

Catch options

Table 6.3.56.2 Whiting in Subarea IV and Division VIIId. The basis for the catch options.

Variable	Value	Source	Notes
F (2015)	0.230	ICES (2015a)	F (2014)
SSB (2016)	378644	ICES (2015a)	Short-term forecast (STF), tonnes
R (2015)	4353	ICES (2015a)	RCT3, millions of individuals
R (2016)	8066	ICES (2015a)	RCT3, millions of individuals (November update)
R (2017)	3782	ICES (2015a)	Geometric mean (GM, 1990–2014), millions of individuals
Total catch (2015)	36754	ICES (2015a)	MFDP output, tonnes
Commercial landings (2015)	21731	ICES (2015a)	MFDP output, tonnes
Discards (2015)	13861	ICES (2015a)	MFDP output, tonnes; discard rate equals average 2012–2014
Industrial bycatch	1162	ICES (2015a)	MFDP output, tonnes; bycatch rate equals average 2012–2014

Table 6.3.56.3 Whiting in Subarea IV and Division VIIId. The catch options. Weights are in thousand tonnes.

Rationale	Total catch 2016	Total wanted catch IV+VIIId 2016 *	Total unwanted catch 2016 *	Total IBC 2016 **	Wanted catch IV 2016 ***	Wanted catch VIIId 2016 ***	Basis	Total F 2016	F (wanted catch) 2016	F (unwanted catch) 2016	F(IBC) 2016	SSB 2017	% SSB change [^]	% TAC change (wanted catch) ^{^^}
EU–Norway management strategy	30.510	14.853	14.426	1.231	12.373	2.480	F _{MGT} from Management Strategy	0.150	0.102	0.038	0.010	523.419	38.2	–10
IBC only	1.295	0.000	0.000	1.295	0.000	0.000	No HC fishery	0.010	0.000	0.000	0.010	546.516	44.3	–100
Other options	35.481	17.329	16.932	1.220	14.436	2.893	$0.75 \times F_{2014}$	0.175	0.121	0.045	0.010	519.531	37.2	6
	28.717	13.957	13.526	1.235	11.626	2.330	15% TAC decrease	0.141	0.096	0.036	0.010	524.825	38.6	–15
	47.217	23.341	22.682	1.194	19.444	3.897	F ₂₀₁₄	0.230	0.161	0.060	0.010	510.216	34.7	42
	33.660	16.420	16.017	1.224	13.678	2.742	Roll-over TAC	0.166	0.114	0.042	0.010	520.957	37.6	0
	57.267	28.180	27.915	1.173	23.474	4.705	$1.25 \times F_{2014}$	0.285	0.201	0.075	0.010	502.489	32.7	72
	38.603	18.882	18.508	1.213	15.730	3.153	15% TAC increase	0.191	0.132	0.049	0.010	517.090	36.6	15
<i>Mixed-fisheries options – minor differences with calculation above can occur because of the different methodology used (ICES, 2015b). Not updated in November.</i>														
Maximum	70.557						A	0.46				319	–2	
Minimum	16.345						B	0.10				363	11	
Cod	27.156						C	0.16				354	8	
SQ_Effort	36.084						D	0.22				347	6	
Value	35.168						E	0.21				348	7	
Effort_Mgt	29.008						F	0.17				353	8	

* “Wanted” and “unwanted” catch are used to described fish that would be landed and discarded in the absence of the EU landing obligation based on discard rates estimates for 2012–2014.

** The split of catch between wanted catch, unwanted catch, and industrial bycatch (IBC) in 2016 was done using partial age-dependent fishing mortalities as forecasting input. Partial Fs were calculated based on total F-at-age and the numbers-at-age per catch category as estimated in the assessment (average exploitation pattern of the three most recent years).

*** The wanted catch split between Subarea IV and Division VIIId in 2016 is the same as the proportion of landings between the areas in 2014: 83.3% from Subarea IV and 16.7% from Division VIIId. This assumes that management for Division VIIId is separate from Subarea VII. Total catches are based on a combined discard rate for Subarea IV and Division VIIId.

[^] SSB 2017 relative to SSB 2016.

^{^^} Human consumption (HC; wanted catch) for Subarea IV in 2016 relative to TAC for Subarea IV and Division IIa in 2015 (13 678 t).

Mixed-fisheries assumptions

(Note: The “fleet’s 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 2016 and the historical proportion of the stock landings taken by the fleet):

A. Maximum scenario: Each fleet stops fishing when its last stock share is exhausted.

B. Minimum scenario: Each fleet stops fishing when its first stock share is exhausted.

C. Cod scenario: Each fleet stops fishing when its cod stock share is exhausted.

D. *Status quo* (SQ) effort scenario: The effort of each fleet in 2015 and 2016 is as in 2014.

E. Value scenario: The effort of each fleet is equal to the weighted average of the efforts required to catch the fleet’s quota share of each of the stocks, where the weights are the relative catch values of each stock in the fleet’s portfolio.

F. Effort management scenario: Effort reductions according to cod and flatfish management plans.

Basis of the advice

Table 6.3.56.4 Whiting in Subarea IV and Division VIIId. The basis of the advice.

Advice basis	EU–Norway management strategy.
Management plan	<p>EU–Norway long-term management strategy for whiting in the North Sea</p> <p>Excerpt from the EU–Norway agreement 2014:</p> <p><i>The Parties agreed to implement a long-term management plan for the whiting stock in the North Sea, which is consistent with a precautionary approach and designed to provide for sustainable fisheries and high yields.</i></p> <p><i>The plan shall consist of the following elements:</i></p> <ol style="list-style-type: none"> <i>1. The Parties shall establish a TAC that is consistent with a fishing mortality rate of no more than 0.15 for appropriate age-groups.</i> <i>2. Where the rule in paragraph 1 would lead to a TAC, which deviates by more than 15% from the TAC of the preceding year, the Parties shall establish a TAC that is no more than 15% greater or 15% less than the TAC of the preceding year.</i> <i>3. A review of this arrangement shall take place no later than 31 December 2017.</i> <i>4. This arrangement entered into force on 1 January 2014.</i>

Quality of the assessment

The overall reporting of catch data provided to ICES has improved during 2012–2014 through such aspects as the fully documented fisheries (FDF) programme and increased coverage by the Scottish industry/science observer sampling scheme.

In 2012, natural mortality estimates were revised substantially, taking into account additional predation mortality, which has resulted in a rescaling of SSB, F, and recruitment. There have been improvements in the provision of landing and discard estimates from participating countries in recent years. Within the North Sea, stock identity remains an unresolved issue with this assessment.

The latest IBTS Q3 index (from the ICES International Bottom Trawl Survey in 2015) does not alter the previous perception of recruitment (at age 1) in 2015. Age 0 abundance information from the same survey has been used to obtain an estimate of recruitment (at age 1) in 2016.

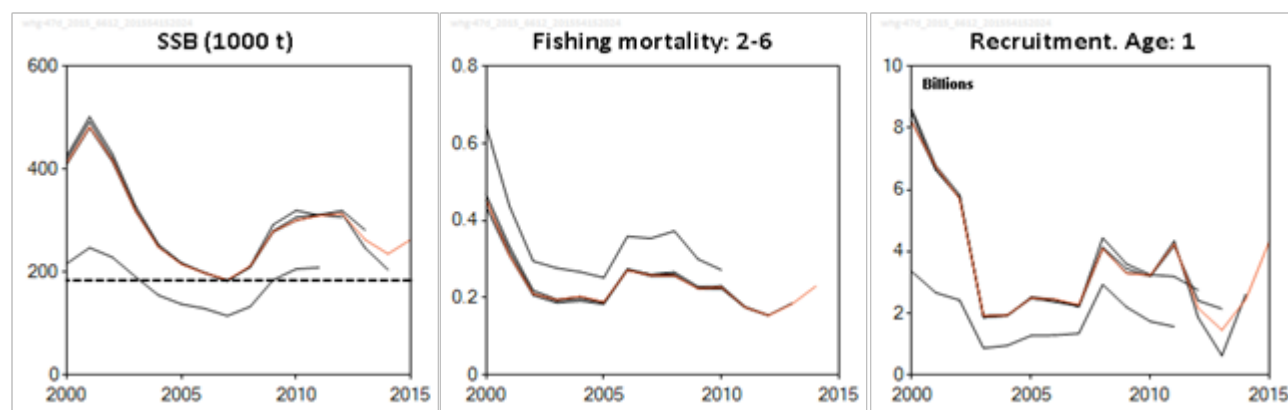


Figure 6.3.56.2 Whiting in Subarea IV and Division VIIId. Historical assessment results (final-year recruitment estimates included). Horizontal line shows B_{lim} (dashed).

Issues relevant for the advice

The overall status of the stock shows a low biomass, but there is still a concentration of whiting biomass in the western part of the North Sea; therefore, catch rates from some local fleets do not represent trends in the overall stock.

Results from a North Sea mixed-fisheries analysis are presented in ICES (2015c). Assuming fishing patterns and catchability in 2015 and 2016 are unchanged from those in 2014, and in the case of a strictly implemented discard ban, North Sea whiting and *Nephrops* FU 6 (if it was managed with an own TAC for the FU) would be the most limiting stocks, constraining 46% and 34% of the 2014 effort, respectively. Results for the whiting stock are also included as additional rows in the catch options table of this advice sheet.

The mixed-fisheries projections have not been updated in November. The revised advice for the *Nephrops* stocks in FUs 7 and 8, plaice in Subarea IV and Division IIIa, sole in Subarea IV, and whiting in Subarea IV and Division VIId, based on the new survey information, does not change the general perception of which stocks are more likely to limit the North Sea fisheries in 2016.

The strong year class, seen as the 0-group in the 2015 IBTS Q3 survey, should be protected to help rebuild the spawning stock.

Reference points

Table 6.3.56.5 Whiting in Subarea IV and Division VIId. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	Not defined.		
	F_{MSY}	Not defined.		
Precautionary approach	B_{lim}	184000 t	Provisional reference point B_{loss} (SSB in 2007 in the 2013 assessment)	ICES (2013a)
	B_{pa}	Not defined.		
	F_{lim}	Not defined.		
	F_{pa}	Not defined.		
EU–Norway management strategy	SSB_{MGT}	Not defined.		
	F_{MGT}	0.15		EU–Norway management strategy

Basis of the assessment

Table 6.3.56.6 Whiting in Subarea IV and Division VIId. The basis of the assessment.

ICES stock data category	1 (ICES, 2015d).
Assessment type	Age-based analytical assessment (FLXSA; ICES, 2015a) that uses catches in the model and in the forecast.
Input data	Commercial catches (international landings, ages from catch sampling by métier), two survey indices (IBTS Q1 & Q3 ages 1 to 5); maturity data assumed fixed through time; time-varying natural mortalities from the SMS multispecies model (ICES, 2011).
Discards and bycatch	Included in the assessment, using samples (in 2014) to estimate discards from France, Germany, UK (England), and UK (Scotland). Data series from the discard-sampled fleets cover 73% of the landings. There were no biological samples available for industrial bycatch in 2014.
Indicators	None.
Other information	This assessment was benchmarked in 2013 (WKROUND; ICES, 2013a).
Working groups	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak (WGNSSK), Working Group on Mixed-Fisheries Advice (WGMIXFISH-NS).

Information from stakeholders

The majority of responses from the Fishers' Survey reported an increase in the abundance of whiting in most areas over the last decade (Napier, 2014; Figure 6.3.56.3). This is in contrast with the assessment estimates of SSB, which have remained relatively stable since 2003.

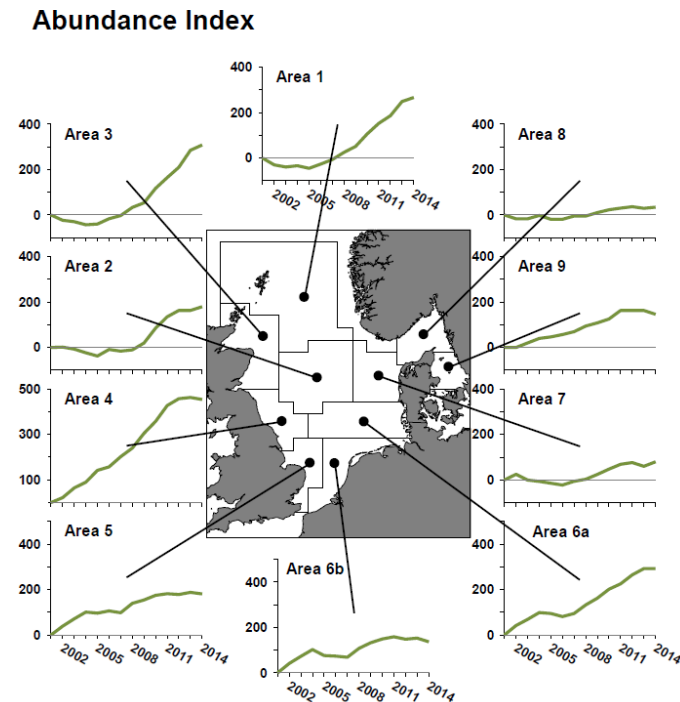


Figure 6.3.56.3 Cumulative time-series of index of perceptions of abundance of whiting, by area (see page 14 of Napier (2014) for an explanation of the index).

History of advice, catch, and management

Table 6.3.56.7a Whiting in Subarea IV and Division VIIId. History of ICES advice, the agreed TAC, and ICES estimates of catches. Weights are in thousand tonnes. n/a = Not available.

Subarea IV (North Sea)

Year	ICES advice	Predicted landings corresp. to advice*	Predicted catch corresp. to advice**	Agreed TAC	Off. Indgs.	ICES estimates			
						Human cons. landings	Indust. bycatch	Discards	Total catch
1989	Protect juveniles	-		115	40	41	43	36	120
1990	80% of F(88); TAC	130		125	41	42	51	52	146
1991	70% of effort (89)	-		141	47	46	40	30	117
1992	70% of effort (89)	-		135	47	45	25	28	99
1993	70% of effort (89)	-		120	47	47	21	41	109
1994	Significant reduction in effort; mixed fishery	-		100	42	42	17	32	91
1995	Significant reduction in effort; mixed fishery	-		81	41	41	27	29	97
1996	Mixed fishery; take into account cod advice	-		67	35	36	5	27	68
1997	Mixed fishery; take into account cod advice	-		74	32	31	6	17	54
1998	No increase from 1996 level	54		60	24	24	3	12	40
1999	at least 20% reduction of F(95–97)	40.4		44	25	26	5	22	52
2000	lowest possible catch	0		30	24	24	9	22	55
2001	60% reduction of F(97–99)	19.4		30	19	19	1	16	36
2002	F not larger than 0.37	≤ 33		32	16	15	7	17	39
2003	No cod catches	-		16	11	10	3	26	39
2004	No cod catches. Fishing mortality in 2004 should be < F_{pa}	No increase compared to recent years		16	9	9	1	18	28
2005	No cod catches. Less than recent average	52		28.5	8	11	1	10	22
2006	No cod catches. Less than recent average	< 17.3		23.8	16	15	2	14	31
2007	No cod catches. Less than recent average	< 15.1		23.8	16	16	1	5	22
2008	No cod catches. Less than recent average	< 15.1		17.9	14	13	0	8	22
2009	No cod catches. $F < F_{max}$	< 11		15.2	12	12	1	5	18
2010	No cod catches. Stable SSB	< 6.8		12.9	12	12	1	8	21
2011	No cod catches. Stable SSB	< 9.5		14.832	13	13	2	8	23
2012	Management plan	< 17.1		17.056	12.588	12.929	0.078	5.929	18.936
2013	Precautionary considerations ($F = 0.225$) and separate management for Division VIIId	< 19		18.932	13.361	15.384	1.53	4.198	21.119
2014	November update: Precautionary considerations (15% TAC reduction) and separate management for Division VIIId	< 16.092		16.092	13.756	15.616	1.479	8.326	25.421
2015	November update: Management plan and separate management for Division VIIId	< 13.678		13.678					
2016	EU–Norway management strategy		< 30.510						

*Including Division VIIId from 2006 to 2010.

**Catch corresponding to the advice for the whole stock (Subarea IV and Division VIIId).

Table 6.3.56.7b Whiting in Subarea IV and Division VIId. History of ICES advice, the agreed TAC, and ICES estimates of catches. Weights are in thousand tonnes. n/a = Not available.**Division VIId (Eastern Channel)**

Year	ICES advice	Predicted landings corresp. to advice*	Predicted catch corresp. to advice^	Agreed TAC ***	Official landings	ICES estimates		
						Human cons.	Discards	Total catch
1989	Precautionary TAC	-		-	n/a	4.2	n/a	n/a
1990	No increase in F; TAC	8.0 **		-	n/a	3.5	3.3	6.8
1991	F_{sq} ; TAC	5.1		-	n/a	5.7	4.2	9.9
1992	If required, precautionary TAC	6.0 **		-	5.9	5.7	4.1	9.8
1993	No basis for advice	-		-	5.4	5.2	3	8.2
1994	No long-term gains in increasing F	-		-	7.1	6.6	3.9	10.5
1995	Significant reduction in effort; link to North Sea	-		-	5.6	5.4	3.2	8.6
1996	Reference made to North Sea advice	-		-	5.1	5.0	3.4	8.3
1997	Reference made to North Sea advice	-		-	4.8	4.6	3.0	7.6
1998	Reference made to North Sea advice	5.8		27	4.8	4.6	3.2	7.8
1999	Reference made to North Sea advice	3.9		25	0.2	4.4	3.6	8.0
2000	Lowest possible catch	0		22	6.1	4.3	4.1	8.4
2001	60% reduction of F_{sq}	2.5		21	6.6	5.8	3.1	8.9
2002	F not larger than 0.37	≤ 4		31.7	5.4	5.8	1.3	7.2
2003	No cod catches	-		27	7.0	5.7	0.6	6.3
2004	No cod catches. Fishing mortality should be $< F_{pa}$	Catch should not increase compared to recent years		21.6	5.3	4.4	0.9	5.3
2005	No cod catches	-		19.9	4.9	4.8	2.2	7.0
2006	No cod catches. Less than recent average	< 17.3		19.9	3.7	3.4	2.2	5.7
2007	No cod catches. Less than recent average	< 15.1		19.9	3.4	3.3	1.8	5.0
2008	No cod catches. Less than recent average	< 15.1		19.9	3.2	4.5	1.9	6.4
2009	No cod catches. $F < F_{max}$	< 11		16.9	6.6	6.6	2.5	9.1
2010	No cod catches. Stable SSB	< 6.8		14.4	6.1	6.0	3.7	9.7
2011	No cod catches. Stable SSB	< 3.2		16.6	5.5	5.1	3.5	8.6
2012	Management plan	< 4.2		19.053	3.857	4.103	2.446	6.549
2013	Precautionary considerations ($F = 0.225$) and separate management for Division VIId	< 7		24.500	4.293	3.950	1.778	5.728
2014	November update: Precautionary considerations (15% TAC reduction) and separate management for Division VIId	< 5.106		20.668	3.212	3.130	2.125	5.255
2015	November update: Management plan and separate management for Division VIId	< 3.512		17.742				
2016	EU–Norway management strategy		< 30.510					

* Includes both areas (Subarea IV and Division VIId) from 2006 to 2010.

** Included in TAC for Subarea VII (except Division VIIa).

*** Including Division VIIe.

^ Catch corresponding to the advice for the whole stock (Subarea IV and Division VIId).

History of catch and landings

Table 6.3.56.8 Whiting in Subarea IV and Division VIIId. Catch distribution by fleet in 2014 as estimated by ICES.

Catch (2014)	Landings				Discards	Industrial bycatch
30675 t	53% demersal trawls and seine, mesh size ≥120 mm (North Sea)	19% demersal trawls, mesh size 70–99 mm (North Sea)	15% demersal trawls, mesh size 70–99 mm (Eastern Channel)	13% other gears	10451 t	1479 t
	18746 t					

Table 6.3.56.9a Whiting in Subarea IV. History of commercial landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. Weights in tonnes. NA = not available.

Year	Belgium	Denmark	France	Germany	Netherlands	Norway	Sweden	England (Wales)	Scotland	UK	Total landings	Unallocated landings	ICES landings
1990	1040	1206	4951	692	3273	55	16	2338	23486	NA	41057	–1123	42180
1991	913	1528	5188	865	4028	103	48	2676	31257	NA	46606	396	46210
1992	1030	1377	5115	511	5390	232	22	2528	30821	NA	47026	1816	45210
1993	944	1418	5502	441	4799	130	18	2774	31268	NA	47295	685	46610
1994	1042	549	4735	239	3864	79	10	2722	28974	NA	42214	344	41870
1995	880	368	5963	124	3640	115	1	2477	27811	NA	41379	829	40550
1996	843	189	4704	187	3388	66	1	2329	23409	NA	35116	–434	35550
1997	391	103	3526	196	2539	75	1	2638	22098	NA	31567	627	30940
1998	268	46	1908	103	1941	65	0	2909	16696	NA	23936	246	23690
1999	529	58	NA	176	1795	68	9	2268	17206	NA	NA	NA	25700
2000	536	105	2527	424	1884	33	4	1782	17158	NA	24453	173	24280
2001	454	105	3455	402	2478	44	6	1301	10589	NA	18834	–426	19260
2002	270	96	3314	354	2425	47	7	1322	7756	NA	15591	721	14870
2003	248	89	2675	334	1442	39	10	680	5734	NA	11251	801	10450
2004	144	62	1721	296	977	23	2	1209	5057	NA	9491	541	8950
2005	105	57	1261	149	805	16	0	2560	3441	NA	8394	–2286	10680
2006	93	251	2711	252	702	17	2	NA	NA	11632	15660	563	15097
2007	45	78	3336	76	618	11	1	NA	NA	12110	16275	609	15666
2008	115	42	3076	76	656	92	2	NA	NA	10391	14451	972	13479
2009	162	79	2305	124	718	73	4	NA	NA	8853	12318	544	11774
2010	147	156	2644	156	614	118	8	NA	NA	7845	11690	–591	12281
2011	74	135	2794	111	514	28	6	NA	NA	8892	12554	–751	13305
2012	45	131	1925	25	471	94	4	NA	NA	9893	12588	–341	12929
2013	33	124	942	44	495	560	1	NA	NA	11162	13361	–2023	15384
2014	46	160	1887	31	466	916	2	NA	NA	10248	13756	–1860	15616

Table 6.3.56.9b Whiting in Division VIIId. History of commercial landings; both the official and ICES estimated values are presented by area for each country participating in the fishery. Weights in tonnes. NA = not available.

Year	Belgium VIIId	France VII d	Netherlands VII	England (Wales) VIIId	Scotland VIIId	UK VIIId	Total landings	Unallocated landings VIIId	ICES landings VIIId
1990	83	NA	0	239	0	NA	NA	NA	3480
1991	83	NA	0	292	0	NA	NA	NA	5720
1992	66	5414	0	419	24	NA	5923	203	5740
1993	74	5032	0	321	2	NA	5429	219	5210
1994	61	6734	0	293	0	NA	7088	468	6620
1995	68	5202	0	280	1	NA	5551	161	5390
1996	84	4771	1	199	1	NA	5056	106	4950
1997	98	4532	1	147	1	NA	4779	159	4620
1998	53	4495	32	185	0	NA	4765	165	4600
1999	48	NA	6	135	0	NA	NA	NA	4430
2000	65	5875	14	118	0	NA	6072	1772	4300
2001	75	6338	67	134	0	NA	6614	814	5800
2002	58	5172	19	112	0	NA	5361	-439	5800
2003	67	6654	175	109	0	NA	7005	1295	5710
2004	46	5006	132	99	0	NA	5283	933	4350
2005	45	4638	128	NA	NA	90	4901	111	4790
2006	73	3487	117	NA	NA	72	3749	306	3443
2007	75	3135	118	NA	NA	63	3391	137	3254
2008	69	2875	162	NA	NA	87	3193	-1278	4471
2009	71	6248	112	NA	NA	138	6569	-77	6646
2010	88	5512	275	NA	NA	258	6133	194	5939
2011	78	4833	282	NA	NA	271	5464	400	5064
2012	66	3093	437	NA	NA	261	3857	-246	4103
2013	95	3076	650	NA	NA	472	4293	-343	3950
2014	89	2115	663	NA	NA	345	3212	-82	3130

Summary of the assessment

Table 6.3.56.10 Whiting in Subarea IV and Division VIIId. Assessment summary (weights in tonnes).

Year	Recruitment Age 1 thousands	SSB tonnes	Landings tonnes	Discards tonnes	Industrial bycatch tonnes	Mean F Ages 2–6
1990	5579623	524311	45662	55603	51337	0.672
1991	5686421	462165	51929	35058	39755	0.539
1992	5424684	439801	50946	32564	25045	0.498
1993	6312802	400799	51818	44370	20723	0.504
1994	5989842	402822	48486	35692	17473	0.647
1995	5454007	416298	45938	32176	27379	0.552
1996	3935829	367194	40503	30505	5116	0.456
1997	3030676	318719	35563	19660	6213	0.35
1998	4184373	271079	28288	15693	3494	0.339
1999	6800343	287442	30130	25677	5038	0.398
2000	8169327	411487	28583	26063	9160	0.455
2001	6752439	482385	25061	19237	944	0.309
2002	5698481	416857	20675	18501	7275	0.21
2003	1913873	318943	16161	26745	2734	0.195
2004	1935858	248575	13295	19048	1214	0.203
2005	2491554	215393	15471	12525	888	0.189
2006	2442975	198168	18535	16310	2193	0.271
2007	2278771	185089	18915	6971	1239	0.258
2008	4096200	211551	17951	10296	0	0.257
2009	3291003	279003	18418	7705	1016	0.224
2010	3234111	300610	18224	11577	1346	0.227
2011	4240968	309605	18899	11977	1750	0.175
2012	2161495	313321	17032	7968	78	0.154
2013	1453422	262960	19335	5976	1530	0.184
2014	2446622	235388	18746	10451	1479	0.23
2015	4352809*	263195**				
Average	4206096	328583	28583	21534	9377	0.34

* RCT3 estimate.

** Estimated survivors from 2014.

Sources and references

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