

White anglerfish (*Lophius piscatorius*) in Subarea 7 and divisions 8.a–b and 8.d (Celtic Seas, Bay of Biscay)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2022 should be no more than 34 275 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, *Lophius budegassa* and *L. 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

ICES assesses that fishing pressure on the stock is below F_{MSY} ; spawning stock size is above MSY $B_{trigger}$, B_{pa} , and B_{lim} .

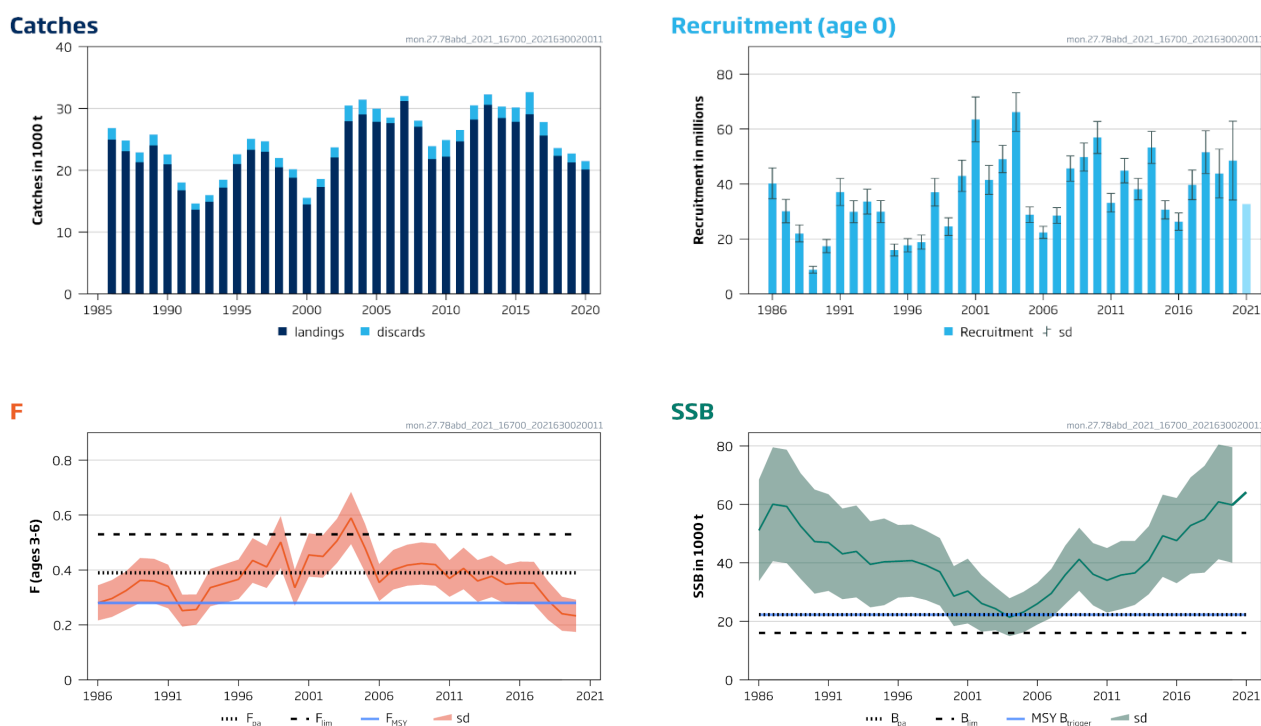


Figure 1 White anglerfish in Subarea 7 and in divisions 8.a–b and 8.d. Summary of the stock assessment. Discard observations are available only since 2003. Assumed recruitment values for 2021 are shaded in a lighter colour.

Catch scenarios

Table 1 White anglerfish in Subarea 7 and in divisions 8.a–b and 8.d. Assumptions made for the interim year and in the forecast. All weights are in tonnes, recruitment in thousands.

Variable	Value	Notes
$F_{\text{ages 3–6}}$ (2021)	0.25	$F_{\text{ages 3–6}}$, average F (2018–2020)
SSB (2022)	70972	Short-term forecast; tonnes
$R_{\text{age 0}}$ (2021–2022)	32708	Geometric mean of full time-series excluding the last 2 years (GM, 1986–2018); thousands
Catch (2021)	28882	Short-term forecast; tonnes
Projected landings (2021)	27349	Short-term forecast assuming mean landings proportion-at-age, last 3 years, 2018–2020; tonnes
Projected discards (2021)	1533	Short-term forecast assuming mean discards proportion-at-age, last 3 years, 2018–2020; tonnes

Table 2 White 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 (2022)	Projected landings* (2022)	Projected discards** (2022)	F_{total} (2022)	$F_{\text{ages 3–6}}$ Projected landings (2022)	$F_{\text{ages 3–6}}$ Projected discards (2022)	SSB (2023)	% SSB change ***	% Advice change ^
ICES advice basis									
MSY approach = F_{MSY}	34275	32953	1322	0.28	0.28	0.00028	82203	16	-0.88
Other scenarios									
EU MAP ^{^^^} : F_{MSY}	34275	32953	1322	0.28	0.28	0.00028	82203	16	-0.88
$F = \text{MAP}^{\text{^^^}}$ $F_{\text{MSY lower}}$	23162	22277	885	0.181	0.181	0.00018	89903	27	-0.68 ^{^^}
$F = \text{MAP}^{\text{^^^}}$ $F_{\text{MSY upper}}$	45491	43720	1771	0.39	0.39	0.00039	74500	5.0	-1.10 ^{^^}
$F = 0$	0	0	0	-	-	-	106148	50	-100
F_{pa}	45491	43720	1771	0.39	0.39	0.00039	74500	5.0	32
F_{lim}	58233	55940	2292	0.53	0.53	0.00053	65842	-7.2	68
$\text{SSB}_{2023} = B_{\text{lim}}$	136230	130295	5935	2.31	2.31	0.00231	16032	-77	294
$\text{SSB}_{2023} = B_{\text{pa}} = \text{MSY } B_{\text{trigger}}$	125712	120340	5372	1.861	1.86	0.00187	22278	-69	264
$\text{SSB}_{2023} = \text{SSB}_{2022}$	50823	48842	1981	0.44	0.44	0.00045	70972	0	47
$F = F_{2021}$	31499	30287	1212	0.25	0.25	0.00026	84120	18.5	-9

* Marketable landings, assuming recent discard rate.

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

*** SSB 2023 relative to SSB 2022 (70 972 tonnes).

^ Advice value for 2022 relative to advice value for 2021 (34 579 tonnes).

^^ Advice value this year relative to the advice value last year for the MAP $F_{\text{MSY lower}}$ (23 320 tonnes) and MAP $F_{\text{MSY upper}}$ (45 996 tonnes)

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

Basis of the advice

Table 3 White anglerfish in Subarea 7 and in 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 the UK for this stock and ICES provides advice according to the ICES MSY approach. Catch scenarios consistent with the MAP F_{MSY} ranges are provided.

Quality of the assessment

The collection of data from the commercial fishery and research surveys during 2020 was impacted by COVID-19 restrictions to a varying degree across member states. For this stock, discards sampling was reduced, but the diagnostics

for the assessment were deemed acceptable and the impact on the perception of the stock status and advice is considered minimal.

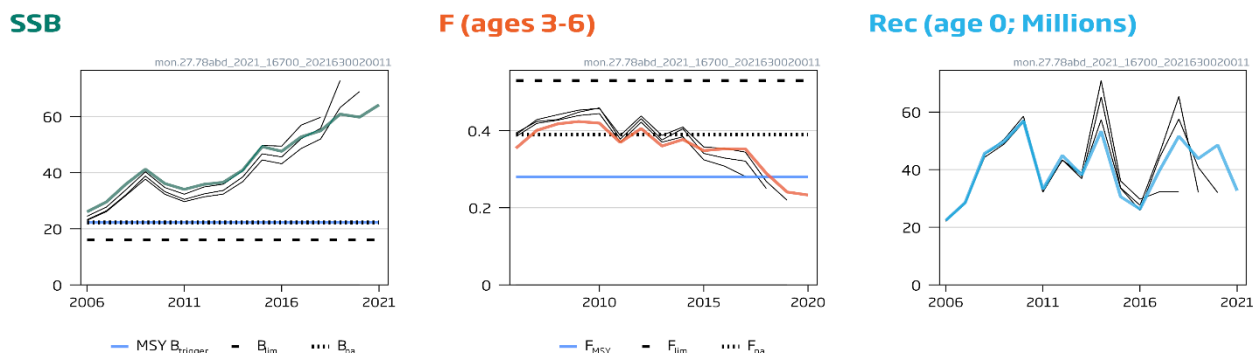


Figure 2 White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Historical assessment results (final-year recruitment assumptions included). The reference points were revised in 2018 following a benchmark and only the last 4 assessment results should be compared to the reference points indicated.

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, and species-specific landings are estimated by ICES (ICES, 2019). ICES considers that management of the catches of the two anglerfish species under a combined TAC prevents effective control of single-species exploitation rates and could lead to the overexploitation of either species.

Reference points

Table 4 White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Reference points, values, and their technical basis. All weights are in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	22278	B_{pa} ; in tonnes	ICES (2018a)
	F_{MSY}	0.28	Median Eqsim estimate for landings	ICES (2018a)
Precautionary approach	B_{lim}	16032	B_{loss}	ICES (2018a)
	B_{pa}	22278	$B_{lim} \times \exp(1.645 \times 0.2)$	ICES (2018a)
	F_{lim}	0.53	F with 5% probability of $SSB < B_{lim}$	ICES (2018a)
	F_{pa}	0.39	$F_{p.05}$ with AR: The F that provides a 95% probability for SSB to be above B_{lim} .	ICES (2018a, 2021b)
Management plan	MAP MSY $B_{trigger}$	22278	MSY $B_{trigger}$; in tonnes.	EU (2019)
	MAP B_{lim}	16032	B_{lim} ; in tonnes.	EU (2019)
	MAP F_{MSY}	0.28	F_{MSY}	EU (2019)
	MAP range F_{lower}	0.181	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with F_{MSY} .	ICES (2018a) and EU (2019)
	MAP range F_{upper}	0.39	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with F_{MSY} .	ICES (2018a) and EU (2019)

Basis of the assessment

Table 5 White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. The basis of the assessment.

ICES stock data category	1 (ICES, 2021a).
Assessment type	Age-based analytical assessment (a4a; ICES, 2018b) that uses catches in the model and in the forecast.
Input data	Commercial landings and discards; three survey indices consisting of a combined French Southern Atlantic Bottom trawl survey (EVHOE-WIBTS-Q4 [G9527]) / Irish Groundfish Survey (IGFS-WIBTS-Q4 [G7212]) index, the Spanish Porcupine Bottom Trawl Survey (SpPGFS -WIBTS-Q3 [G5768]), and the Irish Anglerfish and Megrin Survey (IE-IAMS [G3098]); weights- and numbers-at-age derived from catch and survey length-frequency distribution.
Discards and bycatch	Discards are available since 2003 and included in the assessment and forecast.
Indicators	LPUE and effort of some fleets in the fisheries.
Other information	Last benchmarked in 2018 (ICES, 2018a).
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 White 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	ICES advice *** #	Catch corresponding to advice *** #	Landings corresponding to advice (both <i>Lophius</i> species) *** #	Agreed TAC * **	ICES landings (both <i>Lophius</i> species)***	Landings <i>L. piscatorius</i>	Catches <i>L. piscatorius</i> ^
1987	Not assessed	-	< 27600	39080	30709	23091	-
1988	Not assessed	-	< 19900	42990	29695	21314	-
1989	Not assessed	-	< 16400	42990	32836	24015	-
1990	Not assessed	-	< 26700	42990	30613	20982	-
1991	No advice	-	< 37800	42990	25542	16763	-
1992	No advice	-	< 33900	42990	21793	13617	-
1993	Concern about <i>L. pisc.</i> SSB decrease	-	< 36000	25100	21462	14895	-
1994	SSB decreasing, still inside safe biological limits	-	< 33000	23900	22946	17201	-
1995	No increase in F	-	< 33000	23200	27987	21033	-
1996	No increase in F	-	-	30400	31426	23333	-
1997	No increase in F	-	-	34300	31099	22983	-
1998	No increase in F	-	-	34300	29072	20474	-
1999	No increase in F	-	< 24800	34300	25530	18792	-
2000	At least 20% decrease in F	-	< 37448	29600	21095	14451	-
2001	Reduce F below F_{pa}	-	< 37448	27600	23022	17294	-
2002	Reduce F below F_{pa}	-	< 37448	23700	28588	22083	-
2003	At least 30% decrease in F	-	< 37448	21000	36104	27933	30444
2004	At least 10% decrease in F	-	< 37448	26700	36565	29028	31439
2005	Maintain F below F_{pa}	-	< 27600	31200	35056	27869	29980
2006	Maintain F below F_{pa}	-	< 19900	34000	33783	27652	28545
2007	Maintain F below F_{pa}	-	< 16400	36000	37821	31213	32029
2008	Less than average landings	-	< 26700	36000	34452	27053	28046
2009	Same advice as last year	-	< 37800	36000	30122	21835	23913
2010	No increase in effort	-	< 33900	41400	30841	22215	24886
2011	No increase in effort	-	< 36000	40900	34005	24657	26489
2012	Reduce catch	-	< 33000	38900	36617	28188	30519
2013	Reduce catch by the rate of biomass decrease (14% for <i>L. piscatorius</i> and 20% for <i>L. budegassa</i>)	17900		36953	41086	30611	32295

Year	ICES advice *** #	Catch corresponding to advice *** #	Landings corresponding to advice (both <i>Lophius</i> species) *** #	Agreed TAC * **	ICES landings (both <i>Lophius</i> species)***	Landings <i>L. piscatorius</i>	Catches <i>L. piscatorius</i> ^
2014	Increase landings by the rate of biomass increase (20% for <i>L. piscatorius</i> and 20% for <i>L. budegassa</i>)	< 26691		42496	38306	28474	30333
2015	Same landings advice for <i>L. piscatorius</i> as in 2014	< 26691		42496	37508	27859	30183
2016	Precautionary approach (same landings value as advised for 2014)	≤ 26691		42496	39303	29083	32668
2017	Precautionary approach (same landings value as advised for 2016)	≤ 26691		42496	37324	25634	27808
2018	Precautionary approach (same landings value as advised for 2016)	≤ 26691		42496	32420	22345	23595
2019	MSY approach	≤ 31042		41370	30946	21266	22710
2020	Management plan	31798 (range 21248 – 42331) ##		44307	28832	20156	21491
2021	Management plan	34579 (range 23320 – 45996) ##		38123^			
2022	MSY approach	34275					

* Applies to the combined *Lophius* species.

** Includes Division 8.e.

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

Advice refers to landings up to 2017 and to catches since 2018.

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

^ DEFRA (2021).

History of catch and landings

Table 7 White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Catch distribution by fleet in 2018 as estimated by ICES.

Total catch (2020)	Landings					Discards
21 491 tonnes	63%	3.6%	13 %	13%	7.2%	1335 tonnes
	Otter trawl demersal fish	Otter trawl <i>Nephrops</i>	Beam trawl	Gillnet	Other	
	20 156 tonnes					

Table 8a White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. History of commercial catch and landings; ICES estimated values are presented for Subarea 7 for each country participating in the fishery. All weights are in tonnes.

Year	France	Ireland	Spain	UK	Others	Unallocated	Total landings in Subarea 7	Total discards in Subarea 7
1986	9797	1014	6223	3356	467	0	20858	-
1987	8549	928	5407	3382	96	0	18362	-
1988	8257	654	4615	3673	168	0	17366	-
1989	9536	1716	4926	4339	609	0	21126	-
1990	8773	1474	4284	2845	227	0	17602	-
1991	7228	1056	3707	2559	54	0	14604	-
1992	5595	1127	2669	2762	102	0	12255	-
1993	6290	1286	2851	2630	250	0	13307	-
1994	7358	2036	2856	2280	627	0	15156	-
1995	9563	1661	3240	2561	896	0	17921	-
1996	9832	1372	4097	3192	852	0	19345	-

Year	France	Ireland	Spain	UK	Others	Unallocated	Total landings in Subarea 7	Total discards in Subarea 7
1997	9557	1994	3548	3377	589	0	19065	-
1998	8484	1998	3586	3214	406	0	17687	-
1999	7870	3176	3050	2903	321	0	17319	-
2000	6411	1726	2274	2676	334	0	13420	-
2001	8096	1598	2493	3021	462	0	15670	-
2002*	9195	1884	3084	2985	1397	0	18546	-
2003**	12081	1456	4662	2850	1569	0	22619	2077
2004	12281	1646	4507	2906	1743	0	23083	1968
2005	11137	2071	4663	3032	1469	0	22371	1779
2006	10607	2656	4589	3137	1375	0	22366	674
2007	12253	2902	5065	4036	1596	0	25852	620
2008	10871	2419	4107	2928	1062	0	21387	743
2009	8691	2048	2754	3013	857	0	17363	1509
2010	8188	2523	2353	3675	993	0	17732	2038
2011***	9546	2304	920	4287	1174	1313	19544	1443
2012	12225	2648	1398	4028	1835	1167	23302	1833
2013*	12775	2557	3316	4629	1625	1148	26051	1405
2014	11410	2707	1892	6129	1055	337	23529	1443
2015	11721	2582	1693	5644	1284	414	23338	1796
2016	12667	2761	1754	6052	1578	351	25164	3056
2017	11473	2543	1744	5222	1498	0	22479	1912
2018*	10360	2148	1810	4156	770	85	19327	1192
2019	9379	2822	1473	4553	858	0	19085	1394
2020^	9372	2290	1477	4171	994	0	18304	790

* Landings data revised.

** Discards data revised since 2003.

*** Unallocated landings and Spanish landings revised.

^ Preliminary.

Table 8b White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. History of commercial catch and landings. For divisions 8.a, 8.b, and 8.d both the official and ICES estimated values are presented by country participating in the fishery. The final column shows the total for divisions 8.a–b and 8.d. All weights are in tonnes.

Year	France	Spain	Others	Unallocated	Total landings divisions 8.a–b and 8.d	Total discards divisions 8.a–b and 8.d
1986	3265	858	0	0	4123	-
1987	3955	774	0	0	4729	-
1988	3129	819	0	0	3948	-
1989	2264	625	0	0	2889	-
1990	2580	800	0	0	3380	-
1991	1657	502	0	0	2159	-
1992	1066	296	0	0	1362	-
1993	1314	274	0	0	1588	-
1994	1564	481	0	0	2045	-
1995	2402	482	0	228	3112	-
1996	2216	834	0	938	3988	-
1997	2143	707	0	1068	3918	-
1998	1534	711	0	542	2787	-
1999	924	549	0	0	1473	-
2000	690	341	0	0	1031	-
2001	1240	384	0	0	1624	-
2002 *	3023	514	0	0	3537	-
2003 **	4806	508	0	0	5315	434
2004	5227	718	0	0	5945	443
2005	4927	571	0	0	5498	332
2006	4819	420	48	0	5287	219
2007	4935	401	25	0	5361	197
2008	5132	527	7	0	5666	250
2009	4065	374	33	0	4472	569

Year	France	Spain	Others	Unallocated	Total landings divisions 8.a–b and 8.d	Total discards divisions 8.a–b and 8.d
2010	4043	367	73	0	4483	634
2011	4569	422	93	30	5114	388
2012	4221	430	194	41	4887	497
2013	4105	318	137	0	4560	279
2014	4279	408	174	84	4945	416
2015	4153	293	65	10	4521	528
2016	3561	283	69	5	3919	529
2017	2886	203	66	0	3154	263
2018 *	2844	156	15	3	3018	58
2019	1987	130	64	0	2181	50
2020 ** ^	1666	129	57	0	1852	545

* Landings data revised.

** From 2003 discard data revised.

^ Preliminary.

Summary of the assessment

Table 9 White anglerfish in Subarea 7 and divisions 8.a–b and 8.d. Assessment summary. Weights are in tonnes and recruitment in thousands. High and low refers to 95% confidence intervals.

Year	Recruitment	High	Low	SSB	High	Low	Landings	Discards	F _{Ages 3–6}	High	Low
1986	40236	45839	34632	51093	68480	33706	24981	1861	0.28	0.34	0.22
1987	30125	34389	25862	60055	79547	40563	23091	1721	0.30	0.36	0.23
1988	22005	25099	18911	59307	78713	39901	21314	1588	0.32	0.40	0.25
1989	8786	10033	7540	52594	70672	34515	24015	1789	0.36	0.44	0.28
1990	17402	19804	14999	47285	65112	29458	20982	1563	0.36	0.44	0.28
1991	37087	42020	32154	46950	63487	30414	16763	1249	0.34	0.42	0.26
1992	29915	33935	25896	43097	58611	27582	13617	1015	0.25	0.31	0.194
1993	33598	38138	29058	43918	59644	28193	14895	1110	0.26	0.31	0.20
1994	29960	33988	25932	39508	54231	24785	17201	1282	0.34	0.40	0.27
1995	15952	18138	13766	40370	55209	25531	21033	1567	0.35	0.42	0.28
1996	17695	20115	15275	40559	52984	28135	23333	1739	0.37	0.44	0.29
1997	18837	21404	16271	40790	53138	28443	22983	1713	0.43	0.52	0.35
1998	37009	42058	31960	39173	51053	27294	20474	1526	0.41	0.49	0.33
1999	24496	27732	21260	36945	48515	25375	18792	1400	0.50	0.60	0.41
2000	42953	48633	37274	28639	38905	18372	14451	1077	0.34	0.40	0.27
2001	63547	71714	55379	30371	41468	19275	17294	1289	0.45	0.53	0.38
2002	41512	46772	36253	26123	35778	16468	22083	1645	0.45	0.53	0.37
2003	49094	54085	44103	24337	31733	16941	27933	2511	0.51	0.59	0.43
2004	66188	73223	59154	21430	27925	14934	29028	2411	0.59	0.68	0.49
2005	28810	31637	25983	23183	30125	16240	27869	2110	0.48	0.57	0.39
2006	22379	24585	20172	26043	33195	18891	27652	892	0.35	0.42	0.29
2007	28539	31389	25688	29582	37954	21211	31213	816	0.40	0.47	0.33
2008	45647	50249	41044	35904	45924	25884	27053	993	0.42	0.49	0.34
2009	49794	54910	44679	41245	52040	30449	21835	2078	0.42	0.50	0.35
2010	56944	62790	51098	36112	46776	25449	22215	2672	0.42	0.50	0.34
2011	33197	36586	29807	34050	45099	23002	24657	1832	0.37	0.44	0.30
2012	44889	49346	40432	35839	47510	24168	28188	2330	0.41	0.48	0.33
2013	38132	42022	34242	36569	47510	25628	30611	1684	0.36	0.44	0.28
2014	53354	59202	47506	40928	52574	29283	28474	1859	0.38	0.45	0.30
2015	30610	33939	27282	49277	63348	35205	27859	2324	0.35	0.42	0.28
2016	26306	29449	23164	47624	62204	33043	29083	3585	0.35	0.43	0.27
2017	39684	45062	34307	52782	69263	36300	25634	2175	0.35	0.43	0.27
2018	51608	59415	43800	54935	73211	36659	22345	1250	0.29	0.36	0.22
2019	43833	52682	34984	60871	80504	41238	21266	1444	0.24	0.30	0.179
2020	48519	62869	34169	59807	79577	40036	20156	1335	0.23	0.29	0.174

Year	Recruitment	High	Low	SSB	High	Low	Landings	Discards	F _{Ages 3–6}	High	Low
2021 [†]	32708 *			64190							

* Geometric mean 1986–2018.

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[†] Version 2: The previously published version of the advice included the assumed F_{2021} , which is not the output of the assessment. The value, F_{2021} , has therefore been removed from this table.