

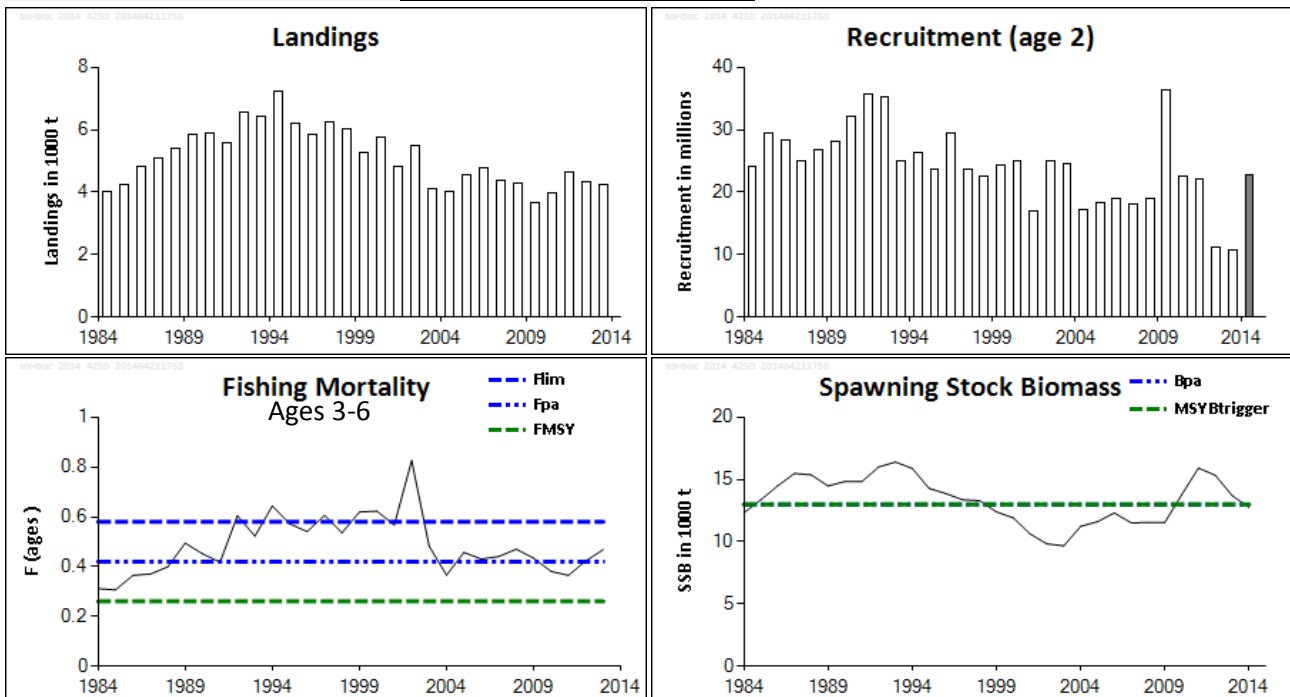
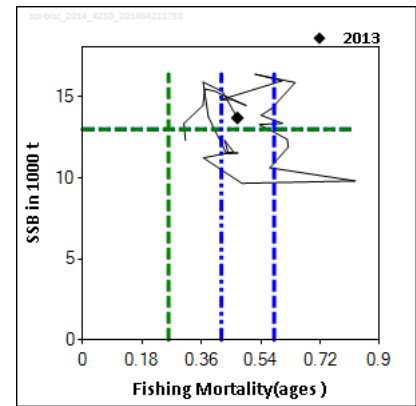
**ECOREGION** Bay of Biscay and Atlantic Iberian waters  
**STOCK** Sole in Divisions VIIIa, b (Bay of Biscay)

**Advice for 2015**

ICES advises on the basis of the MSY approach that catches in 2015 should be no more than 2407 tonnes. All catches are assumed to be landed.

**Stock status**

Fishing pressure				
	2011	2012	2013	
MSY ( $F_{MSY}$ )	✗	✗	✗	Above target
Precautionary approach ( $F_{pa}, F_{lim}$ )	✓	✓	○	Increased risk
Stock size				
	2012	2013	2014	
MSY ( $B_{trigger}$ )	✓	✓	✗	Just below trigger
Precautionary approach ( $B_{pa}, B_{lim}$ )	✓	✓	○	Increased risk



**Figure 7.3.21.1** Sole in Divisions VIIIa, b. Summary of stock assessment (weights in thousand tonnes). Assumed recruitment values are shaded. Top right: SSB and F over the years for the time-series used in the assessment.

The spawning stock increased from a historical low in 2003 but has been decreasing since 2012 and is currently just below MSY  $B_{trigger}$ . During this period, the fishing mortality has been stable around  $F_{pa}$ . The 2012 and 2013 recruitments are the lowest values in the time-series.

**Management plans**

A multiannual plan has been agreed by EU in 2006 ([EC Reg. No. 388/2006](#), Annex 7.3.21). The aim of the plan was first to bring the spawning-stock biomass above 13 000 tonnes in 2008 and thereafter to ensure the sustainable exploitation of the stock. ICES has not evaluated the plan.

## Biology

Sole is present on nearly all of the Bay of Biscay continental shelf, from the coast to a depth of about 150 m. Adult fish gather in deeper areas to spawn in the first quarter of the year, becoming more vulnerable to exploitation during this period. Juveniles spend their first two years of life on nursery grounds which are located in estuaries and semi-closed coastal areas. The quality of these habitats is consequently essential for sole survival.

## Environmental influence on the stock

Environmental conditions have a large influence on catches of the fixed-net fishery. Those conditions were especially favourable in 2002. Studies in Vilaine Bay showed a significant positive relationship between the fluvial discharges in winter–spring and the size of the local nursery. This localized effect is not apparent for the whole of the Divisions VIIIa,b stock and the impact of this relationship was therefore not taken into account in stock projections.

## The fisheries

The French fleet, which consists mainly of trawlers and fixed-nets, is the major participant in the Bay of Biscay sole fishery with landings comprising about 90% of the total official international landings over the historical series. The remaining part is landed by the Belgian beam trawler fleet. The landings of the French fixed-net fishery have increased from less than 5% of total landings prior to 1985 to around 65% in recent years. This shift between fleets has resulted in a change in the selection pattern towards older fish.

**Catch distribution** Total catch (2013): 4.2 kt, where 4.2 kt were ICES estimated landings (inshore trawlers 7%, offshore otter trawlers 18%, offshore beam trawlers 7%, 68% fixed nets). Discards are not quantified and considered to be negligible.

## Effects of the fisheries on the ecosystem

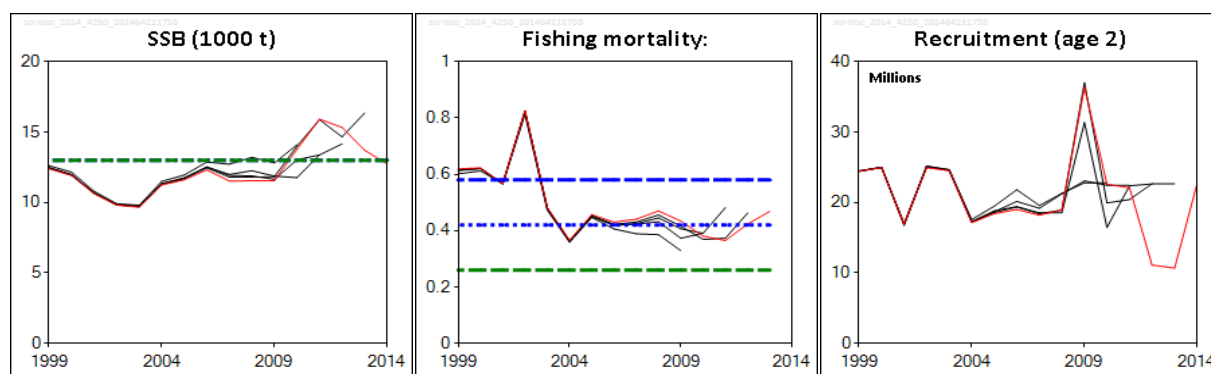
A large part of the French fishery is a fixed-net fishery directed on sole. Bycatch of non-commercial species is limited in this fishery.

## Quality considerations

The 2012 low recruitment is estimated fairly well by the survey.

In addition to the two commercial tuning fleets, fisheries-independent data (ORHAGO survey) were incorporated in the assessment last year. This is an improvement in the quality of the assessment.

The catch and SSB in the forecast are dominated by year classes for which geometric mean recruitment is assumed.



**Figure 7.3.21.2** Sole in Divisions VIIIa,b. Historical assessment results (final-year recruitment estimates are included, for 2014 the GM was used).

## Scientific basis

<b>Stock data category</b>	1 ( <a href="#">ICES, 2014a</a> ).
<b>Assessment type</b>	Age-based analytical assessment (XSA).
<b>Input data</b>	Commercial catches (international landings (French and Belgian), ages and length frequencies from catch sampling); one survey index (FR-ORHAGO in 2007–2013); four commercial indices (FR-SABLES and FR-ROCHELLE in 1991–2009, FR-BB-IN-Q4 in 2000–2013, and FR-BB-OFF-Q2 in 2000–2012). Maturity ogive fixed, estimated in 2000. Assumed natural mortalities fixed (0.1).
<b>Discards and bycatch</b>	Not included, considered negligible.
<b>Indicators</b>	None.
<b>Other information</b>	Benchmarked in 2011 and 2013 (ICES, 2011b, 2013a).
<b>Working group</b>	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion ( <a href="#">WGBIE</a> ).

**ECOREGION** Bay of Biscay and Atlantic Iberian waters  
**STOCK** Sole in Divisions VIIIa, b (Bay of Biscay)

**Reference points**

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
MSY approach	MSY $B_{trigger}$	13 000 t	$B_{pa}$ (provisional estimate).
	$F_{MSY}$	0.26	$F_{max}$ (ICES, 2010) because stock–recruitment relationship, limited variations of recruitment, and fishing mortality pattern are known with low uncertainty.
Precautionary approach	$B_{lim}$	Not defined.	
	$B_{pa}$	13 000 t	The probability of reduced recruitment increases when SSB is below 13 000 t, based on the historical development of the stock.
	$F_{lim}$	0.58	Based on the historical response of the stock.
	$F_{pa}$	0.42	$F_{lim} \times 0.72$ .

(Last changed in: 2010)

**Outlook for 2015**

$F$  (2014) = ( $F_{sq}$  = mean  $F$  (2011–2013)) = 0.42; SSB (2015) = 13.763;  $R$  (2014 age 2) = (GM (1993–2011)) = 22.7 million; catches (2014) = landings = 3.435; discards = negligible.

<b>Rationale</b>	<b>Catch (2015)</b>	<b>Basis</b>	<b>F total (2015)</b>	<b>SSB (2016)</b>	<b>%SSB change<sub>1)</sub></b>	<b>%TAC change<sub>2)</sub></b>
MSY approach	2.407	$F_{MSY}$	0.26	16.105	17%	–37%
Precautionary approach	3.675	$F_{pa}$	0.42	14.699	7%	–3%
Zero catch	0.0	$F = 0$	0.00	18.795	37%	–100%
Other options	421	$F_{sq} \times 0.1$	0.04	18.324	33%	–89%
	1.026	$F_{sq} \times 0.25$	0.10	17.646	28%	–73%
	1.976	$F_{sq} \times 0.5$	0.21	16.584	20%	–48%
	2.853	$F_{sq} \times 0.75$	0.31	15.609	13%	–25%
	3.219	–15% TAC ( $F_{sq} \times 0.86$ )	0.36	15.203	10%	–15%
	3.668	$F_{sq} \times 1$	0.42	14.706	7%	–3%
	3.791	0% TAC ( $F_{sq} \times 1.04$ )	0.44	14.570	6%	0%
	4.362	+15% TAC ( $F_{sq} \times 1.23$ )	0.52	13.938	1%	15%

Weights in thousand tonnes.

<sup>1)</sup> SSB 2016 relative to SSB 2015.

<sup>2)</sup> Catch 2015 relative to TAC 2014.

**Management plan**

The multiannual plan for the Bay of Biscay sole ([EC Reg. No. 388/2006](#)) does not provide any basis for a TAC advice for 2015.

**MSY approach**

Applying the MSY approach implies a fishing mortality at the  $F_{MSY} = 0.26$  in 2015. It results in catches that should be no more than 2407 t in 2015. This is expected to lead to an SSB of 16 105 t in 2016, which is above  $B_{pa}$ . All catches are assumed to be landed.

**Precautionary approach**

The fishing mortality in 2014 should be no more than  $F_{pa}$ , corresponding to catches of less than 3675 t in 2015. This is expected to keep SSB above  $B_{pa}$  in 2016 (14 699 t). All catches are assumed to be landed.

## Additional considerations

### Management considerations

The aim of the management plan was first to bring the spawning-stock biomass above 13 000 tonnes. This target is estimated to have been achieved. According to the plan, the Council must decide on (a) a long-term target fishing mortality rate; and (b) the rate of reduction in the fishing mortality that should apply until the target fishing mortality rate decided under (a) has been reached. The EC has not yet defined the values for items (a) and (b).

A proposal for a management plan for sole in the Bay of Biscay has been evaluated by ICES (ICES, 2013b, 2014c). It aims to decrease fishing mortality by applying a constant TAC to reach  $F_{MSY}$  in 2015–2020. ICES considered the plan to be precautionary for all the TAC values tested, with very low probabilities of SSB falling below 13 000 t ( $B_{pa}$ ), and that fixed TAC values equal to or lower than 4300 t would allow  $F$  to reach  $F_{MSY}$  before 2020.

$F_{MSY}$  is based on  $F_{max}$ , but this value is ill defined. The current  $F_{max}$  is higher than was calculated using the 2010 data. The basis for  $F_{MSY}$  may need to be reevaluated.

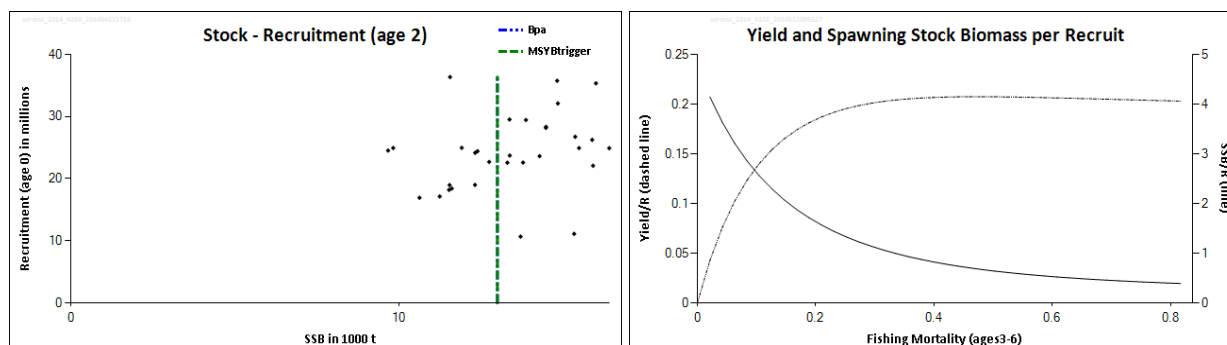
### Uncertainty in the assessment and forecast

The estimate of the recruitment in 2013 is based on a survey index that is considered reliable. The incorporation of the Orhago survey in the assessment (2013) is considered to have improved the quality of the assessment. The contribution of assumed recruitment in the predicted catches does, however, remain substantial.

### Comparison of the basis of previous assessment and advice

Compared to the 2013 assessment, the SSB in 2013 was revised downwards by 16% and the  $F$  in 2012 downwards by 8%.

The basis for the advice is the same as last year: the MSY approach.



**Figure 7.4.21.3** Sole in Divisions VIIIa,b. Stock–recruitment relationship (left panel) and yield- and spawning-stock biomass-per-recruit (right panel).

### Sources

- ICES. 2010. Report of the Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk, and Megrin (WGHMM), 5–11 May 2010, Bilbao, Spain. ICES CM 2010/ACOM:11.
- ICES. 2011a. Report of the Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk, and Megrin (WGHMM), 5–11 May 2011, ICES Headquarters, Copenhagen. ICES CM 2011/ACOM:11.
- ICES. 2011b. Report of the Benchmark Workshop on Flatfish (WKFLAT), 1–8 February 2011, Copenhagen, Denmark. ICES CM 2011/ACOM:39. 257 pp.
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- ICES. 2013a. Report of the Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk, and Megrin (WGHMM), 10–16 May 2013, ICES Headquarters, Copenhagen. ICES CM 2013/ACOM:11A. 701 pp.
- ICES. 2013b. EU request for the evaluation of the harvest control rule for sole in the Bay of Biscay. *In* Report of the ICES Advisory Committee, 2013. ICES Advice 2013, Book 7, Section 7.3.5.2.
- ICES. 2014a. Advice basis. *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2.
- ICES. 2014b. Report of the Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE), 7–13 May 2014, Lisbon, Portugal. ICES CM 2014/ACOM:11. 714 pp.
- ICES. 2014c. EU request for clarification on the request for the evaluation of the harvest control rule for sole in the Bay of Biscay, October 2013. *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 7, Section 7.2.3.1.

**Table 7.3.21.1** Sole in Divisions VIIIa,b. ICES advice management and landings, discards, and catches.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	Official landings	ICES landings	Discards	ICES catch
1987	Not assessed	-	4.4	4.4	5.1	0.2 <sup>c</sup>	5.3
1988	Precautionary TAC	3.7	4.0	4.4	5.4	0.3 <sup>c</sup>	5.6
1989	No increase in effort; TAC	4.5	4.8	5.8 <sup>a</sup>	5.8	0.4 <sup>c</sup>	6.2
1990	No increase in F; TAC	5.1	5.2	5.5 <sup>a</sup>	5.9	0.3 <sup>c</sup>	6.2
1991	Precautionary TAC	4.7	5.3	4.7 <sup>a</sup>	5.6	0.2 <sup>c</sup>	5.8
1992	F = F(90)	5.0	5.3	6.4 <sup>a</sup>	6.6	0.1 <sup>c</sup>	6.7
1993	No long-term gain in increasing F	-	5.7	6.5	6.4	0.1 <sup>c</sup>	6.5
1994	No long-term gain in increasing F	-	6.6	7.1	7.2	0.2 <sup>c</sup>	7.4
1995	No long-term gain in increasing F	5.4 <sup>b</sup>	6.6	5.9	6.2	0.1 <sup>c</sup>	6.3
1996	No increase in F	5.0	6.6	4.3	5.9	0.1 <sup>c</sup>	6.0
1997	40% reduction in F	3.1	5.4	5.0	6.3	0.1	6.4
1998	No increase in F	7.6	6.0	4.3 <sup>d</sup>	6.0	0.1	6.1
1999	Reduce F below F <sub>pa</sub>	< 5.0	5.4	3.8 <sup>d</sup>	5.2	0.2	5.4
2000	F at F <sub>pa</sub>	< 5.8	5.8	5.7 <sup>d</sup>	5.7	0.1	5.8
2001	TAC 2001, at most TAC 2000	< 5.8	6.3	4.9 <sup>d</sup>	4.8	0.0	4.9
2002	Establish rebuilding plan or no fishing	-	4.0	4.0	5.5	0.0	5.5
2003	Establish rebuilding plan or no fishing	-	3.8	4.1	4.1	0.0	4.0
2004	65% reduction in F or recovery plan <sup>e</sup>	< 2.0	3.6	4.1	4.0	-	-
2005	F at F <sub>pa</sub>	< 4.1	4.14	4.4	4.5	-	-
2006	F at F <sub>pa</sub>	< 4.2 or management plan	4.1	4.4	4.8	-	-
2007	Management plan: 10% reduction in F	4.54	4.54	4.1	4.4	-	-
2008	Reach B <sub>pa</sub> in 2009	3.85	4.58	3.3	4.3	-	-
2009	F at F <sub>pa</sub>	< 4.43	4.39	4.8	3.6	-	-
2010	F at F <sub>status quo</sub>	< 4.9	4.83	4.7	4.0		
2011	See scenarios	-	4.25	4.6	4.6		
2012	MSY transition	4.0	4.25	4.2 <sup>f</sup>	4.3 <sup>f</sup>		
2013	MSY transition	3.5	4.1	4.5	4.2		
2014	MSY transition	3.270	3.8				
2015	MSY approach	2.407					

Weights in thousand tonnes.

<sup>a</sup> Not reported for all countries.

<sup>b</sup> Landings assuming current discarding practise.

<sup>c</sup> Discards revised in 1998.

<sup>d</sup> Preliminary. TAC in 2001 increased from 5.8 to 6.3 in November.

<sup>e</sup> Single-stock boundaries and the exploitation of this stock should be conducted in the context of mixed fisheries.

<sup>f</sup> A carry-over of 10% for the French quota was decided.

**Table 7.3.21.2** Sole in Divisions VIIIA, b. Landings by country (tonnes).

Year	Official landings						ICES landings	Discards <sup>2</sup>	ICES catches
	Belgium	France <sup>1</sup>	Netherlands	Spain	Others	Total			
1979	0	2376		62*		2443	2619	-	-
1980	33*	2549		107*		2689	2986	-	-
1981	4*	2581*	13*	96*		2694	2936	-	-
1982	19*	1618*	52*	57*		1746	3813	-	-
1983	9*	2590	32*	38*		2669	3628	-	-
1984	na	2968	175*	40*		3183	4038	99	4137
1985	25*	3424	169*	308*		3925	4251	64	4315
1986	52*	4228	213*	75*		4567	4805	27	4832
1987	124*	4009	145*	101*		4379	5086	198	5284
1988	135*	4308		0		4443	5382	254	5636
1989	311*	5471		0		5782	5845	356	6201
1990	301*	5231		0		5532	5916	303	6219
1991	389*	4315		3		4707	5569	198	5767
1992	440*	5928		0		6359	6550	123	6673
1993	400*	6096		13		6496	6420	104	6524
1994	466*	6627		2***		7095	7229	184	7413
1995	546*	5326		0		5872	6205	130	6335
1996	460*	3842		0		4302	5854	142	5996
1997	435*	4526		0		4961	6259	118	6377
1998	469*	3821	44	0		4334	6027	127	6154
1999	504	3280		0		3784	5249	110	5359
2000	451	5293		5***		5749	5760	51	5811
2001	361	4350	201	0		4912	4836	39	4875
2002	303	3680		2***		3985	5486	21	5507
2003	296	3805		4***		4105	4108	20	4128
2004	324	3739		9***		4072	4002	-	-
2005	358	4003		10		4371	4539	-	-
2006	393	4030		9		4432	4793	-	-
2007	401	3707		9		4117	4363	-	-
2008	305	3018		11	2*	3336	4299	-	-
2009	364	4391				4755	3650	-	-
2010	451	4248				4699	3966	-	-
2011	386	4259				4645	4632	-	-
2012	385	3819				4204	4321	-	-
2013	312	4181				4492	4234**	-	-

<sup>1</sup> Including reported in Subarea VIII or Divisions VIIIc,d.

<sup>2</sup> Discards = partial estimates for the French offshore trawlers fleet.

\* Reported in Subarea VIII.

\*\* Preliminary.

\*\*\* Reported as *Solea* spp. (*Solea lascaris* and *Solea solea* in Subarea VIII).

Table 7.3.21.3

Sole in Divisions VIIIA,b. Summary of the assessment.

Year	Recruitment Age 2 thousands	SSB	Landings tonnes	Mean F Ages 3–6
1984	24168	12323	4038	0.312
1985	29535	13370	4251	0.307
1986	28365	14485	4805	0.365
1987	24939	15489	5086	0.37
1988	26755	15372	5382	0.399
1989	28190	14481	5845	0.495
1990	32127	14844	5916	0.452
1991	35773	14822	5569	0.418
1992	35365	16007	6550	0.605
1993	24922	16410	6420	0.523
1994	26261	15891	7229	0.644
1995	23631	14288	6205	0.572
1996	29458	13872	5854	0.541
1997	23726	13377	6259	0.606
1998	22585	13303	6027	0.536
1999	24431	12397	5249	0.62
2000	24972	11915	5760	0.623
2001	16933	10629	4836	0.568
2002	24951	9823	5486	0.826
2003	24532	9671	4108	0.482
2004	17143	11244	4002	0.366
2005	18421	11611	4539	0.457
2006	19003	12317	4793	0.431
2007	18197	11529	4363	0.441
2008	18971	11544	4299	0.47
2009	36376	11558	3650	0.434
2010	22598	13781	3966	0.381
2011	22091	15919	4632	0.365
2012	11120	15340	4321	0.424
2013	10678	13709	4234	0.469
2014	22699*	12752		
<b>Average</b>	<b>24159</b>	<b>13357</b>	<b>5122</b>	<b>0.483</b>

\* GM (1993–2011).

**Annex 7.3.21**      **Extract from multiannual plan for Bay of Biscay sole in Divisions VIIIa and VIIIb: Council Regulation (EC) No. 388/2006**

*Article 2*

*Objective of the management plan*

1. *The plan shall aim to bring the spawning stock biomass of Bay of Biscay sole above the precautionary level of 13 000 tonnes in 2008 or before and, thereafter, to ensure its sustainable exploitation.*
2. *This objective shall be attained by gradually reducing the fishing mortality rate on the stock.*

*Article 3*

*Legislative measures and annual TAC setting*

1. *Once the spawning stock biomass is evaluated by ICES to be equal to or above the precautionary level of 13 000 tonnes, the Council shall decide by qualified majority, on the basis of a Commission proposal, on:*
  - (a) *a long-term target fishing mortality rate; and*
  - (b) *a rate of reduction in the fishing mortality rate for application until the target fishing mortality rate decided under (a) has been reached.*
2. *Each year the Council shall decide by qualified majority, on the basis of a proposal from the Commission, on a TAC for the following year for Bay of Biscay sole.*

*Article 4*

*Procedure for setting the TAC*

1. *Where the spawning stock biomass of Bay of Biscay sole has been estimated by the Scientific, Technical and Economic Committee for Fisheries (STECF), in the light of the most recent report from ICES, to be below 13 000 tonnes, the Council shall decide on a TAC which, according to the STECF estimation, shall not exceed a level of catches which will result in a 10 % reduction in fishing mortality rate in its year of application compared to the fishing mortality rate estimated for the preceding year.*
2. *Where the spawning stock biomass of Bay of Biscay sole has been estimated by the STECF, in the light of the most recent report from ICES, to be equal to or above 13 000 tonnes, the Council shall decide on a TAC which shall be set at a level of catches which, according to the STECF estimation, is the higher of:*
  - (a) *that TAC whose application conforms with the reduction in fishing mortality rate that has been decided on by the Council in accordance with Article 3(1)(b);*
  - (b) *that TAC whose application will result in the target fishing mortality rate that has been decided on by the Council in accordance with Article 3(1)(a).*
3. *Where application of paragraph 1 or 2 of this Article would result in a TAC which exceeds the TAC of the preceding year by more than 15 %, the Council shall adopt a TAC which is 15 % greater than the TAC of that year.*
4. *Where application of paragraph 1 or 2 would result in a TAC which is more than 15 % less than the TAC of the preceding year, the Council shall adopt a TAC which is 15 % less than the TAC of that year.*