

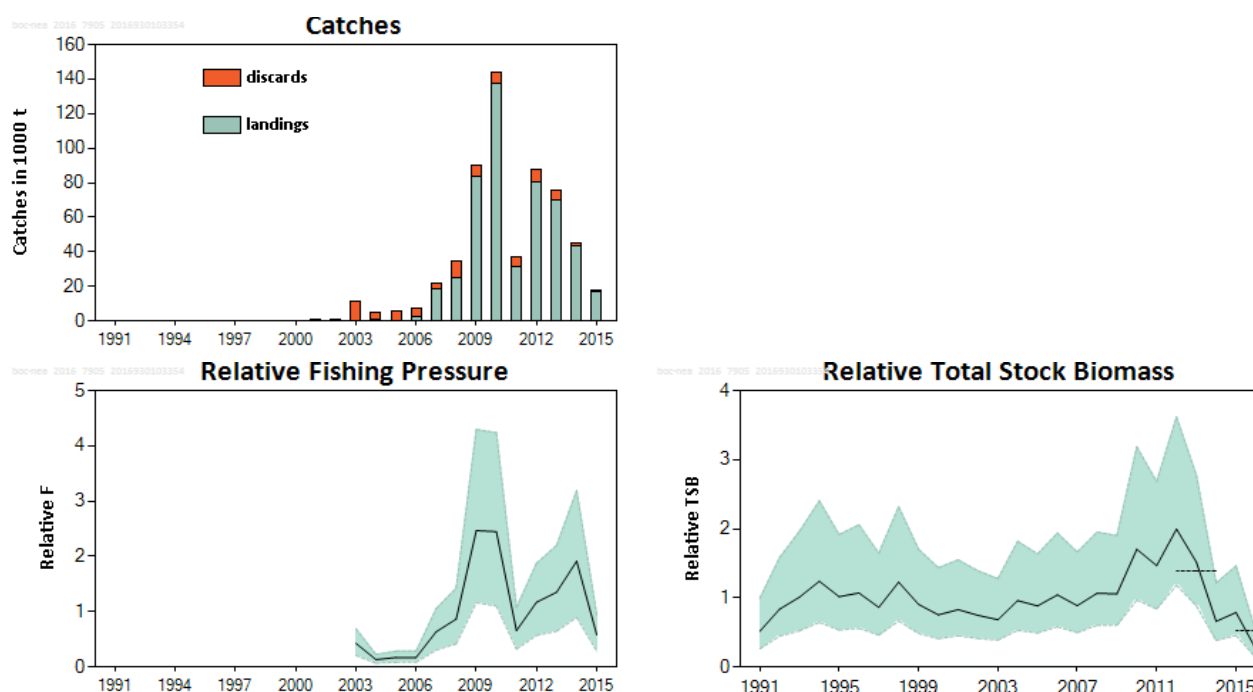
### 9.3.7 Boarfish (*Capros aper*) in subareas 6–8 (Celtic Seas, English Channel, and Bay of Biscay)

#### ICES stock advice

ICES advises that when the precautionary approach is applied, catches in 2017 should be no more than 27 288 tonnes.

#### Stock development over time

The stock status relative to reference points is currently unknown. An exploratory assessment indicates that the stock has declined sharply since the peak in 2010–2013 and is currently at a historic low. Fishing mortality (F) rose between 2011 and 2014 but fell in 2015.



**Figure 9.3.7.1** Boarfish in subareas 6–8. Summary of the assessment. Bottom left panel: fishing mortality relative to the average of 2003–2015. Bottom right panel: total stock biomass relative to the average of 1991–2016, regarded as an indicator of the recent development of the stock. Confidence intervals (95%) are included in the relative fishing mortality and relative stock biomass plots. The dashed lines in the biomass plot indicate the average values for 2012–2014 and 2015–2016.

#### Stock and exploitation status

**Table 9.3.7.1** Boarfish in subareas 6–8. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size			
		2013	2014	2015		2014	2015	2016	
Maximum sustainable yield	$F_{MSY}$	?	?	?	Undefined	?	?	?	Undefined
Precautionary approach	$F_{pa}, F_{lim}$	?	?	?	Undefined	?	?	?	Undefined
Management plan	$F_{MGT}$	-	-	-	Not applicable	-	-	-	Not applicable
Qualitative evaluation	-	↗	↗	↘	Decreasing	↘	↗	↘	Decreasing

## Catch options

The ICES framework for category 3 stocks was applied (ICES, 2012). The Schaefer surplus production model provides an index of total stock biomass (TSB) which is used as the index of stock development. The advice is based on a comparison of the two latest index values (index A, 2015–2016) with the three preceding values (index B, 2012–2014), multiplied by the recent advised catch.

The index is estimated to have decreased by more than 20% in the period 2012–2016 and thus the uncertainty cap was applied in the calculation of the catch advice. Reference points are not defined, and the assessment model does not provide absolute estimates of *F*. The precautionary buffer has never been applied to the advice for this stock. The stock status relative to candidate reference points is unknown and the current estimated biomass is the lowest in the time-series. Therefore, the precautionary buffer was applied to the advice for 2017. Discarding is known to take place and the discard ratio has been estimated, based on 2015 estimates.

**Table 9.3.7.2** Boarfish in subareas 6–8. For stocks in ICES data categories 3–6, one catch option is provided.

Index A (2015, 2016)		0.525
Index B (2012, 2013, 2014)		1.391
Index ratio (A/B)		0.378
Uncertainty cap	Applied	0.8
Recent advised catch for 2016		42637 t
Discard ratio (2015)		0.05
Precautionary buffer	Applied	0.8
Catch advice*		27288 t
Wanted catch corresponding to the catch advice		25924 t

\* (Recent advised catch) × cap × precautionary buffer.

## Basis of the advice

**Table 9.3.7.3** Boarfish in subareas 6–8. The basis of the advice.

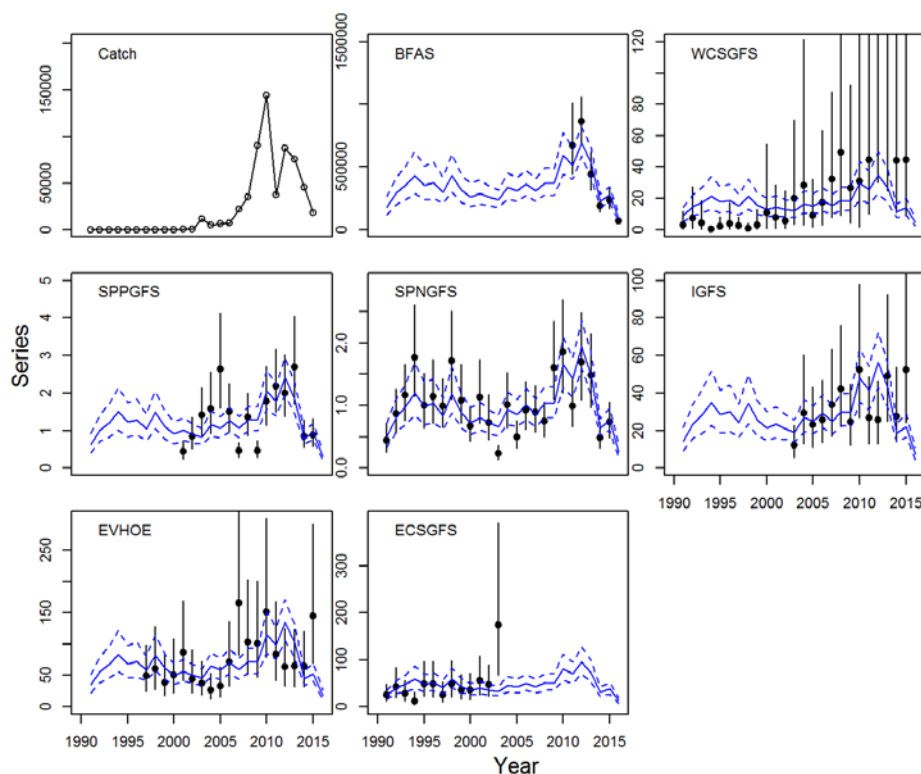
Advice basis	Precautionary approach.
Management plan	A management strategy has been proposed by the Pelagic AC (ICES, 2015). ICES provides advice for this stock following the standard procedures which conforms to the proposed strategy from the Pelagic AC.

## Quality of the assessment

The acoustic survey is considered reliable within the survey grid, though not containing the stock, at transect edges, and there is high uncertainty in the estimates of absolute biomass due to the short time-series. Bottom-trawl survey indices are considered indicative of trends in their respective areas. The assessment model combines the information from the available surveys (Figure 9.3.7.2) and has been used to provide category 3 advice for boarfish since 2014. The overall index is heavily influenced by the acoustic survey.

The commercial catch data are considered to be complete, including discards from other fisheries from 2003 onwards. Discarding stemming from bycatch fisheries prior to 2003 is likely to have been small in comparison with subsequent catches.

The current assessment and management unit is considered appropriate. However, a genetic study shows that a small portion of the northern Division 9.a stock could be included as part of the NEA stock (ICES, 2016a). Based on analyses of IBTS data (ICES, 2016a) and the lack of boarfish in the PELACUS acoustic survey in spring 2016, biomass in northern Division 9.a is expected to be small relative to the overall biomass in the TAC area. There is no evidence of significant immigration or emigration between the TAC area and southern or oceanic water populations.



**Figure 9.3.7.2** Boarfish in subareas 6–8. Catch in tonnes (upper left panel). Survey indices from the boarfish acoustic survey (BFAS), five individual international bottom-trawl surveys (WCSGFS, SPPGFS, SPNGFS, IGFS, EVHOF), and the English Celtic Sea Groundfish Survey (ECSGFS), with modelled catch per unit effort estimates from exploratory surplus production assessment (blue line) and 95% confidence intervals (dashed lines).

### Issues relevant for the advice

There is no information to present for this stock.

### Reference points

No reference points are defined for this stock.

### Basis of the assessment

**Table 9.3.7.4** Boarfish in subareas 6–8. The basis of the assessment.

ICES stock data category	3 ( <a href="#">ICES, 2016b</a> ).
Assessment type	Exploratory Bayesian Schaefer surplus production model (ICES, 2016a).
Input data	Commercial catches (international landings and discards). Combined acoustic surveys – MSHAS & BFAS, Q2 (2011–2015) and WESPAS, Q2 (2016); and six bottom-trawl survey indices – EVHOF, Q4; IGFS, Q4; WCSGFS, Q1 and Q4; SPPGFS, Q3; SPNGFS, Q3/Q4; and ECSGFS, Q4. Annual maturity data from Farrell <i>et al.</i> (2015) and Hüsey <i>et al.</i> (2012a, 2012b). Natural mortality from King (1995).
Discards and bycatch	Discards from non-directed fisheries since 2003 have been included in the assessment.
Indicators	Distribution, abundance from PELACUS Q1/Q2 surveys, abundance from PELGAS survey, IBTS survey time-series, and commercial catch curve estimates of mortality.
Working group	Working Group on Widely Distributed Stocks ( <a href="#">WGWIDE</a> )

## Information from stakeholders

A very small number of Irish vessels prosecuted this fishery in 2015 and the first quarter of 2016. Those that did participate, caught their allocation. The demersal trawlers have encountered juvenile boarfish in their catches, particularly in southwestern Ireland over the last twelve months, and the pelagic trawlers have encountered boarfish much farther north than previously.

## History of advice, catch, and management

**Table 9.3.7.5** Boarfish in subareas 6–8. History of ICES advice, the agreed TAC, and ICES estimates of catch.

Year	ICES advice	Predicted catch corresp. to advice	TAC*	Bycatch quota**	ICES catch
2001	None	-	None	None	0.1
2002	None	-	None	None	0.9
2003	None	-	None	None	11.3
2004	None	-	None	None	5.0
2005	None	-	None	None	5.9
2006	None	-	None	None	7.1
2007	None	-	None	None	21.0
2008	None	-	None	None	33.8
2009	None	-	None	None	89.9
2010	None	-	None	None	143.9
2011	None	-	33	9.8	36.9
2012	No increase in catches	82	82	9.9	80.7
2013	MSY approach	82	82	9.5	75.4
2014	MSY approach	133.957	133.957	7.1	45.2
2015	DLS approach	53.296	53.292	4.8	17.8
2016	Precautionary approach	≤ 42.637	42.637	6.0	
2017	Precautionary approach –36% relative to previous advice)	≤ 27.288			

Weights in thousand tonnes.

\* EU and international waters of subareas 6, 7, and 8.

\*\* The maximum permitted bycatch (5%) of boarfish allowed; to be subtracted from the EU quotas for western and for North Sea horse mackerel. The 5% applies to boarfish, whiting and/or mackerel (EU, 2016).

## History of catch and landings

**Table 9.3.7.6** Boarfish in subareas 6–8. Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings	Discards
17766 t	100% pelagic fishery	~100% demersal gears
	16837 t	929 t

**Table 9.3.7.7** Boarfish in subareas 6–8. History of catch and landings, both the official and ICES estimated values are presented for each country participating in the fishery. Weights in tonnes.

Year	Ireland	Denmark	Scotland	Netherlands	England & Wales	Germany	Total landings	Estimated discards	Total catch
2001	120	0	0	0	0	0	120	NA	120
2002	91	0	0	0	0	0	91	NA	91
2003	458	0	0	0	0	0	458	10929	11387
2004	675	0	0	0	0	0	675	4476	5151
2005	165	0	0	0	0	0	165	5795	5959
2006	2772	0	0	0	0	0	2772	4365	7137
2007	17615	0	772	0	0	0	18387	3189	21576
2008	21585	3098	0.45	0	0	0	24683	10068	34751
2009	68629	15059	0	0	0	0	83688	6682	90370
2010	88457	39805	9241	0	0	0	137503	6544	144047
2011	20685	7797	2813	0	0	0	31295	5802	37096
2012	55949	19888	4884	0	0	0	80720	6634	87355
2013	52250	13182	4380	0	0	0	69812	5598	75409
2014	34622	8758	38	0	0	0	43418	1813	45231
2015*	16325	29	0	375	104	4	16837	929	17766

\* Provisional.

### Summary of the assessment

**Table 9.3.7.8** Boarfish in subareas 6–8. Assessment summary (weights in tonnes). ‘High’ and ‘Low’ refer to 95% confidence intervals.

Year	Relative stock size			Landings	Discards	Relative fishing pressure		
	TSB	High (97.5%)	Low (2.5%)			F	High (97.5%)	Low (2.5%)
1991	0.516	0.995	0.262					
1992	0.837	1.584	0.447					
1993	1.011	1.964	0.523					
1994	1.24	2.404	0.645					
1995	1.017	1.915	0.536					
1996	1.071	2.059	0.56					
1997	0.863	1.647	0.461					
1998	1.228	2.32	0.666					
1999	0.906	1.704	0.486					
2000	0.755	1.437	0.41					
2001	0.83	1.55	0.452	120				
2002	0.747	1.391	0.413	91				
2003	0.685	1.279	0.389	458	10929	0.429	0.695	0.21
2004	0.961	1.819	0.529	675	4476	0.133	0.229	0.067
2005	0.884	1.636	0.493	165	5795	0.171	0.286	0.086
2006	1.043	1.938	0.582	2772	4365	0.171	0.286	0.086
2007	0.887	1.664	0.497	18387	3189	0.638	1.057	0.305
2008	1.067	1.952	0.605	24683	10068	0.867	1.429	0.419
2009	1.057	1.901	0.603	83688	6682	2.467	4.295	1.162
2010	1.704	3.186	0.97	137503	6544	2.448	4.238	1.105
2011	1.466	2.683	0.84	31295	5802	0.657	1.076	0.324
2012	1.996	3.617	1.183	80720	6634	1.171	1.876	0.571
2013	1.517	2.779	0.885	69812	5598	1.352	2.2	0.648
2014	0.661	1.217	0.384	43418	1813	1.914	3.19	0.895
2015	0.789	1.462	0.458	16837	929	0.581	0.943	0.286
2016	0.262	0.506	0.135					

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