

ECOREGION Bay of Biscay and Atlantic Iberian waters
SUBJECT EU request for Bay of Biscay anchovy TAC

Advice summary

ICES advises, on the basis of the harvest control rule G4 with a harvest rate of 0.45, that the TAC for Bay of Biscay anchovy from 1 January 2015 to 31 December 2015 should be 25 000 tonnes.

Although ICES has not yet evaluated the harvest control rule, the TAC is considered precautionary.

Request

“ICES stock assessment of anchovy in Subarea VIII (Bay of Biscay) was benchmarked in 2013, resulting in the revision of the assessment methodology. The JUVENA acoustic index of juveniles is formally considered a valid indicator of the strength of incoming recruitment and hence useful for forecasting the population and it can potentially be used in the assessment of this stock.

In 2014 the STECF carried out an impact assessment of management measures for Bay of Biscay anchovy. The STECF assessed a range of alternative TAC setting scenarios based on the estimated spawning stock biomass level and concluded that an assessment conducted in support of a January to December management period is appropriate.

On the basis of the results of the JUVENA survey, which is expected in September, and of information on catches in the second semester of 2014, ICES is requested to advise on the TAC for the calendar year running from 1st January 2015 to 31st December 2015 in accordance with the rule G4 with a $\gamma=0.45$ (max. TAC 25000t, min. TAC 7000t, Brig 24000t) as assessed by the STECF.” (See Annex 7.2.3.2.)

Elaboration on ICES advice

Following the harvest control rule G4 with a harvest rate of 0.45 as evaluated by STECF in 2014, the TAC for the fishing season running from 1 January 2015 to 31 December 2015 should be established at 25 000 tonnes.

Although ICES has not yet evaluated the harvest control rule (HCR), STECF uses the same precautionary criteria as ICES, and has evaluated the plan and considers it precautionary. The TAC for 2014 set under the plan is lower than other precautionary TACs and is therefore considered precautionary.

Basis of the advice

Background

In 2008 a draft management plan was proposed by the EC in a cooperation between STECF and the South Western Waters RAC. This plan was not formally adopted by the EU. Following the new assessment methodology established in 2013 (ICES, 2013a, 2013b), STECF evaluated the HCR (STECF, 2013, 2014) and considered the plan precautionary. STECF uses the same criteria as ICES to determine if management plans are precautionary.

In 2014, STECF (2013, 2014) evaluated new HCRs, including a change to a January–December management calendar. In October the EC asked ICES to update the advice provided in June according to the HCR rule G4 with a harvest rate of 0.45 (see Annex 7.2.3.2).

Recent management consists of an in-year monitoring regime, as previously recommended by ICES. The new assessment of anchovy includes the JUVENA autumn pre-recruits survey in addition to the spring survey results and catch data. ICES benchmarked this approach in 2013 and the JUVENA acoustic index of pre-recruits is considered a valid indicator of the strength of the incoming recruitment. ICES considers that the autumn JUVENA index can be used to update the stock assessment and the short-term forecast in December. This can be used for a review of the TAC that currently runs from July to June, or to provide preliminary advice for a TAC for the calendar year which would need to be updated, based on the results of the spring survey.

The basis of this assessment is different from that used for the assessment in July. As in previous years ICES 2014 July advice was based on a forward projection, using the historical range of recruitment to estimate the pre-recruits in 2014

as no pre-recruits survey estimate is available by July. The present advice is based on the same stock assessment model, but including the most recent estimate of pre-recruits from the JUVENA 2014 survey.

In July 2014 the Council established a TAC of 20 100 tonnes for the fishing season running from 1 July 2014 to 30 June 2015 (Council Regulation (EC) No. 779/2014), based on the European Commission long-term management plan proposal. Preliminary estimates of catches in the second half of 2014 are 5650 t, of which 3179 t were estimated to be caught by France and 2471 t by Spain.

Results and conclusions

Outlook for the period 1 January 2015–31 December 2015

Basis: R(2015) distribution of recruitment-at-age 1 in biomass estimated from a stochastic forward projection. Total catch distribution: 60% allocated to first half of 2015 and 40% to second half of 2015. Catches in the second half of 2014 = 5650 t. Discards are considered negligible.

Basis	Catch (July 2014–June 2015)	Median SSB	2015 Probability SSB ₂₀₁₅ < B _{lim}
G4 with harvest rate = 0.45	25000	106974	0.001
Precautionary approach	109000	68796	0.049
Zero catches	0	117549	< 0.001
Other options	5000	115473	< 0.001
	10000	113385	< 0.001
	15000	111278	< 0.001
	20000	109140	< 0.001
	25000	106974	< 0.001
	30000	104790	< 0.001
	45000	98233	0.002
	80000	82368	0.010
	100000	73011	0.030

Weights in tonnes.

Methods

Scientific basis

Stock data category	1 (ICES, 2014a).
Assessment type	Two-stage Bayesian biomass dynamic model (CBBM) assessment.
Input data	Commercial catches (international landings, ages and length frequencies from catch sampling), three surveys (BIOMAN, PELGAS, JUVENA); annual maturity data from DEPM survey (BIOMAN), and natural mortalities from past models fitted to spring surveys.
Discards and bycatch	Not included, considered negligible.
Indicators	None.
Other information	The assessment was benchmarked in 2013 and the current assessment methodology was accepted in October 2013 after WKPELA (ICES, 2013b) and WGHANSA (ICES, 2013a).
Working group	Working Group on Southern Horse Mackerel, Anchovy and Sardine (WGHANSA).

Reference points

	Type	Value	Technical basis
MSY approach	MSY B _{escapement}	Not defined.	
	F _{MSY}	Not defined.	
Precautionary approach	B _{lim}	21 000 t.	B _{lim} : B _{loss} (mean of SSB estimates in years 1987 and 2009, the minimum estimated biomass that produced substantial recruitment; Annex 8 in ICES, 2013a).
	B _{pa}	Not defined.	
	F _{lim}	Not defined.	
	F _{pa}	Not defined.	

(Last changed in: 2014)

For Bay of Biscay anchovy the assessment provides the probability distributions for the SSB, it is possible to estimate directly the risk of SSB falling below B_{lim} .

Assessment methodology

A two-stage Bayesian biomass dynamic model (CBBM) assessment was used, based on the Daily Egg Production Method (DEPM) BIOMAN surveys (since 1987), the acoustic PELGAS surveys (since 1989), the autumn acoustic JUVENA surveys (since 2003), and catch data from the French and Spanish fisheries. The stochastic forecast method using the pre-recruits survey is used this year for the first time.

The current assessment is mainly driven by inputs provided by the surveys (SSB and the proportion of 1-group in the biomass and recruitment). The two spring biomass surveys, BIOMAN and PELGAS, usually follow similar trends, with some exceptions (e.g. 2012). The 2014 autumn index of incoming recruitment in 2015 is estimated to be the highest of the historical series. This index, when combined with the other information in the assessment, offers the second highest value in the assessed time-series.

Growth and natural mortality of anchovy are assumed constant over the time-series. Additionally, there is no age-structured catchability in the surveys. Selectivity-at-age in the fishery during the first semester may have changed since 2010; this needs to be further investigated.

The current Bayesian model provides a formal statistical estimate of the precision of the results and these are translated into risk that can be included in harvest control rules. The 90% probability intervals indicate that SSB in 2014 is between 43 808 t and 89 231 t, with a median at 63 070 t. The probability of SSB in 2014 being below B_{lim} is <0.001.

Sources

- ICES. 2009. Report of the Benchmark Workshop on Short-lived Species (WKSHORT), 31 August–4 September 2009, Bergen, Norway. ICES CM 2009/ACOM:34. 164 pp.
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- ICES. 2014a. Advice basis. *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2.
- ICES. 2014b. Anchovy in Subarea VIII (Bay of Biscay). *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 7, Section 7.3.1.
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- STECF. 2013. Scientific, Technical and Economic Committee for Fisheries (STECF) – Advice on the Harvest Control Rule and Evaluation of the Anchovy Plan (COM(2009) 399 final; STECF-13-24). Publications Office of the European Union, Luxembourg, EUR 26326 EN, JRC 86109. 71 pp.
- STECF. 2014. Scientific, Technical and Economic Committee for Fisheries (STECF) – Evaluation/scoping of Management plans – Data analysis for support of the impact assessment for the management plan of Bay of Biscay anchovy (COM(2009)399 final; STECF-14-05). Publications Office of the European Union, Luxembourg, EUR 26611 EN, JRC 89792. 128 pp.

Table 7.2.3.2.1 Anchovy in Subarea VIII (Bay of Biscay). Summary of the assessment. Median and 90% probability intervals for recruitment (age 1 in January), spawning-stock biomass, and harvest rates (catch/SSB).

Year	Recruitment-at-age 1			SSB			Landings	Harvest rate, ages 1+		
	Median	High	Low	Median	High	Low		tonnes	Median	High
	tonnes			tonnes						
1987	15434	20884	11945	21067	27421	16327	14385	0.683	0.525	0.881
1988	31036	38111	25877	29024	36329	23798	14406	0.496	0.397	0.605
1989	8867	12537	6387	15476	21653	10966	8239	0.532	0.38	0.751
1990	67801	79174	59445	53677	64242	46275	33733	0.628	0.525	0.729
1991	22696	30236	17372	29882	39918	22466	18112	0.606	0.454	0.806
1992	90542	113922	71777	75225	97743	57114	37210	0.495	0.381	0.652
1993	63991	79054	50637	74888	89185	62955	39313	0.525	0.441	0.624
1994	41453	51187	33905	48938	60332	40218	33622	0.687	0.557	0.836
1995	46312	60185	35372	42156	56904	30455	29108	0.69	0.512	0.956
1996	50140	62082	40578	48074	59262	39829	32888	0.684	0.555	0.826
1997	40387	52714	31498	46169	60625	35907	20452	0.443	0.337	0.57
1998	96603	126213	75323	96852	126175	75063	31399	0.324	0.249	0.418
1999	42952	61054	28975	70747	90670	53824	25998	0.367	0.287	0.483
2000	91268	110512	74677	94168	113071	78520	36890	0.392	0.326	0.47
2001	73204	87687	61885	90963	106205	79055	40138	0.441	0.378	0.508
2002	12428	18000	8774	38570	47917	31545	17494	0.454	0.365	0.555
2003	19578	24402	15601	24381	33581	22497	10479	0.383	0.312	0.466
2004	30289	37661	24668	30632	38932	24697	16187	0.528	0.416	0.655
2005	4057	5855	2685	14400	19643	10483	1127	0.078	0.057	0.108
2006	17891	24509	13084	21412	28504	15933	1754	0.082	0.062	0.11
2007	22372	30314	16424	31751	41313	24152	140	0.004	0.003	0.006
2008	9099	12839	6454	24858	31933	19310	0	0	0	0
2009	10052	14125	7325	20520	26488	16082	0	0	0	0
2010	46639	60742	36040	48243	61902	37708	10082	0.209	0.163	0.267
2011	107751	136597	85057	114633	143244	91214	14489	0.126	0.101	0.159
2012	41796	55367	31780	92999	116132	73917	14353	0.154	0.124	0.194
2013	33271	44998	24880	61979	80268	47888	14072	0.227	0.175	0.294
2014	50662	73698	35279	63070	89231	43808	20214	0.321	0.227	0.461
2015	97762	192077	49755	117549	205999	71321				
Average	44356	59198	33912	53183	69477	41494	19153	0.377	0.297	0.478

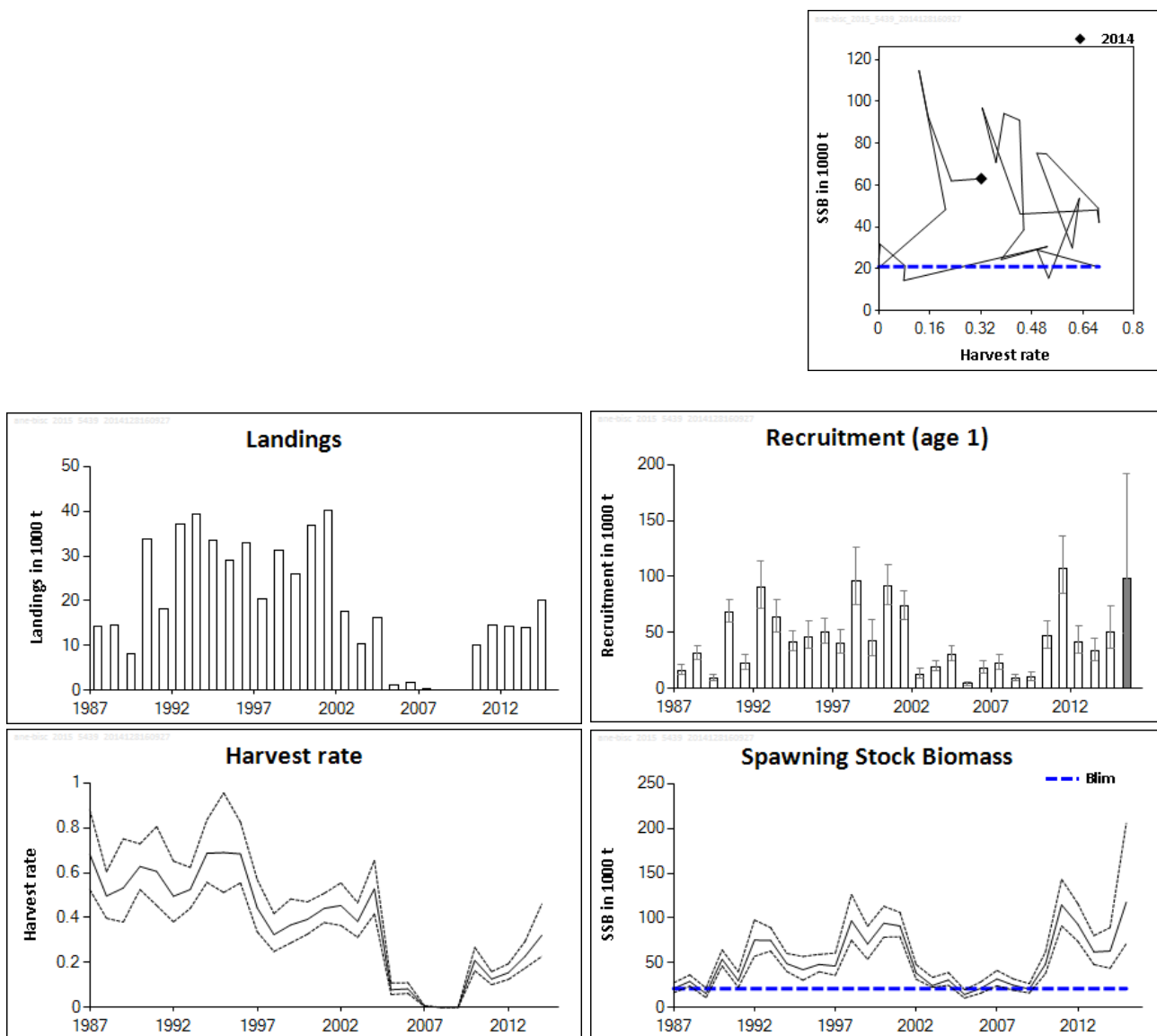


Figure 7.2.3.2.1 Anchovy in Subarea VIII (Bay of Biscay). Trends in landings, recruitment (age 1 biomass in January), harvest rates (catch/SSB), and spawning-stock biomass. Solid lines – posterior median; dashed lines – 90% probability intervals. Top right: SSB and harvest rates over the years.

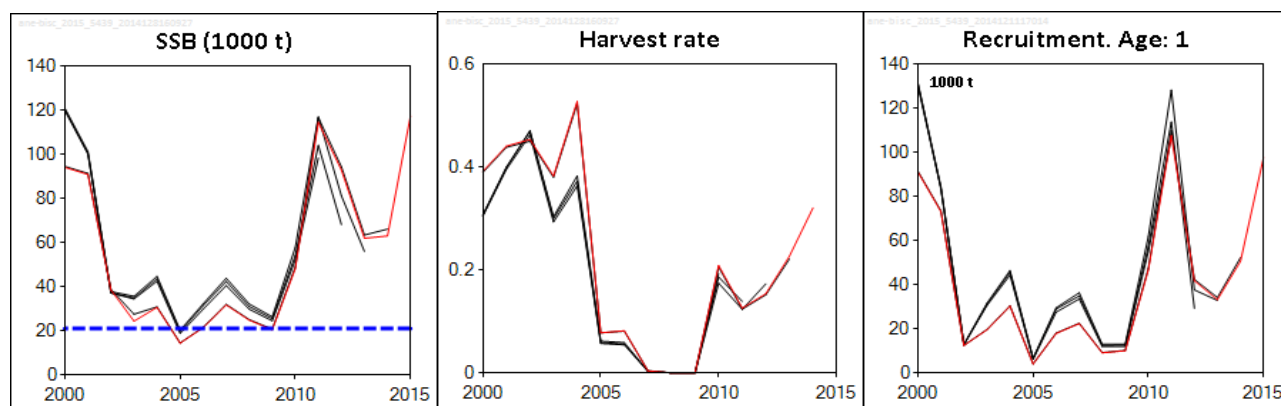


Figure 7.2.3.2.2 Anchovy in Subarea VIII (Bay of Biscay). Historical assessment results (final-year estimate included). The stock was last benchmarked in 2013.

Annex 7.2.3.2 Harvest control rule for the updated advice

The advice is based on the harvest control rule named G4 with a harvest rate of 0.45, evaluated in STECF (2014). This rule sets the total allowable catch (TAC) from 1 January to 31 December as follows:

$$TAC_{Jan_y-Dec_y} = \begin{cases} 0 & \text{si } \widehat{SSB}_y \leq 24000 \\ -3800 + 0.45 \cdot \widehat{SSB}_y & \text{si } 24000 < \widehat{SSB}_y \leq 64000 \\ 25000 & \text{si } \widehat{SSB}_y > 64000 \end{cases}$$

where \widehat{SSB}_y is the expected spawning-stock biomass in that year.