5.3.68 Whiting (*Merlangius merlangus*) in divisions 7.b–c, and 7.e–k (southern Celtic seas and eastern English Channel)
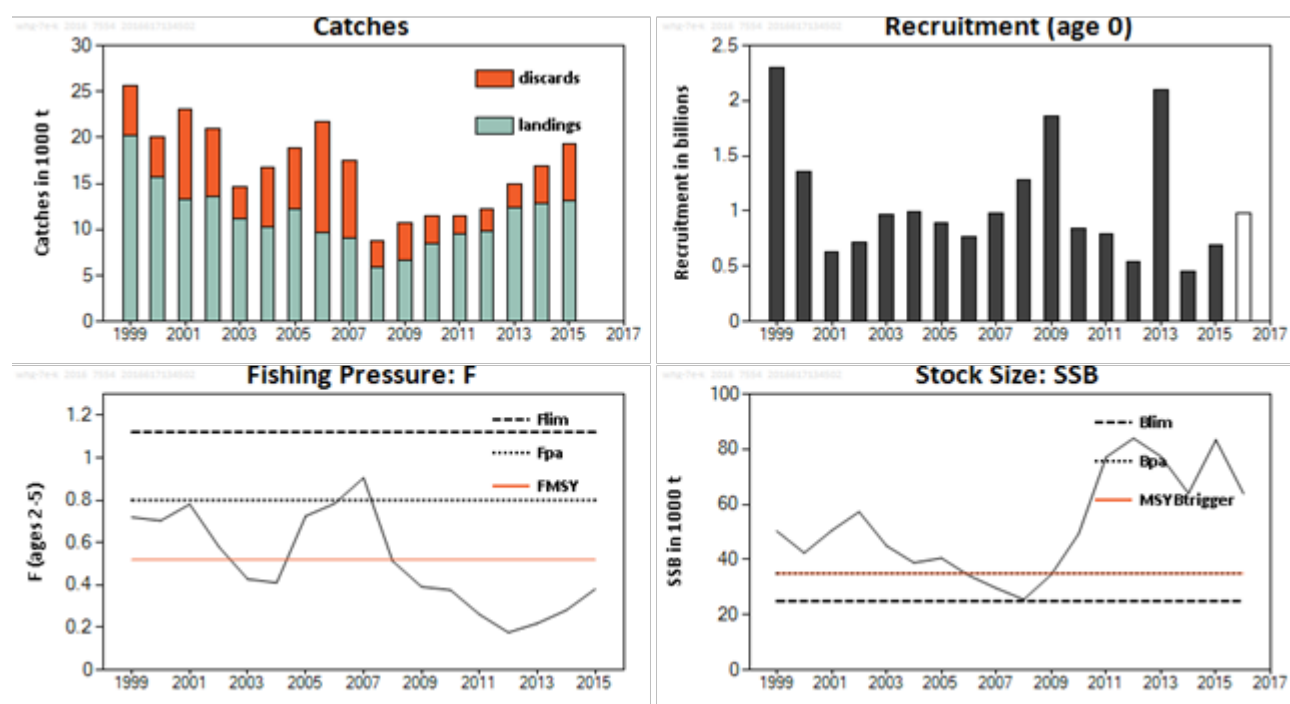
ICES stock advice

ICES advises that when the MSY approach is applied, catches in 2017 should be no more than 25 125 tonnes.

Since this stock is only partially under the EU landing obligation, ICES is not in a position to advise on landings corresponding to the advised catch.

Stock development over time

The spawning-stock biomass (SSB) increased from 2008 to 2011 and has since remained well above MSY $B_{trigger}$. Fishing mortality (F) has been below F_{msy} since 2008 and is increasing in recent years. Recruitment has been below average since 2010 with the exception of the 2013 year class which is estimated to be the second highest in the series.

Figure 5.3.68.1   Whiting in divisions 7.b–c, and 7.e–k. Summary of stock assessment (weights in thousand tonnes). Assumed recruitment values are not shaded.

Stock and exploitation status

Table 5.3.68.1   Whiting in divisions 7.b–c, and 7.e–k. 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 5.3.68.2   Whiting in divisions 7.b–c, and 7.e–k. The basis for the catch options.

Variable	Value	Source	Notes
F ages 2–5 (2016)	0.294	ICES (2016a)	mean (2013–2015)
SSB (2017)	57 746 t	ICES (2016a)	Short term forecast
R_{age0} (2016–2017)	981 125 thousands	ICES (2016a)	$GM_{1999–2014}$
Total catch (2016)	16 679 t	ICES (2016a)	Short-term forecast
Landings (2016)	12 611 t	ICES (2016a)	Average discard pattern (2013–2015)
Discards (2016)	4176 t	ICES (2016a)	Average discard pattern (2013–2015)

Table 5.3.68.3   Whiting in divisions 7.b–c, and 7.e–k. The catch options. Weights in tonnes. No information for % TAC change can be shown as the TAC area differs from the stock distribution area.

Rationale	Catch (2017)	Wanted catch* (2017)	Unwanted catch* (2017)	Basis	F catch (2017)	F wanted catch (2017)	F unwanted catch (2017)	SSB (2018)	% SSB change **
MSY approach	25 125	19 825	5300	F_{MSY}	0.52	0.36	0.16	49 360	-15
Zero catch	0	0	0	F = 0	0	0	0	71 218	23
Other options	42 013	32 424	9589	$F = F_{lim}$	1.12	0.78	0.34	35 449	-39
	34 159	26 673	7486	$F = F_{pa}$	0.8	0.56	0.24	41 809	-28
	42 578	32 829	9750	$SSB_{2018}=B_{trigger=}B_{pa}$	1.15	0.8	0.35	35 000	-39
	15 344	12 215	3129	SSB_{2017}	0.28	0.2	0.09	57 746	0
	55 765	41 739	14 026	$SSB_{2018}=Blim$	2.02	1.41	0.61	25 000	-57
	15 836	12 602	3234	F_{2016}	0.29	0.21	0.09	57 320	-1
Mixed-fisheries options ([ICES, 2016b](#))									
Maximum	25 393			A	0.53			49 133	-15
Minimum	8861			B	0.15			63 397	10
Cod	9020			C	0.16			63 258	10
Haddock	15 829			D	0.29			57 325	-1
Whiting	25 125			E	0.52			49 360	-15
SQ effort	19 842			F	0.39			53 866	-7

* "Wanted catch" is used to describe fish that would be landed in the absence of the EU landing obligation (EU 2015/2438). The "unwanted catch" refers to the component that was previously discarded (ICES, 2016c).
** SSB 2018 relative to SSB 2017.

Mixed-fisheries assumptions:
(note: The "stock share" is used to describe the share of the fishing opportunities for each particular fleet, which has been calculated based on the single-stock advice for 2017 and the historical proportion of the stock landings taken by the fleet)
A. Maximum: Each fleet stops fishing when its last stock share is exhausted.
B. Minimum: Each fleet stops fishing when its first stock share is exhausted.
C. Cod: Each fleet stops fishing when its cod stock share is exhausted.
D. Haddock: Each fleet stops fishing when its haddock stock share is exhausted.
E. Whiting: Each fleet stops fishing when its whiting stock share is exhausted.
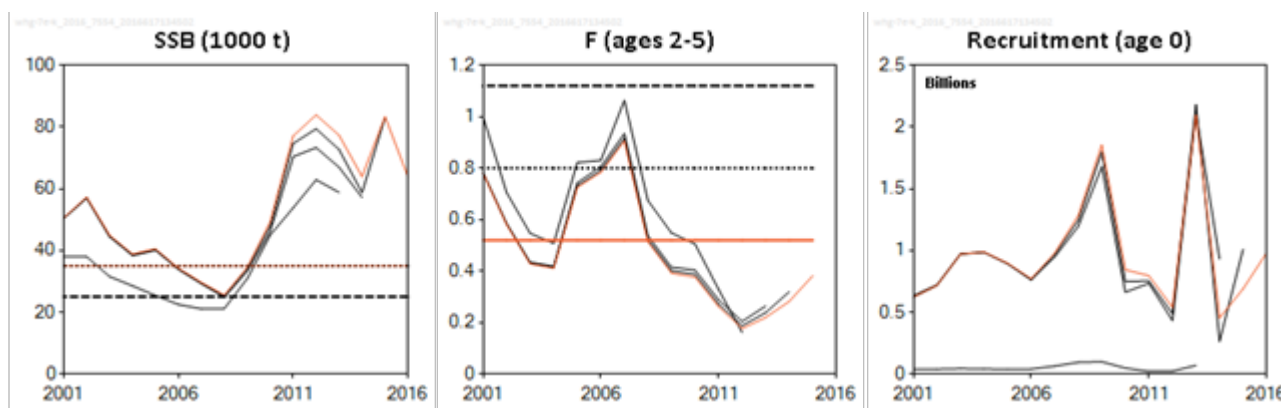F. *Status quo* effort: The effort of each fleet is the same as in 2015.

Basis of the advice

Table 5.3.68.4   Whiting in divisions 7.b–c, and 7.e–k. The basis of the advice.

Advice basis	MSY approach
Management plan	There is no management plan for whiting in this area.

Quality of the assessment

This stock was benchmarked in 2014. This year's assessment is consistent with last year's.

Figure 5.3.68.2   Whiting in divisions 7.b–c, and 7.e–k. Historical assessment results (final-year recruitment estimates included). The 2014 benchmark led to a rescaling of the assessment outputs, particularly recruitment.

Issues relevant for the advice

Despite the introduction of square mesh panels during 2012 the volume of discards has remained high and there is not yet evidence of improvements in selectivity in the fishery.

Vessels actively targeting whiting have been subject to the landings obligation since 2016. Other fleets, in which whiting is a bycatch species, are not currently under the landings obligation (EC, 2015/812).

Whiting are caught in mixed fisheries with cod and haddock, and this should be taken into account. The single-stock advice allows for a large increase in F to achieve F_{MSY} in 2017. The mixed-fisheries analysis carried out by ICES shows that cod will be the limiting species for most of the fleets in 2017 (Section 5.2.2.1). Whiting is fished at or below F_{MSY} in 2017 under all mixed-fisheries scenarios except the maximum scenario, reflecting that it is the least limiting stock for most fleets.

There is a mismatch between the assessment area and the TAC area because 7.d is not considered part of this stock and is assessed separately with Area 4 whiting. ICES recommends that the TAC area correspond to the assessment area.

In addition, catches reported or taken in ICES rectangles 33E2 and 33E3 are reallocated from Division 7.a to this stock. The implications for this stock are minor due to the relative low catches.

Reference points

Table 5.3.68.5   Whiting in divisions 7.b–c, and 7.e–k. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	35 000 t	B_{pa}	ICES(2016d)
	F_{MSY}	0.52	Segmented regression with B_{loss}, the lowest observed spawning-stock biomass (Eqsim).	ICES(2016d)
Precautionary approach	B_{lim}	25 000 t	Lowest observed SSB (2008), rounded value	ICES(2016e)
	B_{pa}	35 000 t	B_{lim} X 1.4	ICES(2016e)
	F_{lim}	1.12	Based on segmented regression with B_{lim} as breakpoint	ICES(2016e)
	F_{pa}	0.80	F_{lim}/1.4	ICES(2016e)
Management plan	SSB_{MGT}	Not applicable		
	F_{MGT}	Not applicable		

Basis of the assessment

Table 5.3.68.6   Whiting in divisions 7.b–c, and 7.e–k. The basis of the assessment.

ICES stock data category	1 (ICES, 2016c)
Assessment type	Age-based analytical assessment (XSA) that uses catches in the model and in the forecast.
Input data	Commercial landings, estimated discards, age composition of catches and one survey index (EVHOE-WIBTS-Q4 & IGFS-WIBTS-Q4 combined: IGFSEVHOE); maturity-based knife-edge at age 2; Lorenzen-based M (Lorenzen, 1996) derived from the mean weight-at-age.
Discards and bycatch	Included in the assessment for the full time-series. Sampling from the majority of the fleets.
Indicators	None
Other information	This stock was benchmarked in 2014 (WKCELT; ICES, 2014).
Working group	Working Group for the Celtic Seas Ecoregion (WGCSE), Working Group on Mixed Fisheries Advice (WGMIXFISH-ADVICE)

Information from stakeholders

The French fishing industry report a slightly higher than average catch rate of whiting during the first quarter of 2015 as well as in 2016.

History of advice, catch, and management

Table 5.3.68.7   Whiting in divisions 7.b–c, and 7.e–k. History of ICES advice, the agreed TAC, and ICES estimates of landings. Weights in thousand tonnes.

Year	ICES advice	Predicted catch corresp. to advice	Predicted landings corresp. to advice	Agreed TAC*	ICES landings	ICES discards
1987	*Status quo* F; TAC	-	7.1#		12.7	
1988	Precautionary TAC	-	7.0#		15.1	
1989	Precautionary TAC	-	7.9#		16.5	
1990	No increase in F; TAC	-	8.4#		14.1	
1991	Precautionary TAC	-	8.0#		13.5	
1992	If required, precautionary TAC	-	8.0#		12.4	
1993	Within safe biological limits	-	6.6#	22.0	16.3	
1994	Within safe biological limits	-	< 9.4#	22.0	20	
1995	20% reduction in F	-	8.2##	25.0	22.7	
1996	20% reduction in F	-	8.6##	26.0	18.3	
1997	At least 20% reduction in F	-	< 7.3###	27.0	20.5	
1998	At least 20% reduction in F	-	< 8.2###	27.0	19.2	
1999	No increase in F	-	12.4###	25.0	20.2	5.4
2000	17% reduction in F	-	< 13.1###	22.2	15.6	4.4
2001	No increase in F	-	13.5###	21.0	13.2	9.9
2002	No increase in F	-	27.7###	31.7	13.6	7.3
2003	No increase in F	-	20.2###	31.7	11.1	3.6
2004	No increase in F	-	14.0###	27.0	10.2	6.5
2005	No increase in F	-	10.6###	21.6	12.2	6.7
2006	No increase in F	-	10.8###	19.9	9.7	12.0
2007	No increase in F	-	-	19.9	9.1	8.5
2008	Reduction in F	-	-	19.9	5.9	2.9
2009	Same advice as last year	-	-	16.95	6.6	4.1
2010	Same advice as last year	-	-	14.407	8.5	3.0
2011	See scenarios	-	-	16.658	9.5	2.0
2012	No increase catch and improved gear selection	-	-	19.053	9.8	2.4
2013	MSY approach	-	< 17.5###	24.5	12.4	2.5
2014	MSY approach	-	< 15.562###	19.162	12.8	3.9
2015	MSY approach	< 18.501**	< 14.230	17.742	13.2	6.1
2016	MSY approach	≤ 19.076**	≤ 15.395	22 778		
2017	MSY approach	≤ 25.125**	≤ 19.825			

* TAC covers Subarea 7 (except Division 7.a).
** Wanted catch.
\# For the divisions 7.f and 7.g stock component.
\#\# For the divisions 7.f–h stock component.
\#\#\# For the divisions 7.e–k stock component.

History of catch and landings

Table 5.3.68.8   Whiting in divisions 7.b–c, and 7.e–k. Catch distribution by fleet in 2015 as estimated by ICES.

Catch (2015)	Landings				Discards			
	otter trawls	seine nets	other gears	beam trawls	otter trawls	seine nets	other gears	beam trawls
19 275 t	74%	17%	7%	2%	67%	19%	10%	4%
	13 174 t				6101 t			

Table 5.3.68.9　　Whiting in Divisions 7.b–c, and 7.e–k. History of official landings presented for each country participating in the fishery (in tonnes).

Year	Belgium	France	Ireland	UK: Eng. + W.	Others	Rectangles 33E2 & 33E3	Total
1998	479	11 748	5549	1755	179		19 710
1999	448	16 418	6013	1354	27		24 260
2000	194	9186	5358	1255	39		16 032
2001	171	7317	5365	948	31		13 832
2002	149	7548	5718	847	35		14 297
2003	129	5989	4516	763	21		11 418
2004	180	4874	4350	587	132		10 123
2005	218	5913	5774	482	136		12 523
2006	128	4711	4570	413	129		9951
2007	127	3575	4864	575	86		9227
2008	122	3072	2406	618	35		6253
2009	87	2815	2798	828	25		6553
2010	101	3464	4331	792	86		8774
2011	100	4311	4752	739	174		10 076
2012	170	3709	5842	750	141	32	10 644
2013	226	4007	6887	906	92	34	12 152
2014	222	4927	6873	1057	38	49	13 117
2015*	152	5640	6437	819	97	32	13 145

*Preliminary.

Summary of the assessment

Table 5.3.68.10　　Whiting in divisions 7.b–c, and 7.e–k. Assessment summary with weights (in tonnes).

Year	Recruitment Age 0 (thousands)	SSB (tonnes)	Landings (tonnes)	Discards (tonnes)	Mean F Ages 2-5
1999	2 295 352	50 349	20 180	5420	0.719
2000	1 356 009	42 393	15 644	4400	0.703
2001	623 040	50 541	13 196	9877	0.781
2002	716 927	57 302	13 640	7336	0.581
2003	970 688	44 966	11 098	3559	0.428
2004	987 460	38 841	10 188	6481	0.411
2005	896 500	40 538	12 207	6700	0.725
2006	771 349	34 251	9660	12 031	0.784
2007	979 773	29 641	9086	8456	0.905
2008	1 283 028	25 544	5859	2880	0.513
2009	1 854 508	34 600	6572	4101	0.392
2010	843 524	49 345	8514	3008	0.376
2011	795 445	77 142	9498	1954	0.262
2012	538 638	83 957	9812	2449	0.177
2013	2 096 145	77 310	12 402	2512	0.22
2014	452 970	63 959	12 847	3977	0.282
2015	689 038	83 393	13 174	6101	0.382
2016	981 125	63 908			
Average	1 062 862	52 666	11 387	5367	0.508

^ GM 1999–2014.

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