94,290		94,290	313,014		313,014	72,848		72,848	43,796		43,796	640,311		640,311
2000	187,595	1	187,595	115,566	1,918	117,484	285,567	165	304,898	92,557		92,557	36,074		36,074	736,524	2,084	738,608
2001	133,430	83	133,513	150,008	1,081	151,089	341,663	24	341,687	67,113		67,113	43,198		43,198	735,412	1,188	736,600
2002	127,960	12,931	140,891	104,142	2,260	106,402	391,855	8,583	400,438	74,109		74,109	49,575		49,575	747,647	23,774	771,421
2003	135,690	1,399	137,089	72,357	5,712	78,069	354,109	11,785	365,894	53,883		53,883	26,354		26,354	659,861	19,427	679,288
2004	133,033	1,705	134,738	103,703	5,991	109,694	306,040	11,329	317,369	62,923	9	62,932	34,786	982	35,768	640,529	19,962	660,491
2005	79,960	8,201	88,161	92,777	9,659	102,436	249,741	4,633	254,374	54,129		54,129	49,618	391	50,009	523,726	25,383	549,109
2006	88,077	6,081	94,158	66,114	8,642	74,756	200,929	8,263	209,192	46,716		46,716	52,751	3,606	56,357	454,587	26,593	481,180
2007	110,788	2,450	113,238	71,253	7,709	78,962	253,013	4,195	257,208	72,891		72,891	62,834	1,072	63,906	570,762	15,444	586,206
2008[4]	76,358	21,889	98,247	73,954	5,462	79,416	227,252	8,862	236,114	148,487	112	148,599	59,859	73	59,932	586,090	36,398	622,488
2009	135,468	3,927	139,395	88,287	2,921	91,208	226,938	8,120	235,058	163,604		163,604	107,747	725	108,472	722,035	15,693	737,728
2010	106,732	2,904	109,636	104,127	4,614	108,741	246,818	883	247,700	355,725	5	355,730	49,068	4,408	53,476	862,469	12,814	875,283
2011	160,756	1,836	162,592	51,108	5,317	56,425	301,746	1,906	303,652	398,132	28	398,160	24,036	1,806	25,842	935,768	10,894	946,662
2012	121,114	952	122,066	65,723	9,532	75,255	218,400	1,046	219,446	447,207		447,207	24,941	3,848	28,789	877,382	15,380	892,762

[1] Divisions IIIb and IIId from 2000 onwards.

[2] 1976–1985 Division IIa; 1986–1999 Divisions IIa and Va; 2000–2008 Subareas I, II, and V; 2009 Subareas I, II, V, and XIV.

[3] Discards reported as part of the unallocated catches.

[4] Data revised for Northern Ireland.

Table 9.3.17a.7 Mackerel in the Northeast Atlantic (combined Southern, Western, and North Sea spawning components). Summary of stock assessment. Low = lower limit and High = higher limit of 95% confidence interval of the mean F at ages 4–8. Recruitment in thousands, SSB and landings in tonnes.

Year	Recruits	Low	High	SSB	Low	High	Mean F Ages 4-8	Low	High	Landings
1980	6168708	2990467	12724757	3933342	1849748	8363939	0.167	0.079	0.352	713311
1981	5080905	2786007	9266164	3576875	1860061	6878286	0.168	0.084	0.335	708960
1982	2714179	1400164	5261359	3562596	2040734	6219375	0.168	0.088	0.321	691909
1983	2465734	1229945	4943183	3867040	2471510	6050552	0.169	0.092	0.309	660242
1984	4386315	2432767	7908589	4122622	2808890	6050794	0.17	0.097	0.299	629626
1985	3898101	2245458	6767078	4049079	2879882	5692955	0.176	0.103	0.299	606084
1986	3913724	2316296	6612815	3623678	2652412	4950603	0.184	0.112	0.303	594697
1987	4551648	2737183	7568913	3634565	2686205	4917742	0.194	0.122	0.309	644016
1988	3499043	2137228	5728590	3580453	2721626	4710290	0.205	0.134	0.315	644926
1989	3368574	2055932	5519291	3335056	2599007	4279557	0.225	0.151	0.336	582419
1990	2824947	1683726	4739679	3351773	2675161	4199517	0.252	0.173	0.367	611911
1991	3159739	1940352	5145433	3201084	2598695	3943109	0.289	0.202	0.413	637183
1992	3464227	2123423	5651661	2827773	2336886	3421775	0.326	0.232	0.458	735351
1993	2954973	1823157	4789421	2480573	2063888	2981383	0.36	0.261	0.497	806856
1994	2794042	1730602	4510958	2135049	1790573	2545796	0.375	0.273	0.515	816025
1995	2594748	1594834	4221580	2105366	1782793	2486304	0.343	0.254	0.462	748079
1996	3106477	1835743	5256837	2032953	1723825	2397517	0.29	0.217	0.387	552196
1997	2960889	1798566	4874363	2041101	1752125	2377738	0.26	0.194	0.35	550749
1998	3660096	2494403	5370545	2063677	1765489	2412230	0.267	0.201	0.355	658652
1999	4135009	2832867	6035686	2244515	1930871	2609105	0.297	0.23	0.384	640311
2000	2925570	2048421	4178321	2193480	1919048	2507157	0.342	0.295	0.398	736524
2001	4775456	3394816	6717590	2041101	1796513	2318989	0.393	0.34	0.455	735412
2002	7771704	5219019	11572938	1899308	1655772	2178663	0.431	0.371	0.5	747647
2003	3457305	2425043	4928967	1905014	1634749	2219961	0.46	0.393	0.539	659861
2004	4465983	2995076	6659267	2354879	1973438	2810048	0.422	0.356	0.5	640529
2005	6205832	4190288	9190859	2299035	1888173	2799300	0.311	0.26	0.373	523726
2006	9879772	6626186	14730931	2331448	1915126	2838272	0.282	0.233	0.34	454587
2007	4547099	3120551	6625789	2561235	2115636	3100686	0.333	0.274	0.406	570762
2008	4852478	3356469	7015272	3185118	2578865	3933893	0.288	0.232	0.357	586090
2009	4130876	2799244	6095979	3863175	3102131	4810925	0.241	0.191	0.304	722035
2010	4950504	3335523	7347422	4151582	3333989	5169673	0.223	0.175	0.284	862469
2011	6715978	4459111	10115101	4727939	3765157	5936914	0.213	0.165	0.276	935768
2012	6009598			4329662	3408558	5499677	0.192	0.146	0.253	877382
2013				4408301	3387220	5737189				
Average	4256923	2692465	6814854	3059425	2337199	4098527	0.273	0.204	0.374	

9.4.2.1 Annex

ICES evaluated the following harvest control rule contained in the Norway, Faroe Islands, and EU management plan for mackerel in the Northeast Atlantic, agreed in October 2008:

1. *For the purpose of this long-term management plan, "SSB" means the estimate according to ICES of the spawning stock biomass at spawning time in the year in which the TAC applies, taking account of the expected catch.*
2. *When the SSB is above 2,200,000 tonnes, the TAC shall be fixed according to the expected landings, as advised by ICES, on fishing the stock consistent with a fishing mortality rate in the range of 0.20 to 0.22 for appropriate age groups as defined by ICES.*
3. *When the SSB is lower than 2,200,000 tonnes, the TAC shall be fixed according to the expected landings as advised by ICES, on fishing the stock at a fishing mortality rate determined by the following:*

Fishing mortality F = 0.22 SSB/ 2,200,000*

4. *Notwithstanding paragraph 2, the TAC shall not be changed by more than 20% from one year to the next, including from 2009 to 2010.*
5. *In the event that the ICES estimate of SSB is less than 1,670,000 tonnes, the Parties shall decide on a TAC which is less than that arising from the application of paragraphs 2 to 4.*
6. *The Parties may decide on a TAC that is lower than that determined by paragraphs 2 to 4.*
7. *The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES.*