

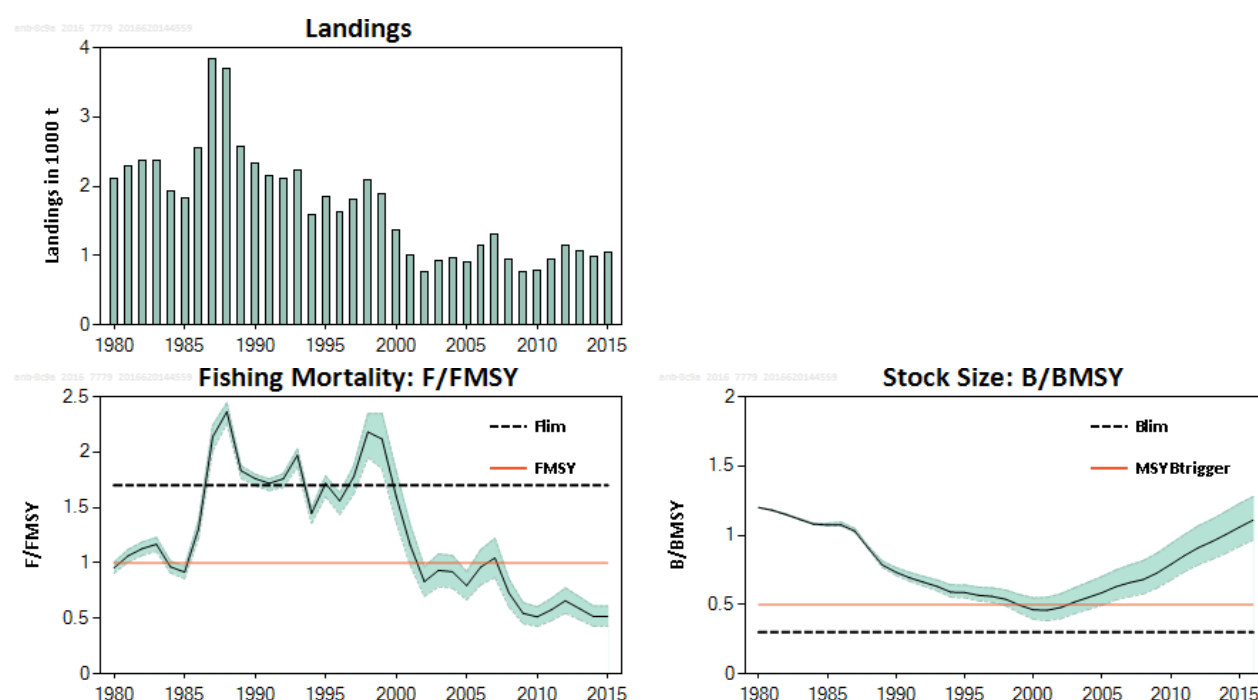
### 7.3.3 Black-bellied anglerfish (*Lophius budegassa*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)

#### ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2017 should be no more than 2122 tonnes. All catches are assumed to be landed.

#### Stock development over time

The stock biomass (B) has been increasing since 2000 and is estimated to be above MSY  $B_{trigger}$  over most of the time-series. Fishing mortality (F) has decreased since 1999 and is estimated to have been below  $F_{MSY}$  since 2008.



**Figure 7.3.3.1** Black-bellied anglerfish in divisions 8.c and 9.a. Summary of stock assessment: Landings (top left),  $F/F_{MSY}$  (bottom left), and  $B/B_{MSY}$  (bottom right) with 80% confidence intervals (shaded area).

#### Stock and exploitation status

**Table 7.3.3.1** Black-bellied anglerfish in divisions 8.c and 9.a. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size		
		2013	2014	2015	2014	2015	2016
Maximum sustainable yield	$F_{MSY}$	✓	✓	✓ Appropriate	$MSY B_{trigger}$	✓	✓ Above trigger
Precautionary approach	$F_{pa}$ , $F_{lim}$	✓	✓	✓ Harvested sustainably	$B_{pa}$ , $B_{lim}$	✓	✓ Full reproductive capacity
Management plan	$F_{MGT}$	-	-	- Not applicable	$SSB_{MGT}$	-	- Not applicable

## Catch options

**Table 7.3.3.2** Black-bellied anglerfish in divisions 8.c and 9.a. The basis for the catch options.

Variable	Value	Source	Notes
$F_{2016}/F_{MSY}$	0.541	ICES (2016a)	mean $F_{(2013-2015)}/F_{MSY}$
$B_{(2017)}/B_{MSY}$	1.153	ICES (2016a)	
Total catch (2016)	1.135 kt		Based on $F_{2016}/F_{MSY}$
Landings (2016)	1.135 kt		Discarding negligible
Discards (2016)	Negligible		Discarding negligible

**Table 7.3.3.3** Black-bellied anglerfish in divisions 8.c and 9.a. The catch options. All weights are in thousand tonnes.

Rationale	Catch (2017)	Basis	$F_{2017}/F_{MSY}$	$B_{2018}/B_{MSY}$	%B change *	% advice change **
MSY approach	2.122	$F_{MSY}$ ( $F_{sq} \times 1.85$ )	1.000	1.134	-2	98
Status quo F	1.177	$F_{sq} \times 1$	0.541	1.192	3	10
Zero catch	0.000	$F_{sq} \times 0$	0.000	1.265	10	-100
Other options	3.469	$F_{lim}$ ( $F_{sq} \times 3.145$ )	1.700	1.049	-9	224
	12.020	$SSB_{2018} = MSY B_{trigger}$ ( $F_{sq} \times 15.42$ )	8.336	0.500	-57	1023
	14.970	$SSB_{2018} = B_{lim}$ ( $F_{sq} \times 23.74$ )	12.830	0.300	-74	1299
	0.910	-15% advice ( $F_{sq} \times 0.768$ )	0.415	1.209	5	-15
	1.070	Equal advice ( $F_{sq} \times 0.914$ )	0.490	1.199	4	0
	1.231	+15% advice ( $F_{sq} \times 1.063$ )	0.566	1.189	3	15
	1.702	*** F multiplier for $F_{MSY}$ of <i>L. piscatorius</i> ( $F_{sq} \times 1.467$ )	0.793	1.160	1	59

\* Biomass 2018 relative to biomass 2017.

\*\* Catch in 2017 relative to advice for 2016 (1070 t).

\*\*\* This catch option applies the same multiplicative factor to the current fishing mortality ( $F_{sq}$ ) for both anglerfish species. This year the *L. piscatorius* multiplier is used.

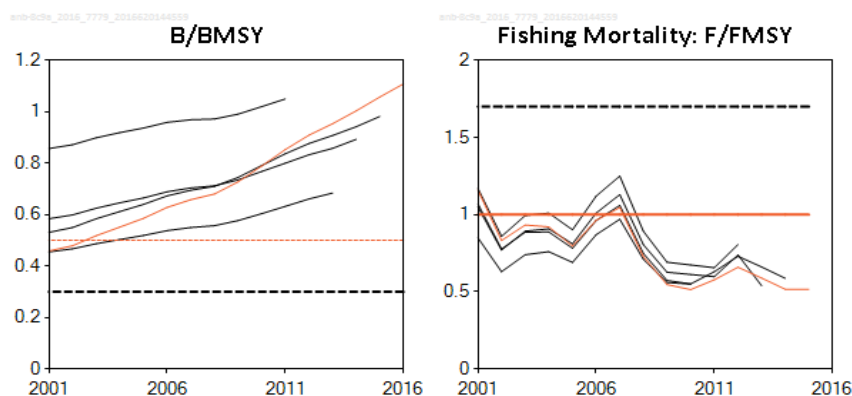
## Basis of the advice

**Table 7.3.3.4** Black-bellied anglerfish in divisions 8.c and 9.a. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no management plan for anglerfish in this area.

## Quality of the assessment

The 2013–2015 values from the LPUE series from Spain (A Coruña fleet) were not used in the assessment because of a change in the data source. As a consequence, only commercial LPUE indices from Portugal, which cover only part of the stock distribution area, were used for 2013–2015, with possible implications for the quality of the assessment.



**Figure 7.3.3.2** Black-bellied anglerfish in divisions 8.c and 9.a. Historical assessment results. This stock was benchmarked prior to the 2012 assessment (ICES, 2012).

### Issues relevant for the advice

The two anglerfish species are not separated in the landings and a single TAC covers both species. For these reasons, ICES advice in previous years was based on a common multiplier of the current  $F$  for both anglerfish species; the value of the multiplier used in the advice corresponded to that required to get fishing mortality for both stocks at or below  $F_{MSY}$  in the advice year. ICES considers that management of the two anglerfish species under a combined TAC prevents effective control of the single-species exploitation rates and could lead to overexploitation of either species. Therefore, this year's advice is based on the single-species  $F_{MSY}$ .

If the TAC continues to be set for both anglerfish species combined, then using the common  $F$  multiplier approach (as has been done in the ICES advice in previous years), would result in combined anglerfish catches in 2017 of no more than:

3955 t (both anglerfish species) = 2253 t (*L. piscatorius* single-species catch advice) + 1702 t (*L. budegassa* catch resulting from the *L. piscatorius*  $F$ -multiplier).

A mixed-fisheries analysis covering the stocks in Iberian waters of hake, megrim, four-spot megrim, and white anglerfish is provided for the first time this year (ICES, 2016b).

### Reference points

**Table 7.3.3.5** Black-bellied anglerfish in divisions 8.c and 9.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	50% $B_{MSY}$	Relative value. $B_{MSY}$ is estimated directly from the assessment model and changes when the assessment is updated.	ICES (2012)
	$F_{MSY}$	Relative value	Relative value. $F_{MSY}$ is estimated directly from the assessment model and changes when the assessment is updated.	ICES (2012)
Precautionary approach	$B_{lim}$	30% $B_{MSY}$	Relative value (equilibrium yield at this biomass is 50% of MSY).	ICES (2016a)
	$B_{pa}$	Not defined		
	$F_{lim}$	170% $F_{MSY}$	Relative value (the $F$ that drives the stock to $B_{lim}$ ).	ICES (2016a)
	$F_{pa}$	Not defined		
Management plan	$SSB_{MGT}$	Not applicable		
	$F_{MGT}$	Not applicable		

## Basis of the assessment

**Table 7.3.3.6** Black-bellied anglerfish in divisions 8.c and 9.a. The basis of the assessment.

ICES stock data category	1 ( <a href="#">ICES, 2016c</a> )
Assessment type	Surplus production model (ASPIC; ICES, 2016a) that uses landings in the model and in the forecast.
Input data	Commercial catches (international landings); three commercial indices (SPCORT8c 1982–2012, PT.crust.tr 1989–2015, and PT.fish.tr 1989–2015).
Discards and bycatch	Discarding is assumed to be negligible.
Indicators	None
Other information	This stock was benchmarked in 2012 ( <a href="#">WKFLAT</a> ; ICES, 2012)
Working group	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion ( <a href="#">WGBIE</a> )

## Information from stakeholders

There is no information available.

## History of the advice, catch, and management

**Table 7.3.3.7** Black-bellied anglerfish in divisions 8.c and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in thousand tonnes.

Year	ICES advice*	Predicted landings corresp. to advice for combined <i>Lophius</i> species	Predicted landings corresp. to advice for <i>L. budegassa</i>	Agreed TAC , **	ICES landings for combined <i>Lophius</i> species	ICES landings <i>L. budegassa</i>
1987	Not dealt with	-		12.0	8.9	3.8
1988	Not dealt with	-		12.0	10.0	3.7
1989	Not dealt with	-		12.0	7.6	2.6
1990	Not dealt with	-		12.0	6.1	2.3
1991	No advice	-		12.0	5.8	2.2
1992	No advice	-		12.0	4.2	2.1
1993	No long-term gain in increasing F	-		13.0	4.5	2.2
1994	No advice	-		13.0	3.6	1.6
1995	If required a precautionary TAC	-		13.0	3.6	1.8
1996	If required a precautionary TAC	-		13.0	4.6	1.6
1997	If required a precautionary TAC	-		13.0	5.5	1.8
1998	Restrict catch to < 80% recent levels			10.0	5.1	2.1
1999	Reduce F to $F_{pa}$	4.2		8.5	3.8	1.9
2000	60% reduction in F	1.6		6.8	2.6	1.4
2001	50% reduction in F	2.8		6.0	1.8	1.0
2002	30% reduction in F	3.5		4.8	1.8	0.8
2003	5% reduction in F	3.2		4.0	3.2	0.9
2004	F = 0 or recovery plan***	0***		2.3	4.1	1.0
2005	F = 0 or recovery plan	0		2.0	4.5	0.9
2006	F = 0 or recovery plan	0		2.0	4.1	1.1
2007	F = 0 or recovery plan	0		2.0	3.6	1.3
2008	F = 0 or recovery plan	0		2.0	3.3	1.0
2009	Same advice as last year	0		1.8	3.0	0.8
2010	F = 0 or management plan	0		1.5	2.3	0.8
2011	MSY framework	1.5	0.48	1.6	1.8	0.8
2012	MSY framework	3.3	1.1	3.3	2.3	1.0
2013	MSY transition	2.09	0.74	2.5	2.2	0.8
2014	MSY approach	2.629	1.153	2.6	3.0	1.0
2015	MSY approach	2.987	1.050	3.0	2.8	1.042

Year	ICES advice*	Predicted landings corresp. to advice for combined <i>Lophius</i> species	Predicted landings corresp. to advice for <i>L. budegassa</i>	Agreed TAC , **	ICES landings for combined <i>Lophius</i> species	ICES landings <i>L. budegassa</i>
2016	MSY approach^	$\leq 2.413$	$\leq 1.070$	2.6		
2017	MSY approach^		$\leq 2.122$			

\* For *Lophius piscatorius* and *L. budegassa* combined.

\*\* For Division 8.c and subareas 9 and 10; EU waters of CECAF 34.1.1.

\*\*\* Single-stock boundary and the exploitation of this stock should be conducted in the context of mixed fisheries, protecting stocks outside safe biological limits.

^ Advice is for catch.

### History of catch and landings

**Table 7.3.3.8** Black-bellied anglerfish in divisions 8.c and 9.a. Catch distribution by fleet in 2015 as estimated by ICES.

Table 7B.15B Black Seamed angelfish in divisions 3-E and 3-F: Catch distribution by fleet in 2015 as estimated by RECs						
Total catch (2015)	Landings					Discards
1.042 kt	44.5% bottom trawl	21.3% Portuguese artisanal	19.4% Spanish gillnet	0.3% Other gears	14.6% Unallocated	Negligible
	1.042kt					

**Table 7.3.3.9** Black-bellied anglerfish in divisions 8.c and 9.a. History of commercial catch and landings, both the official and ICES estimated values are presented by area for each country participating in the fishery. Weights are in tonnes.

Year	Division 8.c				Division 9.a						Divisions 8.c and 9.a		
	SPAIN				SPAIN			PORTUGAL					
	Trawl	Gillnet	Others	TOTAL	Trawl I	Gillnet	Others	Trawl	Artisanal	TOTAL	SUBTOTAL	Unallocated	TOTAL
1978	n/a	n/a		n/a	248			n/a	107	355	355		355
1979	n/a	n/a		n/a	306			n/a	210	516	516		516
1980	1203	207		1409	385			n/a	315	700	2110		2110
1981	1159	309		1468	505			n/a	327	832	2300		2300
1982	827	413		1240	841			n/a	288	1129	2369		2369
1983	1064	188		1252	699			n/a	428	1127	2379		2379
1984	514	176		690	558			223	458	1239	1929		1929
1985	366	123		489	437			254	653	1344	1833		1833
1986	553	585		1138	379			200	847	1425	2563		2563
1987	1094	888		1982	813			232	804	1849	3832		3832
1988	1058	1010		2068	684			188	760	1632	3700		3700
1989	648	351		999	764			272	542	1579	2578		2578
1990	491	142		633	689			387	625	1701	2334		2334
1991	503	76		579	559			309	716	1584	2162		2162
1992	451	57		508	485			287	832	1603	2111		2111
1993	516	292		809	627			196	596	1418	2227		2227
1994	542	201		743	475			79	283	837	1580		1580
1995	924	104		1029	615			68	131	814	1843		1843
1996	840	105		945	342			133	210	684	1629		1629
1997	800	198		998	524			81	210	815	1813		1813
1998	748	148		896	681			181	332	1194	2089		2089
1999	565	127		692	671			110	406	1187	1879		1879
2000	441	73		514	377			142	336	855	1369		1369
2001	383	69		452	190			101	269	560	1013		1013
2002	173	74		248	234			75	213	522	770		770
2003	279	49		329	305			68	224	597	926		926
2004	250	120		370	285			50	267	603	973		973
2005	273	97		370	283			31	214	527	897		897
2006	323	124		447	541			39	121	701	1148		1148
2007	372	68		440	684			66	111	861	1301		1301
2008	386	70		456	336			40	119	495	951		951
2009	301	148		449	172			34	114	320	769		769
2010	352	81		432	197			70	84	351	784		784
2011	214	115	32	361	157	60	98	75	119	510	871	74	945
2012	161	83	22	265	109	40	90	156	370	765	1030	109	1139
2013	221	135	14	370	95	55	90	100	258	598	968	98	1066
2014	187	126	7	319	120	47	4	113	286	569	888	100	988
2015	233	141	1	375	103	62	2	126	222	515	890	152	1042

## Summary of the assessment

**Table 7.3.3.10** Black-bellied anglerfish in divisions 8.c and 9.a. Assessment summary (weights in tonnes) with 80% confidence intervals.

Year	Biomass: Biomass/B <sub>MSY</sub>	80% confidence interval		Landings (tonnes)	Fishing mortality: F/F <sub>MSY</sub>	80% confidence interval	
		High	Low			High	Low
1980	1.2	1.2	1.2	2110	0.956	1.006	0.906
1981	1.18	1.18	1.18	2300	1.065	1.122	1.008
1982	1.15	1.15	1.15	2370	1.129	1.189	1.068
1983	1.11	1.12	1.11	2380	1.169	1.23	1.106
1984	1.08	1.09	1.08	1930	0.965	1.017	0.91
1985	1.07	1.09	1.07	1830	0.917	0.97	0.859
1986	1.07	1.09	1.07	2560	1.311	1.388	1.225
1987	1.03	1.05	1.02	3830	2.137	2.242	2.012
1988	0.91	0.92	0.9	3700	2.364	2.443	2.26
1989	0.79	0.81	0.77	2580	1.832	1.878	1.766
1990	0.73	0.77	0.71	2330	1.761	1.8	1.697
1991	0.69	0.73	0.67	2160	1.718	1.758	1.652
1992	0.66	0.7	0.63	2110	1.759	1.805	1.681
1993	0.63	0.68	0.6	2230	1.97	2.027	1.864
1994	0.59	0.64	0.55	1580	1.447	1.495	1.357
1995	0.59	0.64	0.55	1840	1.718	1.785	1.599
1996	0.57	0.63	0.53	1630	1.56	1.632	1.437
1997	0.56	0.62	0.52	1810	1.779	1.877	1.621
1998	0.54	0.6	0.49	2090	2.181	2.346	1.952
1999	0.5	0.57	0.44	1880	2.117	2.347	1.849
2000	0.46	0.55	0.39	1370	1.603	1.827	1.37
2001	0.46	0.55	0.38	1010	1.16	1.343	0.979
2002	0.48	0.58	0.4	770	0.832	0.965	0.699
2003	0.52	0.62	0.44	926	0.933	1.082	0.785
2004	0.55	0.66	0.46	972	0.921	1.067	0.774
2005	0.59	0.7	0.49	897	0.796	0.92	0.667
2006	0.63	0.75	0.53	1150	0.963	1.12	0.804
2007	0.66	0.79	0.56	1300	1.046	1.223	0.869
2008	0.68	0.82	0.58	951	0.728	0.854	0.605
2009	0.73	0.87	0.62	769	0.546	0.642	0.454
2010	0.79	0.94	0.68	784	0.514	0.605	0.427
2011	0.85	1	0.74	945	0.578	0.68	0.48
2012	0.91	1.07	0.79	1140	0.659	0.775	0.548
2013	0.95	1.12	0.83	1070	0.589	0.695	0.489
2014	1	1.17	0.87	988	0.516	0.61	0.429
2015	1.06	1.23	0.92	1040	0.517	0.611	0.43
2016	1.11	1.28	0.97				

## Sources and references

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