Whiting (*Merlangius merlangus*) in Subarea 4 and Division 7.d (North Sea and eastern English Channel)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2024 should be no more than 128 290 tonnes.

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

Management should be implemented at the stock level.

ICES advice on conservation aspects

ICES has not identified any conservation aspects.

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}.

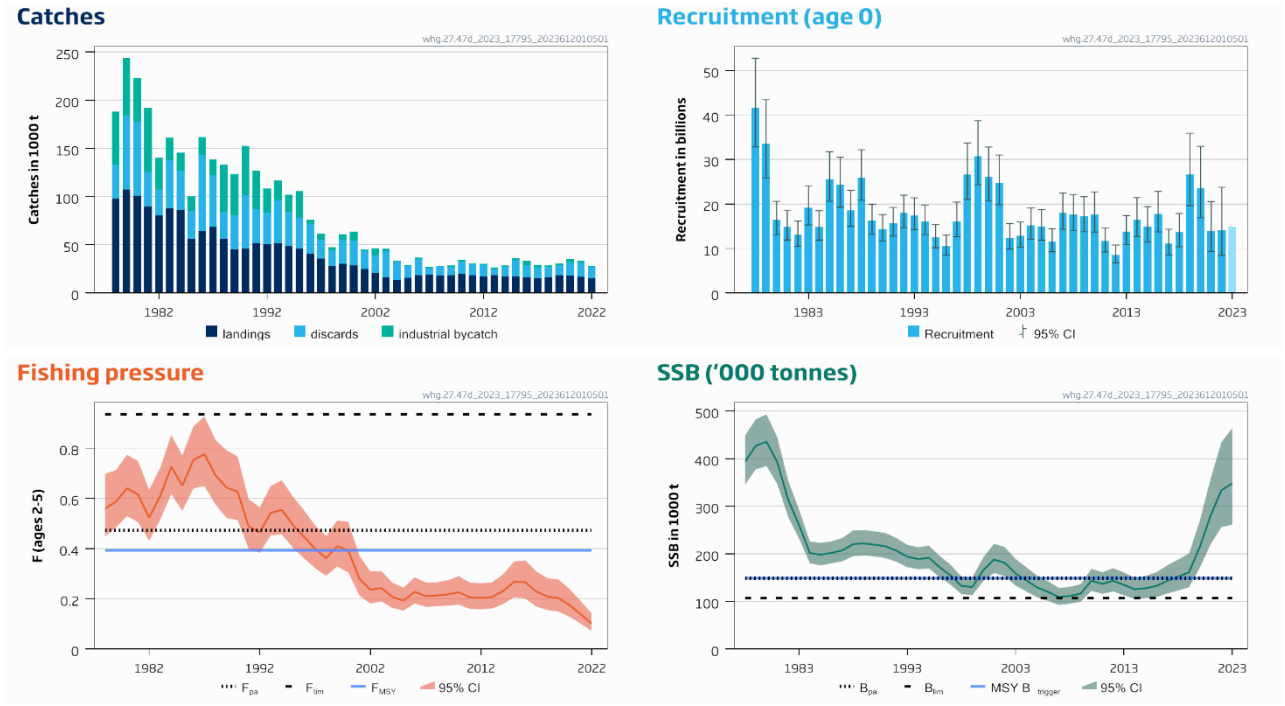

Figure 1 Whiting in Subarea 4 and Division 7.d. Summary of the stock assessment. The assumed recruitment value for 2023 is shaded in a lighter colour. Discards include BMS (below minimum size) landings.

Conservation status

ICES is not aware of any information on stock/species-specific conservation status.

Catch scenarios

Table 1 Whiting in Subarea 4 and Division 7.d. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 2–5}$ (2023)	0.101	Average exploitation pattern (2020–2022), scaled to the total F in 2022
SSB (2024)	347863	Short-term forecast (STF); tonnes
$R_{age\ 0}$ (2023, 2024)	15061	Geometric mean (GM, 2003–2022); millions
Total catch (2023)	34829	STF; tonnes
Projected landings (2023)	21985	STF, relative contribution to total catch by age = average 2020–2022; tonnes
Projected discards (2023)	10426	STF, relative contribution to total catch by age = average 2020–2022; tonnes
Projected industrial bycatch (2023)	2418	STF, relative contribution to total catch by age = average 2020–2022; tonnes

Table 2 Whiting in Subarea 4 and Division 7.d. Annual catch scenarios. Weights are in tonnes.

Basis	Total catch (2024)	Projected landings (2024)*	Projected discards (2024)*	Projected IBC (2024)*	Human Consumption catch (2024)	F_{total} (ages 2–5) (2024)**	$F_{projected\ landings}$ (ages 2–5) (2024)	$F_{projected\ discards}$ (ages 2–5) (2024)	$F_{projected\ IBC}$ (ages 2–5) (2024)***	SSB (2025)	% SSB change^	% advice change^^
ICES advice basis												
MSY approach: F_{MSY}	128290	89707	36502	2082	126209	0.393	0.25	0.137	0.0074	268348	−23	16.5
Other scenarios												
$F_{MSY\ upper}$	154187	108173	44033	1981	152206	0.473	0.30	0.165	0.0074	248162	−29	40
$F_{MSY\ lower}$	95596	66393	26993	2209	93387	0.292	0.184	0.101	0.0074	293833	−15.5	−13.2
F = 0 (IBC only)	2571	0	0	2571	0	0.0074	0	0	0.0074	366442	5.3	−98
$F = F_{2023}$	53837	36616	14849	2372	51465	0.163	0.101	0.055	0.0074	326383	−6.2	−51
Rollover TAC	43995	29598	11986	2410	41584	0.133	0.083	0.046	0.0074	334055	−4.0	−60
$0.75 \times F_{2023}$†	26127	16857	6791	2480	23647	0.080	0.045	0.025	0.0074	347983	0.00034	−76
$1.25 \times F_{2023}$†	41241	27634	11186	2421	38820	0.124	0.075	0.041	0.0074	336202	−3.4	−63
F_{pa}	154187	108173	44033	1981	152206	0.473	0.30	0.165	0.0074	248162	−29	40
F_{lim}	303741	214817	87526	1398	302343	0.935	0.60	0.33	0.0074	131587	−62	176
SSB (2025) = B_{pa} = MSY $B_{trigger}$	281346	198848	81014	1485	279861	0.87	0.55	0.30	0.0074	148888	−57	155

Basis	Total catch (2024)	Projected landings (2024)*	Projected discards (2024)*	Projected IBC (2024)*	Human Consumption catch (2024)	F_{total} (ages 2–5) (2024)**	$F_{projected\ landings}$ (ages 2–5) (2024)	$F_{projected\ discards}$ (ages 2–5) (2024)	$F_{projected\ IBC}$ (ages 2–5) (2024)***	SSB (2025)	% SSB change^	% advice change^^
SSB (2025) = B_{lim}	334854	237003	96575	1277	333577	1.03	0.66	0.36	0.0074	107146	−69	204

* The split of catch between landings, discards, and industrial bycatch (IBC) in 2024 was done using recent (2020–2022) partial age-dependent fishing mortalities as a forecasting assumption.
** Total F is calculated as the sum of partial fishing mortalities.
***F (IBC) is assumed to be constant in all scenarios at *status quo* value.
^ SSB 2025 relative to SSB 2024.
^^ Total catch 2024 relative to the advice value 2023 (110 172 tonnes).
† Multiplier only applied to F (discards) and F (landings), with F (IBC) constant.

The change in advice (16.5%) is caused by an upwards revision in the size of estimated recruitment for the 2019 and 2020 year classes, leading to a higher stock size at the start of the advice year.

Basis of the advice

Table 3 Whiting in Subarea 4 and Division 7.d. The basis of the advice.

Advice basis	MSY approach.
Management plan	An EU multiannual management plan (MAP) has been agreed by the EU for this stock (EU, 2018). There is no agreement with Norway and UK regarding this plan, and it is not used as the basis of the advice for this shared stock. ICES was requested by EC and UK to provide advice based on the MSY approach and to include F_{MSY} ranges in the catch scenarios.

Quality of the assessment

The plus group was changed from 8+ to 6+ in 2022 to address the retrospective pattern; fishing mortality is averaged across ages 2 to 5 instead of ages 2 to 6 (ICES, 2022). These changes did not affect the trend or the stock status, but investigations into how to resolve the retrospective pattern without changing the plus group are still ongoing.

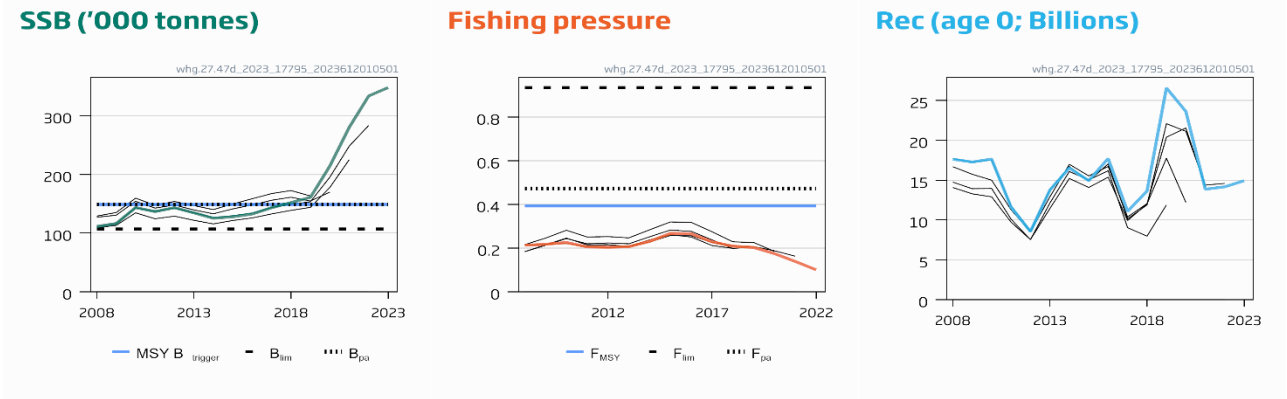

Figure 2 Whiting in Subarea 4 and Division 7.d. Historical assessment results (final-year recruitment included for each line, corresponding to the forecast recruitment in the interim year). The stock has undergone an interbenchmark in 2021 and an update of the model and reference points in 2022 (only the last two years should be compared to the reference points shown on all plots). On the fishing pressure plot, the two most recent lines cannot be compared to previous years because the age range used for the calculation of mean fishing pressure was changed in 2022.

Issues relevant for the advice

Whiting in the North Sea is under EU landing obligation as well as Norway and UK national legislation regulating discards. Below minimum size (BMS) landings reported to ICES in 2015–2022 were low. Substantial discarding still continues, based on observations from sampling programmes (estimated discards in 2022 are 11 913 tonnes, which is 44% of the human consumption fishery catch).

Catches of whiting in Division 7.d are managed under a common TAC with whiting in divisions 7.b–c and e–k. Management should be implemented at the stock level to ensure that fishing opportunities are in line with both the scale of the resource for each of the stocks and the corresponding MSY approach.

Reference points

Table 4 Whiting in Subarea 4 and Division 7.d. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	148888	B_{pa}; in tonnes.	ICES (2022)
	F_{MSY}	0.393	Stochastic simulation (EqSim) with segmented regression with a freely estimated breakpoint based on recruitment period 1983–2021	ICES (2022)
Precautionary approach	B_{lim}	107146	B_{loss} (SSB in 2007, as estimated in the 2022 assessment); in tonnes.	ICES (2022)
	B_{pa}	148888	$B_{lim} \times \exp(1.645 \times \sigma)$, $\sigma = 0.20$; in tonnes.	ICES (2022)
	F_{lim}	0.935	Stochastic simulation (EqSim) with segmented regression fixed at B_{lim} based on recruitment period 1983–2021.	ICES (2022)
	F_{pa}	0.473	The F that provides a 95% probability for SSB to be above B_{lim} ($F_{P.05}$ with advice rule [AR]).	ICES (2022)
EU Management Plan (MAP)*	MAP MSY $B_{trigger}$	148888	MSY $B_{trigger}$; in tonnes.	ICES (2022)
	MAP B_{lim}	107146	B_{lim}; in tonnes.	ICES (2022)
	MAP F_{MSY}	0.393	F_{MSY}	ICES (2022)
	MAP range F_{lower}	0.292–0.393	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022)
	MAP range F_{upper}	0.393–0.473	Consistent with ranges resulting in no more than 5% reduction in long-term yield compared with MSY.	ICES (2022)

* EU multiannual plan (MAP) for the North Sea (EU, 2018).

Basis of the assessment

Table 5 Whiting in Subarea 4 and Division 7.d. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2023a)
Assessment type	Age-based analytical assessment (SAM; Nielsen and Berg, 2014; ICES, 2023b) that uses catches in the model and in the forecast
Input data	Commercial catches (international catches, ages from catch sampling by métier, since 1978), two survey indices (NS-IBTS Q1 [G1022] & Q3 [G2829]; ages 0 to 5; since 1983); time-varying maturity estimated from NS-IBTS Q1 data; time-varying natural mortalities from the North Sea SMS multispecies model (ICES, 2021b).
Discards, BMS landings, and bycatch	The proportion of landings with associated discards was 68%. 55% of the discards were sampled. No biological samples were available for age allocations from the industrial bycatch; therefore, samples of total catches were used and mean weight-at-age is assumed equal to catch weights-at-age. Below minimum size (BMS) landings, where reported to ICES, are included with discards in the assessment since 2015.
Indicators	None
Other information	This assessment was benchmarked in 2018 (WKNSEA; ICES, 2018), interbenchmarked in 2021 (ICES, 2021a), and revised in 2022 (ICES, 2022)
Working group	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK)

History of the advice, catch, and management

Table 6a Whiting in Subarea 4. ICES advice, TAC, official landings, and ICES estimates of catch. All weights are in tonnes.

Stock				Subarea 4 (North Sea)							
								ICES estimates^^			
Year	ICES advice	Landings corresponding to advice	Total catch corresponding to advice	Human consumption catch in Subarea 4 corresponding to advice*	Landings in Subarea 4 corresponding to advice	Agreed TAC	Official landings	Landings	Industrial bycatch	Discards	Total catch
1994	Significant reduction in effort; mixed fishery	-			-	100000	42216	41870	17473	31840	91183
1995	Significant reduction in effort; mixed fishery	-			-	81000	41400	40550	27379	28940	96869
1996	Mixed fishery; take into account cod advice	-			-	67000	35116	35550	5116	27130	67796
1997	Mixed fishery; take into account cod advice	-			-	74000	31573	30940	6213	16660	53813
1998	No increase from 1996 level	50700			44900	60000	23937	23690	3494	12480	39664
1999	At least 20% reduction of F (95–97)	33800			29900	44000	22110	25700	5038	22110	52848
2000	Lowest possible catch		0		0	30000	24453	24280	9160	21931	55371
2001	60% reduction of F (97–99)	21900			19400	29700	18834	19260	940	16130	36330
2002	F not larger than 0.37	≤ 37000			≤ 33000	41000	15608	14870	7270	17144	39284
2003	No cod catches	-	-		-	16000	11255	10450	2730	26135	39315
2004	No cod catches. Fishing mortality in 2004 should be < F_{pa}		Catchshouldnotincreasecomparedtorecentyears		-	16000	9491	8950	1210	18142	28302
2005	No cod catches. Less than recent average	25000	52000			28500	8394	10680	890	10300	21870
2006	No cod catches. Less than recent average	< 17300				23800	15660	15097	2190	14018	31305
2007	No cod catches. Less than recent average	< 15100				23800	16275	15666	1240	5206	22112
2008	No cod catches. Less than recent average	< 5000				17850	14451	13479	0	8356	21835
2009	No cod catches. F < F_{max}	< 5900	< 11000			15173	12320	12444	1344	6597	20385
2010	No cod catches. Stable SSB	< 6800	< 12500			12897	11690	12801	1907	8451	23159
2011	No cod catches. Stable SSB	< 12700	< 21900		< 9500	14832	12554	13260	1035	7989	22283
2012	Management plan	< 21300	< 31500		< 17100	17056	12588	12944	1117	9307	23368

Stock				Subarea 4 (North Sea)							
								ICES estimates^^			
Year	ICES advice	Landings corresponding to advice	Total catch corresponding to advice	Human consumption catch in Subarea 4 corresponding to advice*	Landings in Subarea 4 corresponding to advice	Agreed TAC	Official landings	Landings	Industrial bycatch	Discards	Total catch
2013	Precautionary considerations (F = 0.225) and separate management for Division 7.d	< 26000			< 19000	18932	13361	13817	1654	4608	20079
2014	November update: precautionary considerations (15% TAC reduction) and separate management for Division 7.d	< 21199	< 31553		< 16092	16092	13795	13847	1623	7016	22486
2015	November update: management plan and separate management for Division 7.d	< 17190	< 30579		< 13678	13678	15333	13232	2097	12265^	27593
2016	EU–Norway management strategy		≤ 30510		≤ 12373	13678	17355	12242	4551	10413^	27206
2017	MSY approach		≤ 23527		≤ 9744	16003	14968	11828	2635	9799^	24262
2018	MSY approach		≤ 26191		≤ 11040	22057	15451	12578	1658	8026^	22263
2019	MSY approach		≤ 24195	≤ 17191		17191	17419	15534	1864	7581^	24979
2020	MSY approach		≤ 22082	≤ 15036		17158	19475	15978	3115	9749^	28842
2021	MSY approach		≤ 26304	≤ 19497		21306	17124#	14163	2048	9930^	26141
2022	MSY approach		≤ 88426	≤ 69231		26636	14344#	13138	827	9170^	23136
2023	MSY approach		≤ 110172	≤ 82940		34294					
2024	MSY approach		≤ 128290								

* The human consumption fishery (HCF) catch split between Subarea 4 and Division 7.d from 2019 to 2023 is based on historical proportions of HCF catch between Subarea 4 and Division 7.d in each year. This assumes that management for Division 7.d is separate from other divisions in Subarea 7. Total catches are based on a combined discard rate for Subarea 4 and Division 7.d. From 2023 onwards, 80.23% of the TAC is allocated to Subarea 4, and 19.77% to Division 7.d (EU–Norway–UK, 2022). As a result, the assumed HCF catch split value is no longer given.

^ Since 2015, discards include BMS landings.

^^ From 2009, the estimated values are the sum of product (SOP) from catch and weight-at-age. The slight discrepancy in the sum of landings/catches by area (Tables 6a and 6b) as compared to the total landings/catches (Tables 7 and 9) is due to Intercatch raising (excluding industrial bycatch [IBC]) and data export procedures for landings (including IBC), as well as to the assignment of total catch weights-at-age for IBC afterwards.

Preliminary.

Table 6b Whiting in Division 7.d. ICES advice, TAC, official landings, and ICES estimates of catch. Weights are in tonnes.

Stock				Division 7.d (eastern English Channel)						
								ICES estimates^^		
Year	ICES advice	Landings corresponding to advice	Total catch corresponding to advice	Human consumption catch in Division 7.d corresponding to advice*	Landings in Division 7.d corresponding to advice	Agreed TAC**	Official landings	Landings	Discards^	Total catch
1994	No long-term gains in increasing F	-			-	-	7088	6620	3850	10470
1995	Significant reduction in effort; link to North Sea	-			-	-	5551	5390	3240	8630
1996	Reference made to North Sea advice	-			-	-	5056	4950	3370	8320
1997	Reference made to North Sea advice	-			-	-	4779	4620	3000	7620
1998	Reference made to North Sea advice	50700			5800	27000	4765	4600	3210	7810
1999	Reference made to North Sea advice	33800			3900	25000	n/a	4430	3570	8000
2000	Lowest possible catch		0		0	22000	6072	4300	4129	8429
2001	60% reduction of F_{sq}	21900			2500	21000	6614	5800	3109	8909
2002	F not larger than 0.37	≤ 37000			≤ 4000	31700	5361	5800	1356	7156
2003	No cod catches.	-	-		-	31700	7005	5710	604	6314
2004	No cod catches. Fishing mortality should be < F_{pa}	-	Catch should not increase compared to recent years		-	27000	5283	4350	907	5257
2005	No cod catches.	25000	52000			21600	4901	4790	2219	7009
2006	No cod catches. Less than recent average	< 17300				19940	3749	3443	2291	5734
2007	No cod catches. Less than recent average	< 15100				19940	3391	3254	1763	5017
2008	No cod catches. Less than recent average	< 5000				19940	3192	4471	1943	6414
2009	No cod catches. F < F_{max}	< 5900	< 11000			16949	6569	5920	2086	8006
2010	No cod catches. Stable SSB	< 6800	< 12500			14407	6133	7100	4532	11632
2011	No cod catches. Stable SSB	< 12700	< 21900		< 3200	16568	5464	5149	3183	8332
2012	Management plan	< 21300	< 31500		< 4200	19053	3857	4413	2389	6802
2013	Precautionary considerations (F = 0.225) and separate management for Division 7.d	< 26000			< 7000	24500	4293	4308	2186	6494

Stock				Division 7.d (eastern English Channel)						
								ICES estimates^^		
Year	ICES advice	Landings corresponding to advice	Total catch corresponding to advice	Human consumption catch in Division 7.d corresponding to advice*	Landings in Division 7.d corresponding to advice	Agreed TAC**	Official landings	Landings	Discards^	Total catch
2014	November update: precautionary considerations (15% TAC reduction) and separate management for Division 7.d	< 21199	< 31553		< 5106	20668	3224	3125	2709	5834
2015	November update: management plan and separate management for Division 7.d	< 17190	< 30579		< 3512	17742	4167	3977	4627	8604
2016	EU–Norway management strategy for Division 7.d		≤ 30510		< 2480	22778	3732	3700	2313	6013
2017	MSY approach		≤ 23527		≤ 2935	27500	3457	3354	1550	4904
2018	MSY approach		≤ 26191		≤ 2759	22213	3608	3482	2562	6044
2019	MSY approach		≤ 24195	≤ 3897		19184	3101	2975	2499	5474
2020	MSY approach		≤ 22082	≤ 4318		10863	1971	1911	4046	5957
2021	MSY approach		≤ 26304	≤ 4573		10259	2453[#]	2250	4708	6958
2022	MSY approach		≤ 88426	≤ 16229		8352	1958[#]	2000	2743	4742
2023	MSY approach		≤ 110172	≤ 23953		8450				
2024	MSY approach		≤ 128290							

* The human consumption fishery (HCF) catch split between Subarea 4 and Division 7.d from 2019 to 2023 is based on historical proportions of HCF catch between Subarea 4 and Division 7.d in each year. This assumes that management for Division 7.d is separate from other Divisions in Subarea 7. Total catches are based on a combined discard rate for Subarea 4 and Division 7.d. From 2023 onwards, 80.23% of the TAC is allocated to Subarea 4 and 19.77% to Division 7d (EU–Norway–UK, 2022). As a result, the assumed HCF catch split value is no longer given.

** Included in TAC for Subarea 7 (except Division 7.a).

^ Since 2015, discards include BMS landings.

^^ From 2009 on, the estimated values are the sum of product (SOP) from catch and weight-at-age. The slight discrepancy in the sum of landings/catches in by area (Tables 6a and 6b) as compared to the total landings/catches (Tables 7 and 9) is due to Intercatch raising (excluding IBC) and export procedures for landings (including IBC) as well as to the assignment of total catch weights-at-age for IBC afterwards.

[#] Preliminary.

n/a = not available.

History of catch and landings

Table 7 Whiting in Subarea 4 and Division 7.d. Catch distribution by fleet in 2022 as estimated by ICES.

Catch	Landings				Discards*	Industrial bycatch
27907 tonnes	Demersal trawls and seine mesh size ≥ 120 mm (North Sea) 74%	Demersal trawls mesh size 70–99 mm (North Sea) 4%	Demersal trawls mesh size 70–99 mm (Eastern English Channel) 5%	Other 17%	11913 tonnes	827 tonnes
	15167 tonnes					

* Discards include BMS landings from EU and UK fleets.

Table 8a Whiting in Subarea 4. History of human consumption landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. Weights are in tonnes.

Year	Belgium	Denmark	Faroes	France	Germany	Netherl.	Norway	Sweden	England (Wales)	Scotland	UK	Total landings	Unallocated landings	Official BMS landings	ICES landings ***, ^
1990	1040	1206	26	4951	692	3273	55	16	2338	27486		41083	−1097		42180
1991	913	1528	0	5188	865	4028	103	48	2676	31257		46606	396		46210
1992	1030	1377	16	5115	511	5390	232	22	2528	30821		47042	1832		45210
1993	944	1418	7	5502	441	4799	130	18	2774	31268		47301	691		46610
1994	1042	549	2	4735	239	3864	79	10	2722	28974		42216	346		41870
1995	880	368	21	5963	124	3640	115	1	2477	27811		41400	850		40550
1996	843	189	0	4704	187	3388	66	1	2329	23409		35116	−434		35550
1997	391	103	6	3526	196	2539	75	1	2638	22098		31573	633		30940
1998	268	46	1	1908	103	1941	65	0	2909	16696		23937	247		23690
1999	529	58	1	n/a	176	1795	68	9	2268	17206		n/a	n/a		25700
2000	536	105	0	2527	424	1884	33	4	1782	17158		24453	173		24280
2001	454	105	0	3455	402	2478	44	6	1301	10589		18834	−426		19260
2002	270	96	17	3314	354	2425	47	7	1322	7756		15608	738		14870
2003	248	89	5	2675	334	1442	39	10	680	5734		11255	805		10450
2004	144	62	0	1721	296	977	23	2	1209	5057		9491	541		8950
2005	105	57	0	1261	149	805	16	0	2560	3441		8394	−2286		10680
2006	93	251	0	2711	252	702	17	2			11632	15660	563		15097
2007	45	78	0	3336	76	618	11	1			12110	16275	609		15666
2008	116	42	0	3076	76	656	92	2			10391	14451	972		13479
2009	162	79	2	2305	124	718	73	4			8853	12320	−124		12444
2010	147	158	0	2644	156	614	118	8			7845	11690	−1111		12801
2011	74	135	0	2794	111	514	28	6			8892	12554	−706		13260
2012	45	131	0	1925	25	471	94	4			9893	12588	−356		12944
2013	33	124	0	942	44	495	560	1			11162	13361	−456		13817
2014	46	160	0	1884	31	464	918	2			10290	13795	−52		13847
2015	70	2375**	0	1131	73	581	1088	0			10015	15333	2101**		13232
2016	65	4727**	8	1232	111	644	1150	6			9412	17355	5113**		12242
2017	71	2804**	1	952	82	791	993	11			9263	14968	3140**	< 1	11828
2018	71	2026**	0	918	99	684	1025	8			10689	15520	2942**	46	12578
2019	141	2357**	80	890	81	838	1102	18			11847	17354	1885**	66	15534
2020	211	3606**	25	677	246	769	1674	27			12144	19399	3421**	76	15978
2021*	126	2493**	0	478	195	711	1099	50			11584	16736	2573**	39	14163
2022*	116	1311**	0	457	97	724	909	40			10686	14342	1204**	16	13138

* Preliminary.

** The value of official landings in 2015–2022 for Denmark is substantially higher than in previous years. It is likely that, before 2015, the official landings exclude IBC.

*** Human consumption landings. Values prior to 2009 are from historical assessments and prior to 2006 these values are rounded to the nearest 10 tonnes.

^ Slight discrepancy in sum of landings/catches by area (Table 8a) as compared to total (Tables 7 and 9) due to Intercatch raising and export procedures for landings (including IBC) as well as to the assignment of total catch weights-at-age for IBC afterwards.
n/a = not available.

Table 8b Whiting in Division 7.d. History of human consumption landings. Both the official and ICES estimated values are presented by area for each country participating in the fishery. Weights are in tonnes.

Year	Belgium	France	Netherlands	England (Wales)	Scotland	UK	Total landings	Unallocated landings	Official BMS landings	ICES landings **, ^
1990	83	n/a	0	239	0		n/a	n/a		3480
1991	83	n/a	0	292	0		n/a	n/a		5720
1992	66	5414	0	419	24		5923	183		5740
1993	74	5032	0	321	2		5429	219		5210
1994	61	6734	0	293	0		7088	468		6620
1995	68	5202	0	280	1		5551	161		5390
1996	84	4771	1	199	1		5056	106		4950
1997	98	4532	1	147	1		4779	159		4620
1998	53	4495	32	185	0		4765	165		4600
1999	48	n/a	6	135	0		n/a	n/a		4430
2000	65	5875	14	118	0		6072	1772		4300
2001	75	6338	67	134	0		6614	814		5800
2002	58	5172	19	112	0		5361	−439		5800
2003	67	6654	175	109	0		7005	1295		5710
2004	46	5006	132	99	0		5283	933		4350
2005	45	4638	128			90	4901	111		4790
2006	73	3487	117			72	3749	306		3443
2007	75	3135	118			63	3391	137		3254
2008	69	2875	162			87	3193	−1278		4471
2009	71	6248	112			138	6569	649		5920
2010	88	5512	275			258	6133	−967		7100
2011	78	4833	282			271	5464	315		5149
2012	66	3093	437			261	3857	−556		4413
2013	95	3076	650			472	4293	−15		4308
2014	90	2126	663			345	3224	99		3125
2015	121	3102	565			379	4167	190		3977
2016	146	2771	556			259	3732	32		3700
2017	128	2378	593			358	3457	103	< 1	3354
2018	138	2720	484			283	3625	143	< 1	3482
2019	144	2095	602			259	3100	125	< 1	2975
2020	45	1309	329			287	1971	60	< 1	1911
2021	57	1718	229			417	2424	174	< 1	2250
2022*	50	1319	259			323	1958	−42	< 1	2000

* Preliminary.
** Human consumption landings. Values prior to 2009 are from historical assessments; prior to 2006, these values are rounded to the nearest 10 tonnes.
^ Slight discrepancy in sum of landings/catches in by area (Table 8b) as compared to total (Tables 7 and 9) due to Intercatch raising and export procedures for landings (including IBC) as well as to the assignment of total catch weights-at-age for IBC afterwards.
n/a = not available.

Summary of the assessment

Table 9 Whiting in Subarea 4 and Division 7.d. Assessment summary. Recruitment is in thousands, weights are in tonnes. High and Low refer to 95% confidence intervals.

Year	Recruitment (Age 0)			Spawning stock biomass			Landings^	Discards^	Industrial bycatch^	Fishing pressure (Ages 2–5)		
	Low	R	High	Low	SSB	High				Low	F	High
1978	32833491	41625553	52771929	344862	393162	448226	97553	35382	55287	0.45	0.56	0.70
1979	25874458	33538362	43472283	377603	427066	483009	107231	77391	58948	0.48	0.59	0.71
1980	13107720	16434112	20604655	384433	435481	493307	100775	77003	45584	0.53	0.64	0.77
1981	11920448	14887631	18593392	346125	392375	444805	89583	35894	66641	0.51	0.62	0.75
1982	10506162	13035187	16172995	276915	313248	354348	80576	26620	33055	0.43	0.52	0.64
1983	15291045	19193605	24092170	231915	260762	293198	88002	49562	23753	0.51	0.61	0.72
1984	11887919	14841615	18529192	180163	201832	226108	86275	40483	18878	0.62	0.73	0.85
1985	20616747	25598967	31785185	175621	198047	223336	56059	28961	15310	0.55	0.65	0.77
1986	19312903	24282189	30530091	180112	202029	226613	64019	79523	17953	0.64	0.75	0.89
1987	15017605	18620384	23087483	184231	207339	233346	68317	53901	16519	0.65	0.78	0.93
1988	20894294	25944636	32215692	194956	220469	249321	56100	28146	48969	0.58	0.69	0.83
1989	13167005	16204265	19942137	196676	221782	250092	45103	35787	42643	0.52	0.64	0.79
1990	11677400	14342667	17616260	194202	219204	247426	45662	55603	51337	0.51	0.63	0.77
1991	12790735	15687463	19240217	191028	215770	243717	51929	35058	39755	0.40	0.49	0.60
1992	14677168	17962730	21983783	183037	206670	233355	50946	32564	25045	0.38	0.47	0.57
1993	14249940	17460898	21395386	171798	193992	219053	51818	44370	20723	0.45	0.54	0.65
1994	13138467	16114856	19765517	167477	189213	213768	48486	35692	17473	0.46	0.55	0.67
1995	10169138	12514730	15401350	168849	191608	217434	45938	32176	27379	0.40	0.49	0.61
1996	8499055	10518159	13016938	150578	171577	195504	40503	30505	5116	0.36	0.45	0.55
1997	12662894	16095200	20457839	134862	154457	176900	35563	19660	6213	0.32	0.40	0.49
1998	21044532	26641474	33726962	115228	132505	152373	28288	15693	3494	0.29	0.36	0.45
1999	24356614	30726247	38761638	112833	130403	150709	30130	25677	5038	0.33	0.41	0.51
2000	20686025	26060340	32830926	142384	165431	192209	28583	26063	9160	0.31	0.39	0.51
2001	19861348	24818144	31012008	159601	187994	221437	25061	19237	944	0.21	0.28	0.37
2002	9865076	12410584	15612915	152888	181055	214412	20675	18501	7275	0.181	0.24	0.31
2003	10322290	12840890	15974018	133006	158627	189184	16161	26745	2734	0.190	0.24	0.31
2004	12090105	15212478	19141231	120531	143886	171767	13295	19048	1214	0.163	0.21	0.26
2005	11871965	14916850	18742677	108534	129279	153988	15471	12525	888	0.153	0.193	0.25
2006	9254573	11558730	14436566	101124	120055	142531	18535	16310	1924	0.181	0.23	0.29
2007	14325485	17939446	22465119	92356	108864	128323	18915	6971	1088	0.168	0.21	0.27
2008	14038316	17627105	22133341	95213	111551	130693	17951	10296	0	0.170	0.21	0.27
2009	13777903	17273026	21654778	99352	116450	136491	18403	8684	1344	0.173	0.22	0.27
2010	13698827	17642410	22721261	122099	143589	168862	19846	12683	1907	0.176	0.23	0.29
2011	9240465	11632416	14643538	115967	136821	161424	18461	11173	1035	0.160	0.21	0.27
2012	6775062	8543128	10772601	120886	143393	170090	17407	11697	1117	0.158	0.20	0.26
2013	10867618	13753325	17405283	112766	134707	160919	18211	6795	1654	0.161	0.21	0.27
2014	12718122	16510448	21433582	104939	125392	149832	17027	9725	1623	0.179	0.23	0.30

Year	Recruitment (Age 0)			Spawning stock biomass			Landings^	Discards^	Industrial bycatch^	Fishing pressure (Ages 2–5)		
	Low	R	High	Low	SSB	High				Low	F	High
2015	11495209	14940500	19418399	106400	127889	153717	17299	16891	2097	0.21	0.27	0.35
2016	13735726	17712494	22840616	109107	132680	161347	16118	12726	4551	0.20	0.27	0.35
2017	8548318	11077973	14356214	116663	143349	176141	15361	11348***	2635	0.169	0.23	0.31
2018	10392156	13634181	17887614	122986	152116	188146	16160	10588***	1658	0.155	0.21	0.28
2019	19669598	26577717	35912024	129484	161131	200512	18579	10080***	1864	0.149	0.20	0.28
2020	16923274	23622643	32974073	170725	214495	269487	18014	13795***	3115	0.128	0.175	0.24
2021	9337225	13856825	20564097	219797	280528	358040	16499	14638***	2048	0.101	0.139	0.192
2022	8443510	14164438	23761601	255980	333850	435408	15167	11913***	827	0.072	0.101	0.142
2023		15061207*		261138	348137**	464119						

^ ICES estimates, presented as the sum of product (SOP) values from the catch and weight-at-age, as used in the assessment model.

* In 2023, recruitment is the geometric mean 2003–2022.

** In 2023, SSB is estimated by SAM, stock weights-at-age, and maturity estimates averaged over the last three years.

*** Since 2017, discards include BMS landings from EU and UK fleets.

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