

Whiting (*Merlangius merlangus*) in Division 7.a (Irish Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, there should be zero catches in 2020 and 2021.

Stock development over time

Stock size is extremely low. Spawning-stock biomass (SSB) has been declining since the start of the time-series and has been well below B_{lim} since the mid-1990s. Recruitment (R) has been low since the early 1990s. Fishing pressure (F) has declined since 2015 but remains above F_{MSY} and F_{lim} in 2018.

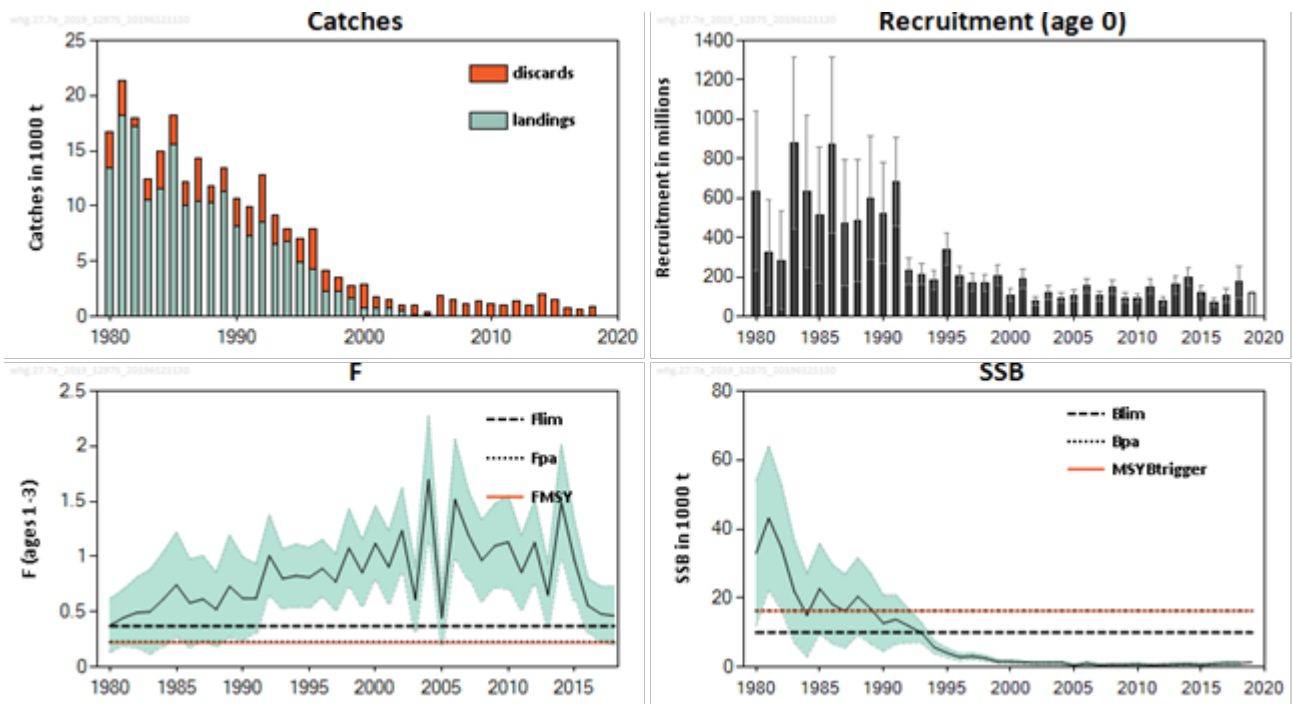


Figure 1 Whiting in Division 7.a. Summary of stock assessment, Recruitment, F, and SSB have uncertainty boundaries (95% confidence intervals) in the plot. Uncertainty boundaries are not available for 2019. Assumed recruitment value is unshaded.

Stock and exploitation status

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

Table 1 Whiting in Division 7.a. State of the stock and fishery relative to reference points.

		Fishing pressure			Stock size				
		2016	2017	2018	2017	2018	2019		
Maximum sustainable yield	F_{MSY}	✗	✗	✗	MSY $B_{trigger}$	✗	✗	✗	Below trigger
Precautionary approach	F_{pa}, F_{lim}	✗	✗	✗	B_{pa}, B_{lim}	✗	✗	✗	Reduced reproductive capacity
Management plan	F_{MGT}	—	—	—	B_{MGT}	—	—	—	

Catch scenarios

Table 2 Whiting in Division 7.a. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages\ 1-3}$ (2019)	0.50	$F_{sq} = F_{average}$ (2016–2018).
SSB_{2020}	1839	Fishing at <i>status quo</i> F (F_{sq}); in tonnes.
$R_{age\ 0}$ (2019–2020)	118 853	Geometric mean (2000–2018); in thousands.
Catch (2019)	1199	Fishing at F_{sq} ; in tonnes.
Wanted catch (2019)	138	Average discard ratio (2016–2018); in tonnes.
Unwanted catch (2019)	1061	Average discard ratio (2016–2018); in tonnes.

Table 3 Whiting in Division 7.a. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2020)	Wanted catch (2020)	Unwanted catch (2020)	F total (2020)	F Wanted catch (2020)	F Unwanted catch (2020)	SSB (2021)	% SSB change *	% TAC change **
ICES advice basis									
MSY approach	0	0	0	0	0	0	2971	62	-100
Other scenarios									
$F_{MSY} = F_{pa}$	595	72	523	0.22	0.0090	0.21	2391	30	-90
$F = 0$	0	0	0	0	0	0	2971	62	-100
$F_{MSY\ lower}$	440	54	386	0.158	0.0065	0.151	2540	38	-93
$F_{MSY\ upper}$	776	94	682	0.29	0.0121	0.28	2219	21	-87
$F_{MSY} \times$ $SSB_{2020}/MSY\ B_{trigger}$	73	9	64	0.025	0.00102	0.024	2899	58	-99
$F_{MSY\ lower} \times$ $SSB_{2020}/MSY\ B_{trigger}$	53	6	46	0.0178	0.00073	0.0171	2919	59	-99
$F_{MSY\ upper} \times$ $SSB_{2020}/MSY\ B_{trigger}$	97	12	85	0.033	0.00137	0.032	2875	56	-98
F_{lim}	948	114	834	0.37	0.0152	0.35	2058	11.9	-84
$SSB_{2021} = B_{lim}^{\wedge}$									
$SSB_{2021} = B_{pa} =$ $MSY\ B_{trigger}^{\wedge}$									
$F = F_{2019}$	1222	146	1076	0.50	0.021	0.48	1808	-1.69	-80

* SSB 2021 relative to SSB 2020.

** Landings in 2020 relative to TAC in 2019 (727 tonnes).

\wedge The B_{lim} , B_{pa} , and $MSY\ B_{trigger}$ options were left blank because B_{lim} , B_{pa} , and $MSY\ B_{trigger}$ cannot be achieved in 2021, even with zero catch.

There has been no change in the perception of stock status and, therefore, there is no change in the advice.

Basis of the advice

Table 4 Whiting in Division 7.a. The basis of the advice.

Advice basis	MSY approach
Management plan	The EU multiannual plan (MAP) for stocks in the Western Waters and adjacent waters (EU, 2019) takes bycatch of this species into account.

Quality of the assessment

The assessment is very consistent and indicates that fishing mortality has declined significantly, but the stock size remains extremely low.

The majority of catches have been discarded for the last couple of decades. Despite increased sampling levels, discard information remains very imprecise. This has contributed to the highly fluctuating fishing pressure estimates in recent years.



Figure 2 Whiting in Division 7.a. Historical assessment results (the final-year recruitment estimates are assumed values).

Issues relevant for the advice

The assessment and the advice are for Division 7.a excluding the rectangles 33E2 and 33E3 in the Irish Sea. Landings have been adjusted since 2003 to exclude those taken from the southern rectangles (33E2 and 33E3) in the Irish Sea, as they are not believed to be part of this stock (Table 7) but rather of the stock in divisions 7.e–k (western English Channel and southern Celtic Seas). Thus, the assessment and the advice exclude these two southern rectangles for the present stock, but include them in the assessment and advice for whiting in divisions 7.e–k. This should be considered when setting TACs for the two management areas for whiting in divisions 7.a and 7.e–k. This amounts to an average of 45% of total Irish Sea landings being re-allocated over the past five years.

The majority of whiting caught are discards in the *Nephrops* fishery and are below the EU minimum conservation reference size (MCRS). The introduction of further highly selective gears to reduce finfish catch and discards in the *Nephrops* fishery, appears to have reduced whiting catches in the last three years. Discards remain high relative to the landings.

Reference points

Table 5 Whiting in Division 7.a. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	16 300	B_{pa} ; in tonnes.	ICES (2017)
	F_{MSY}	0.22	Median point estimates of EqSim with a combined stock–recruitment relationship.	ICES (2017)
	$F_{MSY lower}$	0.158	Median point estimates of EqSim with a combined stock–recruitment relationship.	ICES (2017)
	$F_{MSY upper}$	0.294	Median point estimates of EqSim with a combined stock–recruitment relationship.	ICES (2017)
Precautionary approach	B_{lim}	10 000	SSB below which recruitment is impaired; in tonnes.	ICES (2017)
	B_{pa}	16 300	$B_{lim} \times \exp(1.645 \times \sigma)$; $\sigma = 0.297$; in tonnes.	ICES (2017)
	F_{lim}	0.37	F with 50% probability of SSB < B_{lim}	ICES (2017)
	F_{pa}	0.22	$F_{lim} \times \exp(-1.645 \times \sigma)$; $\sigma = 0.304$	ICES (2017)
Management plan	SSB _{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 6 Whiting in Division 7.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2018).
Assessment type	ASAP (Age-Structured Assessment Programme; NOAA toolbox) that uses catches in the model and in the forecast. (ICES, 2019).
Input data	Commercial catches (weights, ages and length frequencies from catch sampling); survey indices (NIGFS-WIBTS-Q1, NIGFS-WIBTS-Q4, NI MIK); fixed maturity ogive; Lorenzen's natural mortality (Lorenzen, 1996).
Discards and bycatch	Included in the assessment for the full time-series.
Indicators	None.
Other information	This stock was benchmarked in 2017 (ICES, 2017).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE)

Information from stakeholders

No additional information is available.

History of the advice, catch, and management

Table 7 Whiting in Division 7.a. ICES advice and official landings and estimated landings in rectangles 33E2 & 33E3. All weights are in tonnes.

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ICES landings***	Landings taken or reported in 33E2 and 33E3***	Discards **	ICES catch
1987	Reduce F	16000	18170	11684	-		-	-
1988	No increase in F; enforce mesh regulations	12000	18170	11492	10245		1611	11856
1989	F = F _{high} ; enforce mesh regulations	11000	18170	11328	11305		2103	13408
1990	No increase in F; TAC	8300*	15000	8183	8212		2444	10 656
1991	Increase SSB to SSB(89)	6400*	10000	7411	7348		2598	9946
1992	80% of F(90)	9700*	10000	7094	8588		4203	12791
1993	70% of F(91) ~ 6 500 t	6500	8500	5977	6523		2707	9230
1994	Within safe biological limits	-	9900	5637	6763		1173	7936
1995	No increase in F	8300*	8000	5465	4893		2151	7044
1996	No increase in F	9800*	9000	5581	4335		3631	7966
1997	No advice given	-	7500	4472	2277		1928	4205
1998	20% reduction in F	3800#	5000	3355	2229		1304	3533
1999	Reduce F below F _{pa}	3500#	4410	1989	1670		1092	2762
2000	Reduce F below F _{pa}	< 1600#	2640	1130	762		2118	2880
2001	Lowest possible F	~0	1390	1066	733		1012	1745
2002	Lowest possible F	~0	1000	714	747		740	1487
2003	Lowest possible F	~0	500	554	517	159	480	996
2004	Zero catch	0	514	204	133	51	905	1038
2005	Zero catch	0	514	164	125	33	272	397
2006	Lowest possible catch	0	437	85	64	22	1773	1837
2007	Lowest possible catch	0	371	197	35	161	1512	1547

Year	ICES advice	Catch corresp. to advice	Agreed TAC	Official landings	ICES landings***	Landings taken or reported in 33E2 and 33E3***	Discards **	ICES catch
2008	Lowest possible catch	0	278	84	37	44	1169	1206
2009	Same advice as last year	0	209	100	39	63	1321	1360
2010	Same advice as last year	0	157	121	30	91	1154	1184
2011	See scenarios	-	118	118	31	75	946	977
2012	Lowest possible catch and improve selectivity	0	89	86	60	43	1339	1399
2013	Lowest possible catch and improve selectivity	0	84	68	33	33	948	981
2014	Same advice as for 2013	0	80	73	23	50	1951	1974
2015	Same advice as for 2013	0	80	59	28	34	1521	1549
2016	Precautionary approach (minimize all catches)	0	80	50	15	40	765	780
2017	Precautionary approach	0	80	50 [^]	36	20	667	703
2018	MSY approach	0	80	63 [^]	46	18	853	899
2019	MSY approach (same advice as for 2018)	0	727					
2020	MSY approach	0						
2021	MSY approach	0						

* Not including discards from the *Nephrops* fishery.

** From the *Nephrops* fishery from 1987 to 2002.

*** Including estimates of misreporting in 1992–2002 and, since 2003, landings from statistical rectangles 33E2 and 33E3 reallocated to whiting landings in divisions 7.e–k.

[^] Preliminary.

Landings only, no discards included.

History of the catch and landings

Table 8 Whiting in Division 7.a. Catch distribution by fleet in 2018 as estimated by ICES.

Catch	Landings			Discards	
	Finfish-directed otter trawls	<i>Nephrops</i> -directed otter trawls	Other gears	<i>Nephrops</i> -directed otter trawls	Other gears
899 tonnes	38%	14%	48%	98%	2%
	46 tonnes			853 tonnes	

Table 9 Whiting in Division 7.a. History of official landings by country. All weights are in tonnes.

Year	Belgium	France	Ireland	Netherlands	UK (NI, E&W)	Spain	UK (Isle of Man)	UK (Scotland)	UK	Landings taken or reported in rectangles 33E2 and 33E3 (belonging to the 7.b-c-k stock)**	Total official landings
1988	90	1063	4394		5823		15	107			11492
1989	92	533	3871		6652		26	154			11328
1990	142	528	2000		5202		75	236			8183
1991	53	611	2200		4250		74	223			7411
1992	78	509	2100		4089		44	274			7094
1993	50	255	1440		3859		55	318			5977
1994	80	163	1418		3724		44	208			5637
1995	92	169	1840		3125		41	198			5465
1996	80	78	1773	17	3557		28	48			5581
1997	47	86	1119	14	3152		24	30			4472
1998	52	81	1260	7	1900		33	22			3355
1999	46	150	509	6	1229		5	44			1989
2000	30	59	353	1	670		2	15			1130
2001	27	25	482		506		1	25			1066
2002	22	33	347		284		1	27			714
2003	13	29	265		130	85	1	31			554
2004	11	8	96		82		1	6			204
2005	10	13	94		47			< 0.5			164
2006	4	4	55		22			< 0.5			85
2007	3	3	187		3		1	< 0.5			197
2008	2	2	68		11		1				84
2009	2		78		20						100
2010	5	3	97		16		< 0.5				121
2011	4	3	95		16		< 0.5				118
2012	5	1	58		10			1	11	32	86
2013	2	< 0.5	44				< 0.1	2	20	34	68
2014	2	< 0.5	60		11		< 0.1			49	73
2015	1	< 0.5	49		8					32	59
2016	1	< 0.5	44		5		< 0.1			40	50
2017*	2	< 0.5	32		17		< 0.1	< 0.1		20	50
2018*	1		44		19		< 0.5			18	63

* Preliminary.

** Landings in the southern part of Division 7.a (statistical rectangles 33E2 and 33E3) are not included in the assessment and are considered to be part of the whiting stock in divisions 7.b-c and 7.e-k.

Table 10 Whiting in Division 7.a. History of ICES estimates of landings and discards. All weights are in tonnes.

Year	Discards by country/fleet					ICES estimates of:		
	<i>Nephrops</i> fishery ^	IR-OTB fleet	UK (NI) <i>Nephrops</i> fishery	Belgium	UK (E&W) fleet	Discards	Landings	Catch
1988	1611					1611	10245	11856
1989	2103					2103	11305	13408
1990	2444					2444	8212	10656
1991	2598					2598	7348	9946
1992	4203					4203	8588	12791
1993	2707					2707	6523	9230
1994	1173					1173	6763	7936
1995	2151					2151	4893	7044
1996	3631					3631	4335	7966
1997	1928					1928	2277	4205
1998	1304					1304	2229	3533
1999	1092					1092	1670	2762
2000	2118					2118	762	2880
2001	1012					1012	733	1745
2002	740					740	747	1487

Year	Discards by country/fleet					ICES estimates of:		
	<i>Nephrops</i> fishery ^	IR-OTB fleet	UK (NI) <i>Nephrops</i> fishery	Belgium	UK (E&W) fleet	Discards	Landings	Catch
2003		480				480	517	996
2004		905				905	133	1038
2005		272				272	125	397
2006		1580	193			1773	64	1837
2007		725	787			1512	35	1547
2008		693	476			1169	37	1206
2009		688	633			1321	39	1360
2010		240	914			1154	30	1184
2011		330	616			946	31	977
2012		257	1065	17	1	1339	60	1399
2013		95	833	17	3	948	33	981
2014		263	1645	15	28	1951	23	1974
2015		438	1074	9	1	1521	28	1549
2016		173	589		3	765	15	780
2017		122	544		1	667	36	703
2018		98	754		<0.5	853	46	899

^ Based on UK (N. Ireland) and Ireland data.

Summary of the assessment

Table 11 Whiting in Division 7.a. Assessment summary. Weights are in tonnes. High and lows refer to 95% confidence intervals.

Year	Recruitment			SSB			Total catch	Discards	F (ages 1–3)		
	Low	Value	High	Low	Value	High			Low	Value	High
1980	229567	635229	1040890	11934	32900	53866	16737	3314	0.138	0.38	0.62
1981	54896	322377	589858	22389	43126	63863	21331	3064	0.189	0.45	0.70
1982	36963	284961	532960	16492	34608	52723	17969	801	0.174	0.49	0.81
1983	444527	880745	1316963	7121	21970	36818	12405	1829	0.120	0.50	0.88
1984	243493	630711	1017929	2892	14979	27065	14999	3380	0.187	0.61	1.04
1985	167858	513642	859425	9658	22720	35782	18169	2644	0.27	0.74	1.22
1986	424124	870632	1317140	6719	18159	29600	12129	2066	0.182	0.58	0.98
1987	152694	474781	796868	5490	16166	26843	14270	3859	0.22	0.62	1.01
1988	179572	488017	796462	9278	20453	31628	11856	1611	0.187	0.52	0.86
1989	287018	601264	915511	6788	16984	27181	13408	2103	0.27	0.73	1.19
1990	266814	522555	778295	4534	12677	20820	10656	2444	0.25	0.62	1.00
1991	460251	684435	908620	6716	13778	20841	9946	2598	0.31	0.62	0.93
1992	161707	230234	298762	7023	11873	16723	12791	4203	0.64	1.01	1.38
1993	159976	214824	269673	6985	9930	12876	9230	2707	0.53	0.80	1.07
1994	134458	183733	233007	3921	5730	7539	7936	1173	0.54	0.83	1.11
1995	261753	340766	419780	2805	4127	5448	7044	2151	0.54	0.81	1.08
1996	152110	203244	254379	1833	2878	3923	7966	3631	0.63	0.89	1.15
1997	124250	170729	217209	2188	3103	4018	4205	1928	0.52	0.77	1.02
1998	124610	167298	209987	1772	2572	3372	3533	1304	0.72	1.08	1.43
1999	156116	208166	260216	956	1551	2145	2762	1092	0.56	0.85	1.15
2000	79382	109119	138856	952	1509	2066	2880	2118	0.78	1.12	1.46
2001	142992	191982	240973	882	1329	1776	1745	1012	0.58	0.90	1.23
2002	58637	79962	101287	736	1183	1629	1487	740	0.85	1.24	1.62
2003	85078	120096	155113	794	1195	1595	996	480	0.33	0.61	0.90
2004	72177	95546	118915	784	1269	1753	1038	905	1.12	1.70	2.3
2005	77144	105851	134557	264	543	821	397	272	0.20	0.44	0.69
2006	116826	155056	193286	623	1078	1534	1837	1773	0.97	1.52	2.1
2007	77283	103943	130602	273	580	886	1547	1512	0.80	1.19	1.59
2008	112628	148998	185368	430	724	1018	1206	1169	0.60	0.97	1.33
2009	68555	92765	116975	430	736	1041	1360	1321	0.72	1.10	1.48
2010	69420	92709	115998	513	821	1129	1184	1154	0.71	1.13	1.55
2011	114344	151604	188864	338	614	890	977	946	0.52	0.86	1.19

Year	Recruitment			SSB			Total catch	Discards	F (ages 1–3)		
	Low	Value	High	Low	Value	High			Low	Value	High
2012	58425	79507	100588	399	683	967	1399	1339	0.74	1.13	1.51
2013	115899	159742	203585	512	836	1160	981	948	0.37	0.65	0.93
2014	152516	198580	244644	555	942	1329	1974	1951	0.96	1.49	2.0
2015	93025	122731	152437	341	676	1011	1549	1521	0.61	0.96	1.32
2016	49819	71365	92911	603	965	1327	780	765	0.31	0.56	0.80
2017	71551	108235	144918	714	1146	1578	704	668	0.23	0.48	0.73
2018	93804	174768	255732	579	1077	1574	899	853	0.198	0.46	0.73
2019		118853*			1376						

* Geometric mean (GM) recruitment 2000–2018.

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