

White anglerfish (*Lophius piscatorius*) in divisions 8.c and 9.a (Cantabrian Sea and Atlantic Iberian waters)

ICES advice on fishing opportunities

ICES advises that when the EU multiannual plan (MAP) for Western waters and adjacent waters is applied, catches in 2022 that correspond to the F ranges in the MAP are between 1345 tonnes and 2507 tonnes. According to the MAP, catches higher than those corresponding to FMSY (1899 tonnes) can only be taken under conditions specified in the MAP, while the entire range is considered precautionary when applying the ICES advice rule.

Management of catches of the two anglerfish species, *Lophius budegassa* and *L. piscatorius*, under a combined species 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} .



Figure 1 White anglerfish in divisions 8.c and 9.a. Summary of stock assessment. Assumed recruitment value for 2021 is shaded in a lighter colour.

Catch scenarios

Table 1 White anglerfish in divisions 8.c and 9.a. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{30-130\text{ cm}}$ (2021)	0.093	F_{sq} = Average (2018–2020).
SSB (2022)	11557	Short-term forecast fishing at status quo (F_{sq}); tonnes.
R (2021, 2022)	706	Geometric mean of recruitment (2003–2020); thousands
Total catch (2021)	760	Short-term forecast fishing at F_{sq} . Discarding assumed to be negligible; tonnes.
Projected landings (2021)	760	Short-term forecast fishing at F_{sq} ; tonnes.
Projected discards (2021)	0	Discarding is assumed to be negligible.

Table 2 White anglerfish in divisions 8.c and 9.a. Annual catch scenarios. All weights are in tonnes. The % change in TAC is not computed because the TAC is for the two species (*L. piscatorius* and *L. budegassa*) combined.

Basis	Total catch (2022)	F _{total} (2022)	SSB (2023)	% SSB change **	% Advice change ^
ICES advice basis					
EU MAP *: F _{MSY}	1899	0.24	10506	-9.1	1.44
F = MAP F _{MSY} lower	1345	0.164	11123	-3.8	3.9 ^^
F = MAP F _{MSY} upper	2507	0.33	9827	-15.0	-1.40 ^^
Other options					
MSY approach = F _{MSY}	1899	0.24	10506	-9.1	1.44
F = 0	0	0	12608	9.1	-100
F _{pa}	5256	0.87	6698	-42	181
SSB (2023) = B _{lim}	9100	2.9	1993	-83	390
SSB (2023) = B _{pa}	8510	2.3	2769	-76	350
SSB (2023) = MSY _{Btrigger}	5613	0.96	6283	-46	200
SSB ₂₀₂₃ = SSB ₂₀₂₂	953	0.114	11557	0	-49
F = F ₂₀₂₁	788	0.093	11739	1.57	-58

* The EU multiannual plan (MAP; EU, 2019).

** SSB 2023 relative to SSB 2022 (11 557 tonnes).

^ Advice value for 2022 relative to advice value for 2021 (1872 tonnes).

^^ Advice value this year relative to the advice value last year for the MAP F_{MSY} lower (1295 tonnes) and MAP F_{MSY} upper (2472 tonnes).

Basis of the advice

Table 3 White anglerfish in divisions 8.c and 9.a. The basis of the advice.

Advice basis	Management plan approach
Management plan	<p>The EU multiannual plan (MAP) for stocks in the Western Waters and adjacent waters applies to this stock. The plan specifies conditions for setting fishing opportunities, depending on stock status and making use of the FMSY range for the stock.</p> <p>In accordance with the MAP, catches higher than those corresponding to F_{MSY} can only be taken providing SSB is greater than MSY_{Btrigger}, and one of the following conditions is met:</p> <ul style="list-style-type: none"> a) if it is necessary for the achievement of objectives of mixed fisheries; b) if it is necessary to avoid serious harm to a stock caused by intra- or inter-species stock dynamics; c) in order to limit variations in fishing opportunities between consecutive years to not more than 20%. <p>ICES considers that the F_{MSY} range for this stock used in the MAP is precautionary.</p> <p>Full details of the plan are described in Regulation 2019/472 (EU, 2019).</p>

Quality of the assessment

The collection of data from the commercial fishery and research surveys during 2020 has been impacted by COVID-19 restrictions to a varying degree across member states. For this stock, the length distribution data for fleets SP-OTB, PT-OTB, and PT-ART were not available for 2020 due to the low level of sampling and sampling gaps in some strata. The diagnostics for the assessment were considered to be acceptable and did not change the perception of the stock.

Results of the assessment rely heavily on specific assumptions regarding the exploitation pattern on older fish, for which no abundance index is available, and the estimates of their biomass are thus highly uncertain. To improve the quality of the assessment, fishery-independent information on large fish would be required.

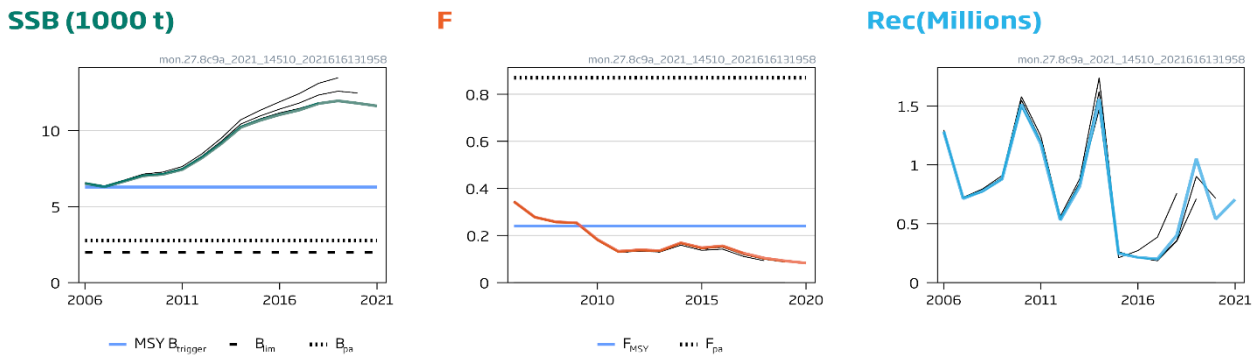


Figure 2 White anglerfish in divisions 8.c and 9.a. Historical assessment results (final-year recruitment assumptions included). All reference points were revised in 2018 following a benchmark and F_{pa} was updated in 2021.

Issues relevant for the advice

The two anglerfish species (*L. piscatorius* and *L. budegassa*) are not separated in the landings statistics. A single TAC covers both species, with species-specific landings being estimated by ICES (ICES, 2018). 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 the overexploitation of either species.

Reference points

Table 4 White anglerfish in divisions 8.c and 9.a. Reference points, values, and their technical basis. All weights are in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	6283	5th percentile of the SSB when fishing at F_{MSY} ; in tonnes	ICES (2021c)
	F_{MSY}	0.24	Stochastic simulations based on a segmented regression.	ICES (2021c)
Precautionary approach	B_{lim}	1993	B_{loss} (lowest observed SSB value); in tonnes	ICES (2021c)
	B_{pa}	2769	$B_{lim} \times \exp(\sigma \times 1.645)$, where $\sigma = 0.2$; in tonnes	ICES (2021c)
	F_{lim}	Undefined	F_{lim} (0.56) is no longer considered appropriate given the estimate of F_{pa}	ICES (2021c)
	F_{pa}	0.87	$F_{p,05}$ with AR: The F that provides a 95% probability for SSB to be above B_{lim} .	ICES (2021c)
Management plan	MAP MSY $B_{trigger}$	6283	MSY $B_{trigger}$; in tonnes	ICES (2018) and EU (2019)
	MAP B_{lim}	1993	B_{lim} ; in tonnes	ICES (2018) and EU (2019)
	MAP F_{MSY}	0.24	F_{MSY}	ICES (2018) and EU (2019)
	MAP range F_{lower}	0.164	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY (ICES, 2018).	ICES (2018) and EU (2019)
	MAP range F_{upper}	0.33	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY (ICES, 2018).	ICES (2018) and EU (2019)

Basis of the assessment

Table 5 White anglerfish in divisions 8.c and 9.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2021b).
Assessment type	Length-based analytical assessment model (SS; ICES, 2021a) that uses landings in the model and in the forecast.
Input data	Landings, length distribution; commercial catches (international official landings); one index from the Spanish North Coast Bottom Trawl Survey (SP-NSGFS-Q4 [G2784]) between 1983 and 2020; two commercial indices (LPUE series from SP-CORUTR8c 1982–2012 and SP-CEDGNS8c 1999–2011); assumed constant natural mortality.
Discards and bycatch	Discarding is not quantified, assumed to be negligible.
Indicators	None.
Other information	The most recent benchmark was in 2018 (ICES, 2018).
Working group	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE).

History of the advice, catch, and management

Table 6 White anglerfish in divisions 8.c and 9.a. ICES advice and official catches. All weights are in tonnes.

Year	ICES advice	Catches corresponding to advice for combined <i>Lophius</i> species	Catches corresponding to advice for <i>L. piscatorius</i>	Agreed TAC*	ICES catches for combined <i>Lophius</i> species	ICES catches for <i>L. piscatorius</i>
1987	Not dealt with	-	-	12000	8973	5141
1988	Not dealt with	-	-	12000	10021	6321
1989	Not dealt with	-	-	12000	7574	4996
1990	Not dealt with	-	-	12000	6124	3790
1991	No advice	-	-	12000	5802	3640
1992	No advice	-	-	12000	5493	3382
1993	No long-term gain in increasing F	-	-	13000	4556	2329
1994	No advice	-	-	13000	3587	2007
1995	If required a precautionary TAC	-	-	13000	3677	1834
1996	If required a precautionary TAC	-	-	13000	4584	2955
1997	If required a precautionary TAC	-	-	13000	5527	3714
1998	Restrict catch to < 80% recent levels	-	-	10000	5070	2981
1999	Reduce F to F_{pa}	4200	-	8500	3817	1938
2000	60% reduction in F	1600	-	6800	2628	1259
2001	50% reduction in F	2800	-	6000	1801	788
2002	30% reduction in F	3500	-	4800	1900	1090
2003	5% reduction in F	3200	-	4000	3258	2324
2004	F = 0 or recovery plan **	0 **	-	2300	4250	3257
2005	F = 0 or recovery plan	0	-	2000	4757	3824
2006	F = 0 or recovery plan	0	-	2000	4158	2997
2007	F = 0 or recovery plan	0	-	2000	3684	2378
2008	F = 0 or recovery plan	0	-	2000	3328	2371
2009	Same advice as last year	0	-	1800	3080	2306
2010	F = 0 or management plan	0	-	1500	2372	1618
2011	MSY framework	1500	1000	1571	2179	1157
2012	MSY framework	3300	2200	3300	2645	1395
2013	MSY transition	2090	1350	2475	2710	1541
2014	MSY approach	2629	1476	2629	3130	2032

Year	ICES advice	Catches corresponding to advice for combined <i>Lophius</i> species	Catches corresponding to advice for <i>L. piscatorius</i>	Agreed TAC*	ICES catches for combined <i>Lophius</i> species	ICES catches for <i>L. piscatorius</i>
2015	MSY approach	2987	1937	2987	2970	1771
2016	MSY approach ^	≤ 2413	≤ 1343	2569	2948	1809
2017	MSY approach ^		≤ 2253	3955	2307	1446
2018	MSY approach ^		≤ 2197	3955	1916	1144
2019	MSY approach ^		≤ 2153	4166	1577	909
2020	Management plan ###		2146 (range 1519–2813) #	4023	1515 ^^	722 ^^
2021	Management plan ###		1872 (range 1295–2472) #	3672		
2022	Management plan ###		1899 (range 1345–2507) #			

* Combined TAC for *Lophius piscatorius* and *L. budegassa*. 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.

^^ Preliminary.

Catches corresponding to F_{MSY} , EU MAP range in brackets (EU, 2019).

EU multiannual plan (MAP) for the Western Waters (EU, 2019).

History of catch and landings

Table 7 White anglerfish in divisions 8.c and 9.a. Catch distribution by fleet in 2020 as estimated by ICES.

Catch (2020)	Landings				Discards
722 tonnes	41% Gillnet	41% Trawl	17% Artisanal	1% Others	Negligible
	722 tonnes				

Table 8 White anglerfish in divisions 8.c and 9.a. History of commercial landings; the ICES estimated values are presented by area for each country participating in the fishery. All weights are in tonnes.

Year	Division 8.c					Division 8.c Total	Division 9.a					Division 9.a		Divisions 8.c and 9.a		
	Spain			France			Spain			Portugal		Total	Subtotal	Unallocated Non-reported	Total	
	Trawl	Gillnet	Other	Trawl	Gillnet	Trawl	Gillnet	Other	Trawl	Artisanal						
1978	n/a	n/a				n/a	258				115	373				
1979	n/a	n/a				n/a	319				225	544				
1980	2806	1270				4076	401				339	740	4816	0	4816	
1981	2750	1931				4681	535				352	887	5568	0	5568	
1982	1915	2682				4597	875				310	1185	5782	0	5782	
1983	3205	1723				4928	726				460	1186	6114	0	6114	
1984	3086	1690				4776	578			186	492	1256	6032	0	6032	
1985	2313	2372				4685	540			212	702	1454	6139	0	6139	
1986	2499	2624				5123	670			167	910	1747	6870	0	6870	
1987	2080	1683				3763	320			194	864	1378	5141	0	5141	
1988	2525	2253				4778	570			157	817	1543	6321	0	6321	
1989	1643	2147				3790	347			259	600	1206	4996	0	4996	
1990	1439	985				2424	435			326	606	1366	3790	0	3790	
1991	1490	778				2268	319			224	829	1372	3640	0	3640	
1992	1217	1011				2228	301			76	778	1154	3382	0	3382	
1993	844	666				1510	72			111	636	819	2329	0	2329	
1994	690	827				1517	154			70	266	490	2007	0	2007	
1995	830	572				1403	199			66	166	431	1834	0	1834	
1996	1306	745				2050	407			133	365	905	2955	0	2955	

Year	Division 8.c					Division 8.c Total	Division 9.a					Division 9.a		Divisions 8.c and 9.a	
	Spain			France			Spain			Portugal		Total	Subtotal	Unallocated Non- reported	Total
	Trawl	Gillnet	Other	Trawl	Gillnet	Trawl	Gillnet	Other	Trawl	Artisanal					
1997	1449	1191				2640	315			110	650	1075	3714	0	3714
1998	912	1359				2271	184			28	497	710	2981	0	2981
1999	545	1013				1558	79			9	285	374	1932	0	1932
2000	269	538				808	107			4	340	451	1259	0	1259
2001	231	294				525	57			16	190	263	788	0	788
2002	385	341		51	7	784	110			29	168	307	1090	0	1090
2003	911	722		46	0	1679	312			29	305	645	2324	0	2324
2004	1262	1269		73	27	2631	264			27	335	626	3257	0	3257
2005	1378	1622		134	46	3180	371			29	244	643	3824	0	3824
2006	1166	1247		60	5	2478	260			29	230	519	2997	0	2997
2007	955	1009		22	6	1992	181			13	192	386	2378	0	2378
2008	894	1168		26	8	2096	138			11	127	275	2371	0	2371
2009	850	1058		17	9	1935	213			10	148	371	2306	0	2306
2010	370	955		12	2	1339	158			2	119	279	1618	0	1618
2011	243	483	73	15	2	816	59	28	48	46	80	260	1077	80	1157
2012	271	527	67	12	2	880	54	20	42	6	163	285	1165	230	1395
2013	274	718	38	19	6	1054	47	30	50	15	154	296	1350	190	1541
2014	358	947	28	25	9	1368	91	47	4	27	122	291	1659	374	2032
2015	324	802	4	11	12	1152	86	53	2	34	200	375	1527	244	1771
2016	376	846	3	10	8	1243	76	67	1	8	120	273	1516	294	1809
2017	248	726	1	3	8	986	106	66	1	30	138	341	1327	119	1446
2018	227	614	34	5	6	886	117	35	1	6	94	253	1139	4	1144
2019	161	435	0	0	0	597	74	33	1	22	104	233	830	78	909
2020*	175	256	1	8	3	443	84	40	2	28	125	279	722	0	722

n/a: not available

* Preliminary

Summary of the assessment

Table 9 White anglerfish in divisions 8.c and 9.a. Assessment summary. High and low refer to 95% confidence intervals. All weights are in tonnes and recruitment is in thousands.

Year	Recruitment	High	Low	SSB	High	Low	Catches	F _{30-130 cm}	High	Low
1980	678	1070	285	9817	13702	5932	4816	0.30	0.33	0.27
1981	1933	2568	1298	11387	14845	7928	5568	0.33	0.36	0.30
1982	7350	8601	6100	11913	14703	9122	5782	0.38	0.41	0.34
1983	1946	2732	1159	10647	12890	8403	6114	0.49	0.51	0.46
1984	774	1060	489	8821	10612	7031	6032	0.51	0.53	0.48
1985	1829	2240	1418	8418	9756	7081	6139	0.53	0.56	0.51
1986	6525	7229	5822	7766	8755	6778	6870	0.80	0.84	0.77
1987	3708	4227	3189	4799	5512	4085	5141	0.92	0.95	0.90
1988	1078	1347	810	3146	3673	2619	6321	1.39	1.42	1.37
1989	3332	3679	2985	2483	2777	2189	4996	1.09	1.12	1.07
1990	2233	2524	1942	2411	2643	2178	3790	0.81	0.84	0.79
1991	1064	1251	878	2213	2436	1990	3640	0.83	0.86	0.81
1992	1321	1506	1137	2114	2317	1911	3382	0.87	0.89	0.84
1993	1699	1931	1467	1973	2165	1780	2329	0.63	0.65	0.60
1994	3127	3432	2823	2065	2289	1841	2007	0.50	0.52	0.48
1995	1821	2078	1564	2333	2605	2062	1834	0.33	0.35	0.32
1996	335	426	243	3295	3626	2964	2955	0.39	0.40	0.37
1997	282	342	223	4362	4724	4000	3714	0.45	0.47	0.43
1998	224	280	167	4749	5116	4382	2981	0.38	0.40	0.36
1999	742	837	647	4588	4967	4209	1932	0.30	0.32	0.27

Year	Recruitment	High	Low	SSB	High	Low	Catches	F _{30-130 cm}	High	Low
2000	646	778	513	4248	4649	3847	1259	0.24	0.25	0.22
2001	3714	4052	3376	3988	4417	3558	788	0.164	0.176	0.152
2002	1619	1884	1353	4187	4648	3726	1090	0.189	0.199	0.179
2003	348	464	232	4808	5308	4308	2324	0.29	0.31	0.28
2004	2167	2454	1880	5878	6422	5335	3257	0.33	0.35	0.31
2005	1370	1608	1132	6813	7407	6219	3824	0.39	0.41	0.36
2006	1284	1469	1099	6525	7156	5894	2997	0.34	0.36	0.33
2007	713	861	564	6304	6986	5622	2378	0.28	0.29	0.26
2008	777	933	622	6657	7405	5910	2371	0.26	0.28	0.24
2009	879	1051	708	7028	7837	6220	2306	0.25	0.27	0.24
2010	1513	1771	1255	7122	7996	6247	1618	0.183	0.197	0.169
2011	1177	1426	929	7442	8402	6482	1157	0.133	0.143	0.122
2012	530	696	365	8204	9266	7142	1395	0.139	0.150	0.128
2013	818	1022	615	9142	10333	7951	1541	0.136	0.149	0.124
2014	1559	1862	1256	10217	11580	8854	2032	0.169	0.187	0.152
2015	247	346	148	10679	12239	9119	1771	0.148	0.162	0.133
2016	214	293	135	11051	12835	9266	1809	0.156	0.176	0.136
2017	202	276	127	11351	13411	9291	1446	0.125	0.145	0.104
2018	403	550	256	11784	14157	9410	1144	0.104	0.125	0.084
2019	1053	1526	581	11958	14607	9309	909	0.092	0.110	0.074
2020	539	841	237	11802	14656	8949	722	0.083	0.096	0.069
2021	706 *			11625	14631	8618				

* Geometric mean 2003–2020.

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