

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

ICES stock advice

ICES advises that when the MSY approach is applied, there should be zero catches in each of the years 2018 and 2019.

Stock development over time

The present stock size is extremely low. SSB has been declining since the start of the time-series and has been well below B_{lim} since the mid-1990s. Recruitment has been low since the early 1990s. Large variations in fishing pressure has been estimated in recent years and F has been above F_{lim} for the entire time-series.



Figure 1 Whiting in Division 7.a. Summary of stock assessment (weights in tonnes), Recruitment, F , and SSB have uncertainty boundaries ($1 \times$ standard deviation) in the plot. The predicted recruitment value is not shaded.

Stock and exploitation status

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

		Fishing pressure				Stock size			
		2014	2015	2016		2015	2016	2017	
Maximum sustainable yield	F_{MSY}	✗	✗	✗	Above	MSY	✗	✗	Below trigger
Precautionary approach	F_{pa}, F_{lim}	✗	✗	✗	Harvested unsustainably	B_{pa}, B_{lim}	✗	✗	Reduced reproductive capacity
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—	Not applicable

Catch options

Table 2 Whiting in Division 7.a. The basis for the catch options.

Variable	Value	Source	Notes
F ages 1–3 (2017)	0.97	ICES (2017a)	$F_{sq} = F_{Average}$ (2014–2016)
SSB (2018)	877 tonnes	ICES (2017a)	Fishing at F_{sq}
$R_{age 0}$ (2017 and 2018)	117 107 thousands	ICES (2017a)	Geometric mean (2000–2014)
Catch (2017)	1577 tonnes	ICES (2017a)	Fishing at F_{sq}
Landings (2017)	137 tonnes	ICES (2017a)	Average discard pattern (2014–2016)
Discards (2017)	1440 tonnes	ICES (2017a)	Average discard pattern (2014–2016)

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

Basis	Total catch (2018)	Landings (2018)	Discards (2018)	F_{total} (2018)	$F_{Landings}$ (2018)	$F_{Discards}$ (2018)	SSB (2019)	% SSB change *	% TAC change **
ICES advice basis									
MSY approach	0	0	0	0	0	0	2103	140	-100
Other options									
$F_{MSY} = F_{pa}$	413	46	367	0.22	0.0085	0.21	1702	94	-43
$F = 0$	0	0	0	0	0	0	2103	140	-100
F_{lim}	657	72	585	0.37	0.0144	0.36	1473	68	-10
$SSB(2019) = B_{lim}^{\wedge}$									
$SSB(2019) = B_{pa} = MSY B_{trigger}^{\wedge}$									
$F = F_{2017}$	1406	147	1259	0.97	0.038	0.93	831	-5.2	84

* SSB 2019 relative to SSB 2018.

** Landings in 2018 relative to TAC in 2017 (80 t).

\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 2019, even with zero advice.

Basis of the advice

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

Advice basis	MSY approach
Management plan	ICES is not aware of any agreed precautionary management plan for whiting in this area.

Quality of the assessment

This stock was benchmarked in January 2017. The result of the benchmark was that the stock was changed from a category 3 stock (trend-based assessment) to a category 1 stock (analytical assessment). The assessment includes information from the commercial fishery, including both landings and discards, and takes into account selectivity changes that occurred in 1995. Three survey series are used within the assessment. Natural mortality parameters were updated to reflect current stock dynamics. Despite the highly fluctuating fishing pressure in recent years (2002–present) it is clear from the assessment that the stock remains extremely low.

Issues relevant for the advice

The majority of whiting caught are discards in the *Nephrops* fishery and are below the minimum landings size. Despite the introduction of several technical measures to reduce fin fish catch and discards in the *Nephrops* fishery, the total discards estimates remain high. Given the continued high discards and low TAC this stock could become a major ‘choke species’ for the Division 7.a *Nephrops* fishery in the context of the landing obligation.

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 $B_{trigger}$	16300	B_{pa}	ICES (2017b)
	F_{MSY}	0.22	Median point estimates of EqSim with a combined S-R relationship	ICES (2017b)
Precautionary approach	B_{lim}	10000	Below 10 000 recruitment is impaired.	ICES (2017b)
	B_{pa}	16300	$B_{lim} \times \exp(1.645 \times \sigma)$; $\sigma = 0.297$	ICES (2017b)
	F_{lim}	0.37	F with 50% probability of $SSB < B_{lim}$	ICES (2017b)
	F_{pa}	0.22	$F_{lim} \times \exp(-1.645 \times \sigma)$; $\sigma = 0.303757$	ICES (2017b)
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

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

ICES stock data category	1 (ICES, 2016)
Assessment type	ASAP (Age-Structured Assessment Programme; NOAA toolbox) that uses catches in the model and in the forecast
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

There is no additional available information for this stock.

History of the advice, catch, and management

Table 7 Whiting in Division 7.a. ICES advice and official landings. All weights are in tonnes.

Year	ICES Advice	Predicted 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

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	Official landings	ICES landings***	Landings taken or reported in 33E2 and 33E3***	Discards.**	ICES catch
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
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					
2018	MSY approach	0						
2019	MSY approach (Same advice as for 2018)	0						

* Not including discards from the *Nephrops* fishery.

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

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

Landings only, no discards included.

History of the catch and landings

Table 8 Whiting in Division 7.a. Catch distribution by fleet in 2016 as estimated by ICES.

Catch	Landings			Discards	
780 t	Fin fish directed otter trawls	<i>Nephrops</i> directed otter trawls	Other gears	<i>Nephrops</i> directed otter trawls	Other gears
	58%	31%	11%	78%	22%
	15 t			765 t	

Table 9 Whiting in Division 7.a. History of official landings as reported to ICES for each country participating in the fishery.
All weights are in tonnes.

Year	Belgium	France	Ireland	Netherlands	UK(NI, Engl. & Wales)	Spain	UK (Isle of Man)	UK (Scotland)	UK	Landings taken or reported in rectangles 33E2 and 33E3 (belonging to the 7.b-ce-k stock)**	Total official landings
1988	90	1063	4394		5823		15	107			11 492
1989	92	533	3871		6652		26	154			11 328
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

* Preliminary

** Landings in the south of Division 7.a (33E2 and 33E3) are not included in the assessment and are considered to be part of the stock (whg.7.b-ce-k)

Table 10 Whiting in Division 7.a. History of commercial catch, and landings, as reported to ICES expert group. 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
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

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

* Preliminary

Summary of the assessment

Table 11 Whiting in Division 7.a. Assessment summary. Weights are in tonnes. High and lows refer to 1 x standard deviation.

Year	Recruitment age 0 thousands	High	Low	SSB	High	Low	Landings	Discards	F ages 1-3	High	Low
1980	634875	841455	428295	32629	43329	21929	13422	3314	0.37	0.49	0.25
1981	322564	459044	186084	43090	53656	32524	18267	3064	0.45	0.58	0.31
1982	285178	411728	158628	34579	43809	25348	17167	801	0.49	0.66	0.33
1983	880701	1103161	658241	21953	29518	14387	10577	1829	0.50	0.70	0.31
1984	630674	828154	433194	14973	21133	8813	11619	3380	0.61	0.83	0.40
1985	513723	690103	337343	22715	29373	16056	15525	2644	0.75	0.99	0.50
1986	870583	1098323	642843	18154	23986	12322	10063	2066	0.58	0.78	0.38
1987	474957	639287	310627	16163	21606	10720	10411	3859	0.62	0.82	0.42
1988	488278	645698	330858	20449	26147	14750	10245	1611	0.52	0.69	0.35
1989	601748	762188	441308	16984	22184	11784	11305	2103	0.73	0.97	0.49
1990	523266	653906	392626	12681	16836	8526	8212	2444	0.62	0.81	0.43
1991	686554	801524	571584	13791	17398	10185	7348	2598	0.62	0.78	0.46
1992	229805	264788	194822	11895	14375	9415	8588	4203	1.01	1.19	0.82
1993	214792	242862	186722	9982	11508	8456	6523	2707	0.80	0.93	0.66

1994	184671	210012	159330	5758	6702	4815	6763	1173	0.83	0.97	0.68
1995	343300	384003	302597	4139	4828	3450	4893	2151	0.81	0.95	0.67
1996	204896	231289	178503	2891	3435	2347	4335	3631	0.88	1.01	0.75
1997	172204	196233	148175	3121	3598	2644	2277	1928	0.77	0.90	0.64
1998	168308	190271	146345	2584	3001	2168	2229	1304	1.07	1.25	0.89
1999	209650	236461	182839	1559	1869	1249	1670	1092	0.85	1.00	0.69
2000	109785	125088	94482	1516	1805	1226	762	2118	1.10	1.28	0.93
2001	193639	218933	168345	1339	1571	1106	733	1012	0.90	1.06	0.73
2002	80493	91462	69524	1192	1423	960	747	740	1.22	1.42	1.02
2003	121095	139180	103010	1205	1414	997	517	480	0.61	0.75	0.46
2004	95987	107996	83978	1278	1529	1027	133	905	1.67	1.97	1.38
2005	106343	121094	91592	551	697	404	125	272	0.44	0.56	0.32
2006	155909	175565	136253	1086	1324	849	64	1773	1.50	1.77	1.22
2007	104358	118032	90684	587	747	427	35	1512	1.18	1.38	0.97
2008	149762	168448	131076	730	883	577	37	1169	0.95	1.14	0.77
2009	93394	105866	80922	743	902	584	39	1321	1.08	1.27	0.89
2010	93123	105076	81170	830	991	670	30	1154	1.12	1.34	0.90
2011	152628	171810	133446	620	765	476	31	946	0.84	1.01	0.67
2012	79945	90784	69106	690	838	542	60	1339	1.11	1.30	0.91
2013	160975	183552	138398	845	1015	675	33	948	0.64	0.78	0.50
2014	202376	227086	177666	957	1159	754	23	1951	1.43	1.70	1.16
2015	111405	129131	93679	708	894	521	28	1521	0.90	1.10	0.70
2016	73818	92169	55467	1134	1397	872	15	765	0.57	0.74	0.39
2017	117107*			1426							

* GM recruitment 2000–2014

Sources and references

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