

## Black-bellied anglerfish (*Lophius budegassa*) in Subarea 7 and divisions 8.a–b and 8.d (Celtic Seas, Bay of Biscay)

### ICES advice on fishing opportunities

**Please note: the present advice replaces the advice given in June 2022.**

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 23 436 tonnes.

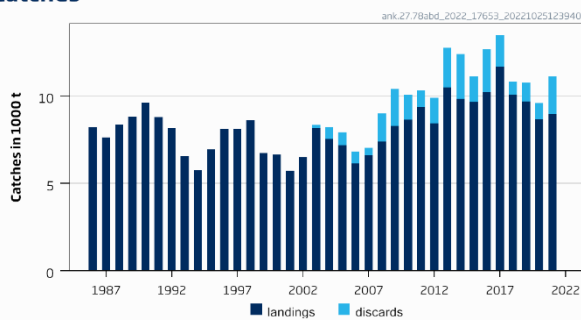
ICES notes the existence of a precautionary management plan developed and adopted by one of the relevant management authorities for this stock.

Management of catches of the two anglerfish species—black-bellied anglerfish (*Lophius budegassa*) and white anglerfish (*Lophius piscatorius*)—under a combined species total allowable catch (TAC) prevents effective control of the single-species exploitation rates and could lead to the overexploitation of either species.

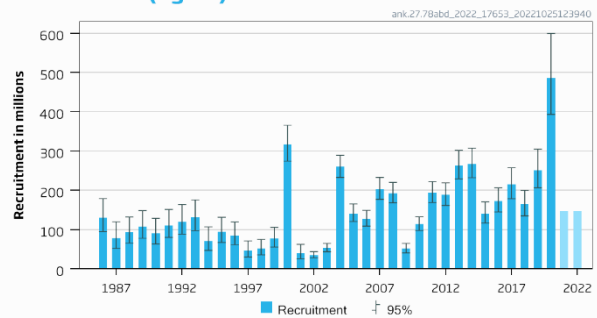
### Stock development over time

Fishing pressure on the stock is below  $F_{MSY}$  and spawning-stock size is above MSY  $B_{trigger}$ ,  $B_{pa}$ , and  $B_{lim}$ .

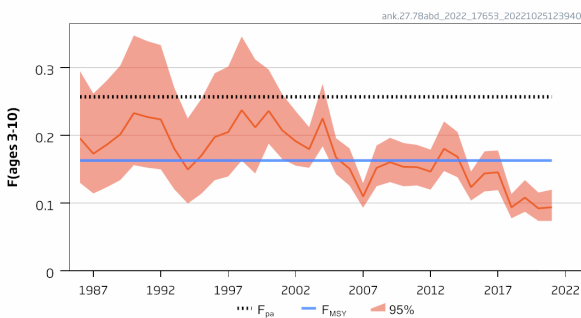
#### Catches



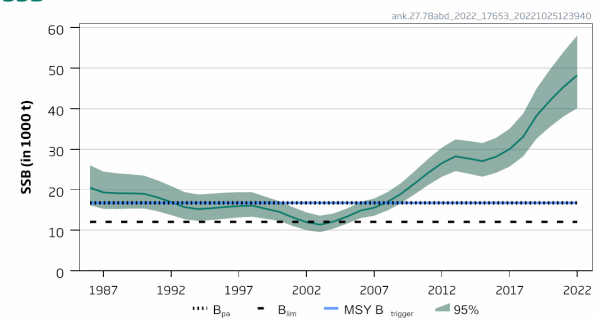
#### Recruitment (age 0)



#### F



#### SSB



**Figure 1**

Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Summary of the stock assessment. Discard observations are available since 2003. The assumed recruitment values for 2021 and 2022 are shaded in a lighter colour.

**Catch scenarios**

**Table 1<sup>†</sup>** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. The basis of the catch scenarios.

Variable	Value	Notes
$F_{\text{ages 3–10}}$ (2022)	0.098	Status quo $F_{\text{ages 3–10}}$ (average 2019–2021).
SSB (2023)	49454	Short-term forecast (STF); in tonnes.
$R_{\text{age 0}}$ (2022)	147092	Predicted from stock–recruitment relationship; in thousands.
$R_{\text{age 0}}$ (2023)	147437	Predicted from stock–recruitment relationship; in thousands.
Catch (2022)	14606	STF; in tonnes.
Projected landings (2022)	10458	STF assuming average landings ratio by age (2019–2021); in tonnes.
Projected discards (2022)	4148	STF assuming average discards ratio by age (2019–2021); in tonnes.

**Table 2** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Annual catch scenarios. All weights are in tonnes.  
 Note: the % change in TAC is not computed because the TAC is for both species of anglerfish.

Basis	Total catch (2023)	Projected landings* (2023)	Projected discards ** (2023)	$F_{\text{ages 3–10}}$ Total (2023)	$F_{\text{ages 3–10}}$ Projected landings (2023)	$F_{\text{ages 3–10}}$ Projected discards (2023)	SSB (2024)	% SSB change ***	% advice change <sup>^</sup>
ICES advice basis									
MSY approach = $F_{\text{MSY}}$	23436	18793	4643	0.163	0.156	0.0069	50314	1.74	+26
Other options									
$F_{\text{MSY lower}}$	16483	13220	3263	0.112	0.107	0.0048	52946	7.1	-11.7
$F_{\text{MSY upper}}$	33948	27211	6737	0.24	0.23	0.0104	46353	-6.3	+82
$F = 0$	0	0	0	0	0	0	59220	19.8	-100
$F_{\text{pa}}$	35420	28390	7030	0.26	0.25	0.0109	45800	-7.4	+90
$\text{SSB}_{2024} = B_{\text{lim}}$	129513	103228	26285	1.59	1.52	0.067	12073	-76	+594
$\text{SSB}_{2024} = B_{\text{pa}} = \text{MSY } B_{\text{trigger}}$	115519	92189	23330	1.26	1.21	0.054	16776	-66	+519
$\text{SSB}_{2024} = \text{SSB}_{2023}$	25712	20616	5096	0.180	0.173	0.0076	49454	0	+38
$F = F_{2022}$	14536	11660	2876	0.098	0.094	0.0042	53685	8.6	-22

\* Marketable landings, assuming recent discard rate.

\*\* Including BMS landings (EU stocks), assuming recent discard rate.

\*\*\* SSB 2024 relative to SSB 2023.

<sup>^</sup> Advice value for 2023 relative to advice value for 2022 (18 661 tonnes).

The advice for 2023 is 26% higher because the advice is now based on the MSY approach using a category 1 assessment method and forecast after being benchmarked (ICES, 2022a).

**Basis of the advice**

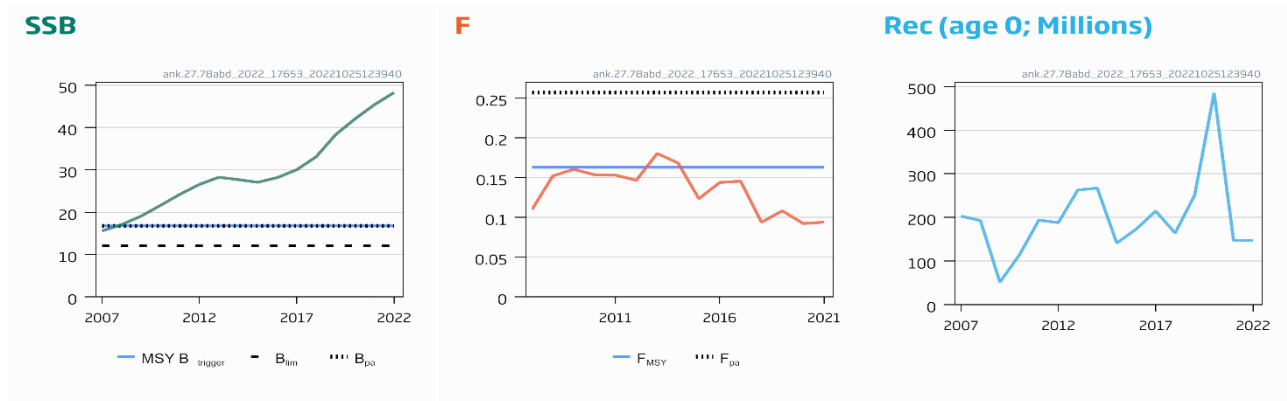
**Table 3** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. The basis of the advice.

Advice basis	MSY approach
Management plan	ICES is aware of the multiannual management plan (EU MAP) which was adopted by the EU for this stock (EU, 2019) and which ICES considers to be precautionary. There is no agreed shared management plan with UK for this stock, and ICES provides advice according to the ICES MSY approach. Catch scenarios consistent with the MAP $F_{\text{MSY}}$ ranges are provided.

<sup>†</sup> Version 2: the values for  $R_{\text{age 0}}$  (2022),  $R_{\text{age 0}}$  (2023), and Catch (2022) have been corrected.

### Quality of the assessment

The stock was benchmarked in 2022 (ICES, 2022a). The broad perception of the stock is unchanged ( $F < F_{MSY}$  and increasing stock size).



**Figure 2** Black-bellied anglerfish in Subarea 7 and divisions 8.a–8.b and 8.d. Historical assessment results. The basis for the advice has changed from a trends-based analysis (category 3) to an analytical assessment (category 1) in 2022, and there are no previous estimates of SSB, F, or R.

### Issues relevant for the advice

The two anglerfish species are not separated in the landings statistics. The TACs are set separately for Subarea 7 and divisions 8.a, 8.b, 8.d, and 8.e with each TAC covering catches of both species. Species-specific landings are estimated by ICES. ICES considers that management of the catches of these two species under a combined TAC prevents effective control of single-species exploitation rates and could lead to overexploitation of either species.

### Reference points

**Table 4** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	16776	$B_{pa}$ ; in tonnes.	ICES (2022a)
	$F_{MSY}$	0.163	Stochastic simulations (EqSim) with Beverton-Holt stock-recruitment relationship estimated by the assessment model.	ICES (2022a)
Precautionary approach	$B_{lim}$	12073	$SSB_{2004}$ ; lowest observed SSB with high recruitment; in tonnes.	ICES (2022a)
	$B_{pa}$	16776	$B_{lim} \times \exp(\sigma \times 1.645)$ , where $\sigma = 0.2$ ; in tonnes.	ICES (2022a)
	$F_{lim}$	Undefined	Inconsistent with $F_{pa}$ .	ICES (2022a)
	$F_{pa}$	0.257	$F_{P05}$ ; the F that leads to $SSB \geq B_{lim}$ with 95% probability.	ICES (2022a)
Management plan	MAP MSY $B_{trigger}$	16776	MSY $B_{trigger}$ ; in tonnes.	ICES (2022a)
	MAP $B_{lim}$	12073	$B_{lim}$ ; in tonnes.	ICES (2022a)
	MAP $F_{MSY}$	0.163	$F_{MSY}$	ICES (2022a)
	MAP range $F_{lower}$	0.122	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with $F_{MSY}$ .	ICES (2022a)
	MAP range $F_{upper}$	0.245	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with $F_{MSY}$ .	ICES (2022a)

## Basis of the assessment

**Table 5** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. The basis of the assessment.

ICES stock data category	1 (ICES, 2022b).
Assessment type	Length-based age-structured Stock Synthesis model that uses catches in the model and forecast (ICES, 2022a; 2022c).
Input data	Commercial landings and discards and three surveys: IAMS [G3098]; IE-IGFS [G7212], and EVHOE [G9527]; the latter two surveys are combined into a single index.
Discards and bycatch	Discard estimates are available since 2003 and used in the assessment.
Indicators	None.
Other information	Last benchmarked in 2022 (ICES, 2022a).
Working group report	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE).

## History of the advice, catch, and management

**Table 6** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. History of ICES advice, the agreed TAC, and ICES estimates of landings. All weights are in tonnes.

Year	<i>L. budegassa</i>	<i>L. budegassa</i>	Combined <i>L. budegassa</i> + <i>piscatorius</i>			<i>L. budegassa</i>	
	ICES advice	Catch/landings corresponding to advice*,**	Catch/landings corresponding to advice*,**	Agreed TAC***	ICES landings^	ICES landings^	ICES catches^
1986	Not assessed	-	-		33198	8218	
1987	Not assessed	-	-	39080	30710	7620	
1988	Not assessed	-	-	42990	29696	8382	
1989	Not assessed	-	-	42990	32835	8820	
1990	Not assessed	-	-	42990	30615	9632	
1991	No advice	-	-	42990	25543	8780	
1992	No advice	-	-	42990	21793	8176	
1993	SSB is decreasing	-	-	25100	21461	6566	
1994	SSB is decreasing	-	-	23900	22945	5744	
1995	No increase in F	-	20000	23200	27987	6955	
1996	No increase in F	-	30300	30400	31426	8093	
1997	No increase in F	-	34300	34300	31097	8115	
1998	No increase in F	-	33000	34300	29073	8600	
1999	No increase in F	-	32900	34300	25531	6739	
2000	≥ 20% decrease in F	-	< 22300	29600	21096	6644	
2001	Reduce F below $F_{pa}$	-	< 27600	27600	23021	5729	
2002	Reduce F below $F_{pa}$	-	< 19900	23700	28588	6505	
2003	≥ 30% decrease in F	-	< 16400	21000	36104	8171	8350
2004	≥ 10% decrease in F	-	< 26700	26700	36565	7538	8214
2005	Maintain $F < F_{pa}$	-	< 37800	31200	35056	7187	7914
2006	Maintain $F < F_{pa}$	-	< 33900	34000	33783	6130	6834
2007	Maintain $F < F_{pa}$	-	< 36000	36000	37821	6608	7021
2008	< average landings	-	< 33000	36000	34452	7398	8983
2009	Same advice as 2008	-	< 33000	36000	30122	8287	10400
2010	No increase in effort	-	-	41400	30841	8627	10063
2011	No increase in effort	-	-	40900	34005	9348	10319
2012	Reduce catch	-	-	38897	36617	8429	9888
2013	Reduce catch <i>pro rata</i> biomass decrease	< 6900	< 24800	36953	41086	10475	12760
2014	Increase landings <i>pro rata</i> biomass increase	< 10757	< 37448	42496	38306	9832	12402
2015	Same advice as 2014	< 10757	< 37448	42496	37508	9651	11111
2016	PA; same as 2015	≤ 10757	≤ 37448	42496	39303	10220	12661
2017	PA; same as 2016	≤ 10757	≤ 37448	42496	37324	11689	13459
2018	PA; same as 2017	≤ 10757	≤ 37448	42496	32421	10077	10804
2019	PA (catch advice)	≤ 10799	≤ 41841	41370	30512	9679	10763

Year	<i>L. budegassa</i>	<i>L. budegassa</i>	Combined <i>L. budegassa</i> + <i>piscatorius</i>			<i>L. budegassa</i>	
	ICES advice	Catch/landings corresponding to advice*,**	Catch/landings corresponding to advice*,**	Agreed TAC***	ICES landings^	ICES landings^	ICES catches^
2020	PA (catch advice)	≤ 12959	≤ 44757	44307	28713	8676	9602
2021	PA (catch advice)	≤ 15551	≤ 50130	48338	31005	8965	11107
2022	PA (catch advice)	≤ 18661	≤ 52936	52205			
2023	MSY approach	≤ 23436	≤ 57976				

\* Includes Division 7.a since the 2018 benchmark (ICES, 2018).

\*\* PA and MSY advice refer to landings up to 2018 and catches since 2019.

\*\*\* Combined TACs for subareas 7 and 8 (which includes Division 8.e).

^ Revised at the 2022 benchmark (ICES, 2022a).

### History of catch and landings

**Table 7** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Catch distribution by fleet in 2021 as estimated by ICES. All weights are in tonnes.

Catch	Landings					Discards
	82% otter trawl demersal fish	2% otter trawl <i>Nephrops</i>	7% beam trawl	6% gillnets	4% others	
11107	8965					2141

**Table 8** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. History of the ICES estimates of the catch and landings by area and by country. All weights are in tonnes.

Year	ICES estimated landings from Subarea 7						ICES estimated landings from divisions 8.a, 8.b, 8.d				ICES estimated; Subarea 7 and divisions 8.a, 8.b, 8.d		
	ESP	FRA	GBR	IRL	OTH	Total 7	ESP	FRA	OTH	Total 8.a, 8.b, 8.d	Landings	Discards	Catch
1986	2816	2251	949	262	165	6443	485	1289	0	1775	8217		
1987	2174	1868	805	241	28	5116	953	1551	0	2504	7620		
1988	2316	2572	1160	234	65	6347	695	1341	0	2035	8382		
1989	2445	2932	472	310	275	6434	602	1785	0	2387	8820		
1990	2393	2914	1030	614	109	7061	571	2000	0	2571	9632		
1991	2180	2390	809	858	17	6254	799	1727	0	2526	8780		
1992	1763	2440	1002	774	28	6008	536	1632	0	2168	8176		
1993	1304	1941	727	607	68	4646	589	1331	0	1919	6566		
1994	1374	1820	378	290	86	3948	624	1172	0	1796	5744		
1995	1668	2448	389	630	69	5204	463	1287	0	1750	6954		
1996	1909	2763	576	641	90	5979	525	1589	0	2114	8093		
1997	2143	2804	644	557	38	6185	366	1563	0	1929	8114		
1998	2042	2419	763	1234	53	6510	441	1648	0	2089	8599		
1999	2434	1771	193	529	141	5068	458	1212	0	1670	6739		
2000	2051	1961	167	873	169	5220	445	980	0	1424	6645		
2001	2083	1516	131	580	168	4478	333	918	0	1251	5728		
2002	2451	1710	146	309	119	4734	463	1309	0	1771	6505		
2003	3600	2175	181	180	119	6256	396	1520	0	1916	8171	179	8351
2004	2875	1845	256	224	157	5358	471	1708	0	2178	7537	676	8213
2005	2902	1530	248	365	167	5214	415	1559	0	1974	7187	727	7914
2006	2737	1536	131	200	71	4675	282	1171	2	1456	6131	704	6835
2007	2451	1747	150	348	162	4857	316	1434	1	1751	6608	413	7021
2008	3017	2030	279	508	205	6039	265	1095	1	1360	7399	1585	8985
2009	3498	1635	304	797	244	6478	293	1515	2	1809	8287	2113	10400
2010	2866	2179	469	981	316	6812	317	1490	8	1815	8626	1436	10062
2011	3812	1863	418	941	382	7416	503	1423	8	1933	9348	971	10319
2012	2888	2032	365	621	53	5959	692	1612	167	2471	8429	1459	9888
2013	3896	2211	484	615	68	7274	790	2032	379	3200	10475	2285	12760
2014	1629	2829	862	720	74	6114	945	2526	246	3718	9832	2570	12402
2015	1384	2945	1046	839	69	6284	749	2480	136	3365	9649	1460	11109
2016	1118	2881	1063	970	94	6127	918	2968	206	4093	10220	2441	12660
2017	1287	4255	1183	793	0	7518	941	3000	231	4172	11690	1770	13460
2018	890	3443	898	1110	0	6341	766	2807	161	3734	10076	727	10803
2019	1366	3500	993	940	0	6800	645	2156	79	2880	9680	1084	10764
2020	1538	2575	757	1445	187	6502	611	1547	16	2174	8676	926	9601
2021	1548	3790	1309	721	78	7445	422	1085	13	1520	8965	2141	11107

### Summary of the assessment

**Table 9** Black-bellied anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Assessment summary. ‘High’ and ‘Low’ refer to 95% confidence intervals. Weights are in tonnes and recruitment is in thousands. Discard observations are available since 2003.

Year	Recruitment (age 0)			Stock size			Landings (tonnes)	Discards (tonnes)	F ages 3–10		
	R	High	Low	SSB	High	Low			F	High	Low
1986	130138	178763	94740	20510	26072	16135	8217		0.196	0.30	0.130
1987	78878	119913	51885	19353	24509	15281	7620		0.173	0.26	0.114
1988	92875	132061	65316	19154	24073	15240	8382		0.186	0.28	0.124
1989	107480	148279	77907	19125	23823	15353	8820		0.20	0.30	0.134
1990	90320	128901	63287	19008	23513	15366	9632		0.23	0.35	0.156
1991	110098	151448	80038	18124	22344	14702	8780		0.23	0.34	0.152
1992	120102	163586	88177	16973	20942	13756	8176		0.22	0.33	0.150
1993	130768	175502	97436	15720	19435	12715	6566		0.181	0.27	0.120
1994	70720	106993	46745	15233	18843	12314	5744		0.150	0.23	0.099

Year	Recruitment (age 0)			Stock size			Landings (tonnes)	Discards (tonnes)	F ages 3–10		
	R	High	Low	SSB	High	Low			F	High	Low
1995	93995	131409	67234	15454	19056	12533	6954		0.170	0.25	0.114
1996	85624	119608	61296	15755	19302	12860	8093		0.198	0.29	0.134
1997	46250	71007	30125	15986	19421	13159	8114		0.21	0.30	0.139
1998	51746	75008	35698	16090	19390	13352	8599		0.24	0.35	0.163
1999	76442	105463	55407	15305	18273	12818	6739		0.21	0.31	0.144
2000	316721	365778	274244	14552	17193	12316	6645		0.24	0.30	0.188
2001	39897	62506	25466	13175	15712	11047	5728		0.21	0.26	0.165
2002	35233	43857	28304	12026	14437	10017	6505		0.192	0.24	0.155
2003	53176	64765	43661	11401	13620	9544	8171	179	0.180	0.21	0.152
2004	259446	289442	232559	12148	14177	10409	7537	676	0.23	0.28	0.184
2005	141191	165227	120652	13393	15413	11638	7187	727	0.167	0.196	0.143
2006	127334	149025	108800	14894	17052	13009	6131	704	0.151	0.181	0.126
2007	202972	232714	177031	15582	17867	13589	6608	413	0.110	0.130	0.093
2008	192670	220453	168388	17049	19468	14929	7399	1585	0.152	0.185	0.125
2009	51394	64881	40710	19055	21723	16715	8287	2113	0.161	0.197	0.131
2010	113789	132654	97607	21601	24651	18928	8626	1436	0.154	0.189	0.125
2011	193717	222015	169026	24221	27692	21185	9348	971	0.153	0.186	0.126
2012	187939	218938	161329	26565	30404	23210	8429	1459	0.147	0.179	0.120
2013	262877	301875	228917	28254	32444	24604	10475	2285	0.180	0.22	0.147
2014	267119	307371	232138	27695	32043	23937	9832	2570	0.168	0.21	0.138
2015	141082	170719	116590	27072	31545	23232	9649	1460	0.124	0.147	0.104
2016	172973	206478	144905	28169	32818	24178	10220	2441	0.144	0.177	0.117
2017	214456	257467	178630	30032	35071	25717	11690	1770	0.146	0.178	0.119
2018	164120	199904	134741	33086	38802	28212	10076	727	0.094	0.114	0.078
2019	250884	304808	206500	38325	45019	32626	9680	1084	0.108	0.134	0.087
2020	485415	599461	393066	42068	49764	35562	8676	926	0.092	0.116	0.074
2021	146922*			45430	54131	38128	8965	2141	0.094	0.120	0.074
2022	147092*			48272	58079	40121					

\* Assumed recruitment based on stock–recruit relationship.

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