

7.3.4 White anglerfish (*Lophius piscatorius*) 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 2253 tonnes. All catches are assumed to be landed.

Stock development over time

The spawning-stock biomass (SSB) has been increasing since 1994 and has been above MSY $B_{trigger}$ since 2004. Fishing mortality (F) has been below F_{MSY} since 2008. Recruitment (R) has been low in recent years with no evidence of strong year classes since 2001.

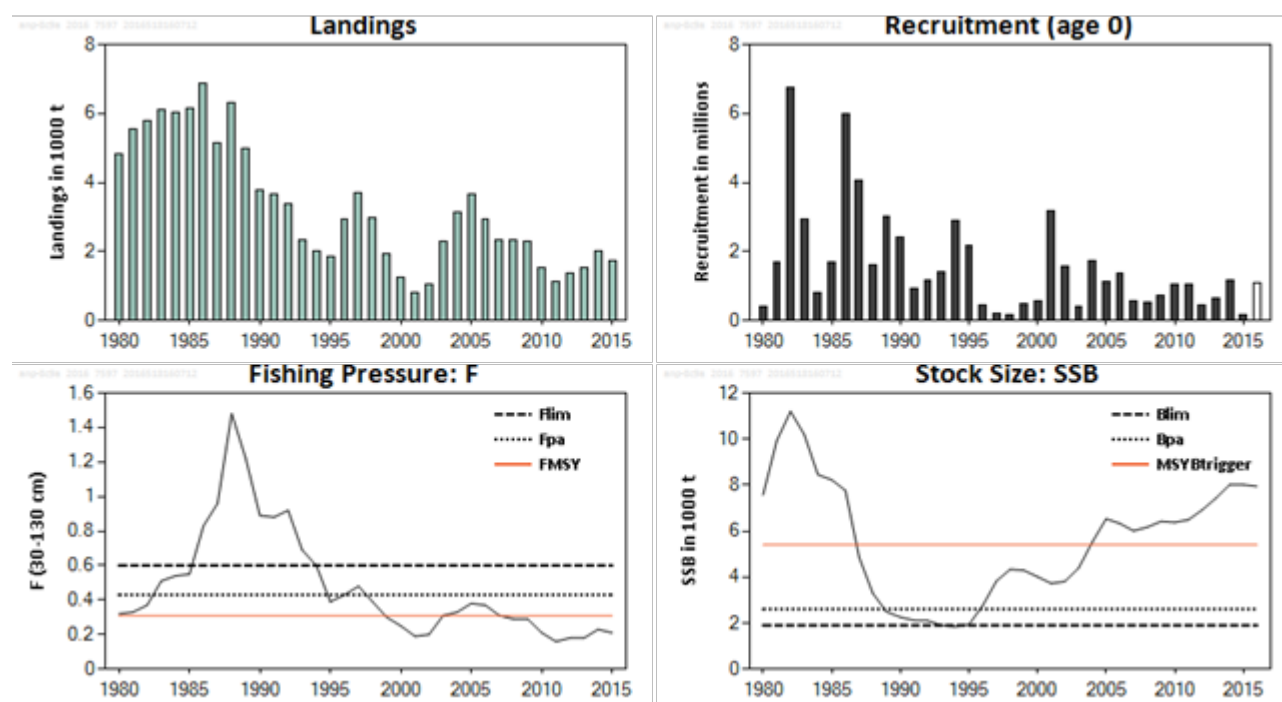


Figure 7.3.4.1 White anglerfish in divisions 8.c and 9.a. Summary of stock assessment (weights in thousand tonnes). Assumed recruitment values are unshaded.

Stock and exploitation status

Table 7.3.4.1 White 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 7.3.4.2 White anglerfish in divisions 8.c and 9.a. The basis for the catch options.

Variable	Value	Source	Notes
$F_{30-130\text{cm}}$ (2016)	0.21	ICES (2016a)	Mean $F_{2013-2015}$
SSB (2017)	7.984 kt	ICES (2016a)	
R_{age0} (2016/2017)	1.084 million	ICES (2016a)	Geometric mean (1980–2015)
Total catch (2016)	1.623 kt	ICES (2016a)	Based on F_{2016}
Landings (2016)	1.623 kt	ICES (2016a)	Discarding negligible
Discards	0 kt	ICES (2016a)	Discarding negligible

Table 7.3.4.3 White anglerfish in divisions 8.c and 9.a. The catch options. Weights are in thousand tonnes.

Rationale	Catch (2017)	Basis	F 2017	SSB 2018	%SSB change *	% advice change **
MSY approach	2.253	F_{MSY} ($F_{\text{sq}} \times 1.467$)	0.31	7.303	–9%	68%
Precautionary approach	2.951	F_{pa} ($F_{\text{sq}} \times 2.044$)	0.43	6.574	–18%	120%
Zero catch	0.000	$F = 0$	0	9.638	21%	–100%
Other options	3.797	F_{lim} ($F_{\text{sq}} \times 2.862$)	0.6	5.686	–29%	183%
	7.296	$\text{SSB}_{2018} = B_{\text{lim}}$ ($F_{\text{sq}} \times 10.24$)	2.13	1.900	–76%	443%
	6.673	$\text{SSB}_{2018} = B_{\text{pa}}$ ($F_{\text{sq}} \times 7.856$)	1.63	2.600	–67%	397%
	4.068	$\text{SSB}_{2018} = \text{MSY } B_{\text{trigger}}$ ($F_{\text{sq}} \times 3.16$)	0.66	5.400	–32%	203%
	1.343	Advice_{2016} ($F_{\text{sq}} \times 0.826$)	0.17	8.160	2%	0%
	1.142	–15% Advice_{2016} ($F_{\text{sq}} \times 0.692$)	0.14	8.370	5%	–15%
	1.544	+15% Advice_{2016} ($F_{\text{sq}} \times 0.965$)	0.20	7.948	0%	15%
	1.616	$F_{\text{sq}} \times 1$	0.21	7.965	0%	20%

* SSB 2018 relative to SSB 2017.

** Catch in 2017 relative to advice for 2016 (1343 t).

Basis of the advice

Table 7.3.4.4 White 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

Since 2013, the only available indices have come from the bottom trawl survey (SpGFS-WIBTS-Q4). These are considered a good indicator of small-sized anglerfish abundance. Tuning data on larger fish are lacking; the implications on the quality of the assessment are unknown.

The stock is assessed using a length-based model, so length sampling is key information for this stock. The current sampling scheme (common to multiple species, and based on sampling multiple species by trip), in combination with the relatively low abundance of anglerfish per trip and the broad size range of this species, leads to noisy length–frequency data. This may impact on the quality of the assessment.

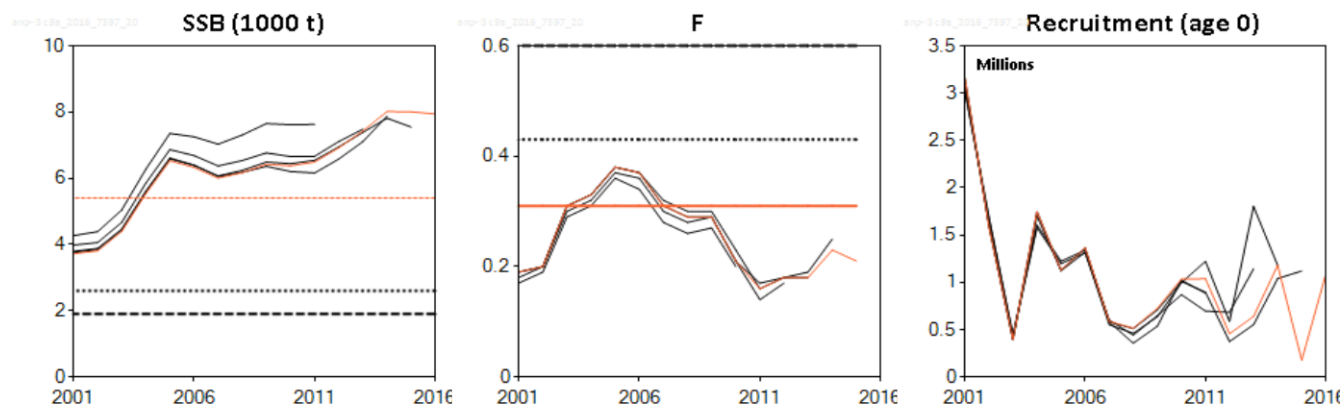


Figure 7.3.4.2 White anglerfish in divisions 8.c and 9.a. Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

The perception of the status of the fishery has changed, following the revision in 2016 of F_{MSY} (from 0.19 to 0.31).

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 7.3.4.5 White 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 $B_{trigger}$	5400 t	5th percentile of the SSB_{2015} , assuming $\sigma = 0.2$.	ICES (2016c)
	F_{MSY}	0.31	Stochastic simulations based on segmented regression.	ICES (2016c)
Precautionary approach	B_{lim}	1900 t	B_{loss} (lowest observed SSB value).	ICES (2016d)
	B_{pa}	2600 t	$B_{lim} \times \exp(\sigma \times 1.645)$, where $\sigma = 0$.	ICES (2016d)
	F_{lim}	0.60	Stochastic simulations where F_{lim} corresponds to 50% probability of $SSB < B_{lim}$.	ICES (2016d)
	F_{pa}	0.43	$F_{lim} \times \exp(-\sigma \times 1.645)$, where $\sigma = 0.2$.	ICES (2016d)
Management plan	SSB_{MGT}	Not applicable		
	F_{MGT}	Not applicable		

Basis of the assessment

Table 7.3.4.6 White anglerfish in divisions 8.c and 9.a. The basis of the assessment.

ICES stock data category	1 (ICES, 2016e)
Assessment type	Length-based model (SS3; ICES, 2016a) that uses landings in the model and in the forecast.
Input data	Landings, length distribution; Commercial catches (international official landings); one survey index (SpGFS-WIBTS-Q4 1983–2015); 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	This stock was benchmarked in WKFLAT (ICES, 2012)
Working group	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE)

Information from stakeholders

There is no information available.

History of the advice, catch, and management

Table 7.3.4.7 White anglerfish in divisions 8.c and 9.a. History of ICES advice, the agreed TAC, and ICES estimates of landings. 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. piscatorius</i>	Agreed TAC *, **	ICES landings for combined <i>Lophius</i> species	ICES landings <i>L. piscatorius</i>
1987	Not dealt with	-		12.0	8.9	5.1
1988	Not dealt with	-		12.0	10.0	6.3
1989	Not dealt with	-		12.0	7.6	5.0
1990	Not dealt with	-		12.0	6.1	3.8
1991	No advice	-		12.0	5.8	3.6
1992	No advice	-		12.0	4.2	3.4
1993	No long-term gain in increasing F	-		13.0	4.5	2.3
1994	No advice	-		13.0	3.6	2.0
1995	If required a precautionary TAC	-		13.0	3.6	1.8

Year	ICES advice*	Predicted landings corresp. to advice for combined <i>Lophius</i> species	Predicted landings corresp. to advice for <i>L. piscatorius</i>	Agreed TAC *, **	ICES landings for combined <i>Lophius</i> species	ICES landings <i>L. piscatorius</i>
1996	If required a precautionary TAC	-		13.0	4.6	3.0
1997	If required a precautionary TAC	-		13.0	5.5	3.7
1998	Restrict catch to < 80% recent levels			10.0	5.1	3.0
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	1.3
2001	50% reduction in F	2.8		6.0	1.8	0.8
2002	30% reduction in F	3.5		4.8	1.8	1.0
2003	5% reduction in F	3.2		4.0	3.2	2.3
2004	F = 0 or recovery plan***	0***		2.3	4.1	3.1
2005	F = 0 or recovery plan	0		2.0	4.5	3.6
2006	F = 0 or recovery plan	0		2.0	4.1	3.0
2007	F = 0 or recovery plan	0		2.0	3.6	2.3
2008	F = 0 or recovery plan	0		2.0	3.3	2.3
2009	Same advice as last year	0		1.8	3.0	2.2
2010	F = 0 or management plan	0		1.5	2.3	1.6
2011	MSY framework	1.5	1.0	1.6	1.8	0.1
2012	MSY framework	3.3	2.2	3.3	2.3	1.3
2013	MSY transition	2.09	1.35	2.5	2.2	1.4
2014	MSY approach	2.629	1.476	2.6	3.0	2.0
2015	MSY approach	2.987	1.937	3.0	2.8	1.748
2016	MSY approach^	≤ 2.413	≤ 1.343	2.6		
2017	MSY approach^		≤ 2.253			

* 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 7.3.4.8 White anglerfish in divisions 8.c and 9.a. Catch distribution by fleet in 2015 as estimated by ICES.

Total catch (2015)	Landings					Discards
1.748 kt	48.9% Spanish gillnet	25.4% bottom trawl	11.4% Portuguese artisanal gears	0.3% Spanish miscellaneous gears	13.9% Unallocated	Negligible
	1.748 kt					

Table 7.3.4.9 White 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. All weights are in tonnes.

Year	Division 8.c Spain				Division 9.a Spain			Division 9.a Portugal		Division 9.a	Divisions 8.c and 9.a		
	Trawl	Gillnet	Other	Total	Trawl	Gillnet	Other	Trawl	Artisanal	Total	Subtotal	Unallocated	Total
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		4816
1981	2750	1931		4681	535				352	887	5568		5568
1982	1915	2682		4597	875				310	1185	5782		5782
1983	3205	1723		4928	726				460	1186	6114		6114
1984	3086	1690		4776	578			186	492	1256	6032		6032
1985	2313	2372		4685	540			212	702	1454	6139		6139
1986	2499	2624		5123	670			167	910	1747	6870		6870
1987	2080	1683		3763	320			194	864	1378	5141		5141
1988	2525	2253		4778	570			157	817	1543	6321		6321
1989	1643	2147		3790	347			259	600	1206	4996		4996
1990	1439	985		2424	435			326	606	1366	3790		3790
1991	1490	778		2268	319			224	829	1372	3640		3640
1992	1217	1011		2228	301			76	778	1154	3382		3382
1993	844	666		1510	72			111	636	819	2329		2329
1994	690	827		1517	154			70	266	490	2007		2007
1995	830	572		1403	199			66	166	431	1834		1834
1996	1306	745		2050	407			133	365	905	2955		2955
1997	1449	1191		2640	315			110	650	1075	3714		3714
1998	912	1359		2271	184			28	497	710	2981		2981
1999	551	1013		1564	79			9	285	374	1938		1938
2000	269	538		808	107			4	340	451	1259		1259
2001	231	294		525	57			16	190	263	788		788
2002	385	341		726	110			29	168	307	1032		1032
2003	911	722		1633	312			29	305	645	2278		2278
2004	1260	1269		2528	264			27	335	626	3154		3154
2005	1378	1622		3000	371			29	244	643	3644		3644
2006	1166	1247		2413	260			29	260	549	2963		2963
2007	955	1009		1964	181			13	192	386	2350		2350
2008	894	1168		2062	138			11	127	275	2337		2337
2009	850	1058		1909	213			10	148	371	2280		2280
2010	313	955		1268	158			2	119	279	1547		1547
2011	243	483	73	799	59	28	48	46	80	260	1060	80	1140
2012	271	527	67	866	54	20	42	6	163	285	1151	230	1381
2013	274	718	38	1029	47	30	50	15	154	296	1325	190	1516
2014	358	947	28	1334	91	47	4	30	122	294	1628	374	2001
2015	324	802	4	1129	86	53	2	34	200	375	1504	244	1748

*n/a = not available.

Summary of the assessment

Table 7.3.4.10 White anglerfish in divisions 8.c and 9.a. Assessment summary. Weights are in tonnes.

Year	Recruitment	Stock size: SSB tonnes	Landings tonnes	Fishing pressure: $F_{30-130cm}$ Year -1
	Age 0			
	thousands			
1980	425	7566	4817	0.32
1981	1676	9923	5566	0.33
1982	6733	11200	5782	0.37
1983	2934	10193	6113	0.51
1984	797	8445	6031	0.54
1985	1695	8223	6139	0.55
1986	5993	7765	6870	0.83
1987	4061	4863	5139	0.96
1988	1631	3291	6321	1.48
1989	3002	2485	4995	1.22
1990	2399	2257	3790	0.89
1991	921	2117	3640	0.88
1992	1169	2103	3382	0.92
1993	1391	1902	2329	0.69
1994	2890	1851	2007	0.6
1995	2165	1932	1835	0.39
1996	451	2756	2956	0.43
1997	208	3823	3715	0.48
1998	181	4330	2981	0.39
1999	481	4288	1939	0.3
2000	570	4010	1256	0.25
2001	3164	3722	788	0.19
2002	1590	3807	1034	0.2
2003	397	4392	2279	0.31
2004	1747	5533	3156	0.33
2005	1129	6531	3646	0.38
2006	1364	6327	2932	0.37
2007	587	6006	2349	0.31
2008	516	6169	2338	0.29
2009	725	6419	2280	0.29
2010	1034	6376	1548	0.21
2011	1038	6488	1140	0.16
2012	457	6919	1382	0.18
2013	640	7428	1516	0.18
2014	1181	8015	2002	0.23
2015	178	8008	1748	0.21
2016	1084*	7941		

*Geometric mean 1980–2015.

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