ECOREGION Widely distributed and migratory stocks
STOCK Blue whiting in Subareas I–IX, XII, and XIV

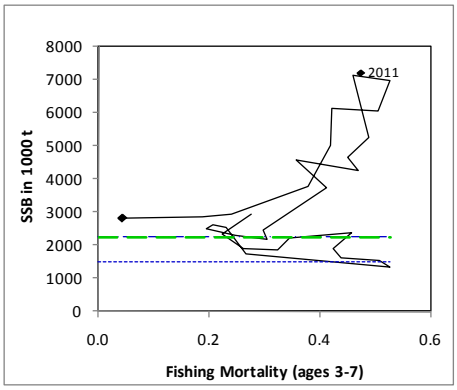
Advice for 2013

ICES advises on the basis of the management plan agreed by Norway, the EU, the Faroe Islands, and Iceland, that catches in 2013 should be no more than 643 000 tonnes.

Stock status

F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✗	✗	✓	At target
Precautionary approach (F_{pa},F_{lim})	?	?	?	undefined
Management plan (F_{MP})	✗	✗	✓	At target

SSB (Spawning-Stock Biomass)	2010	2011	2012	
MSY ($B_{trigger}$)	✓	✓	✓	Above trigger
Precautionary approach (B_{pa},B_{lim})	✓	✓	✓	Full reproductive capacity
Management plan (SSB_{MP})	✓	✓	✓	Above trigger



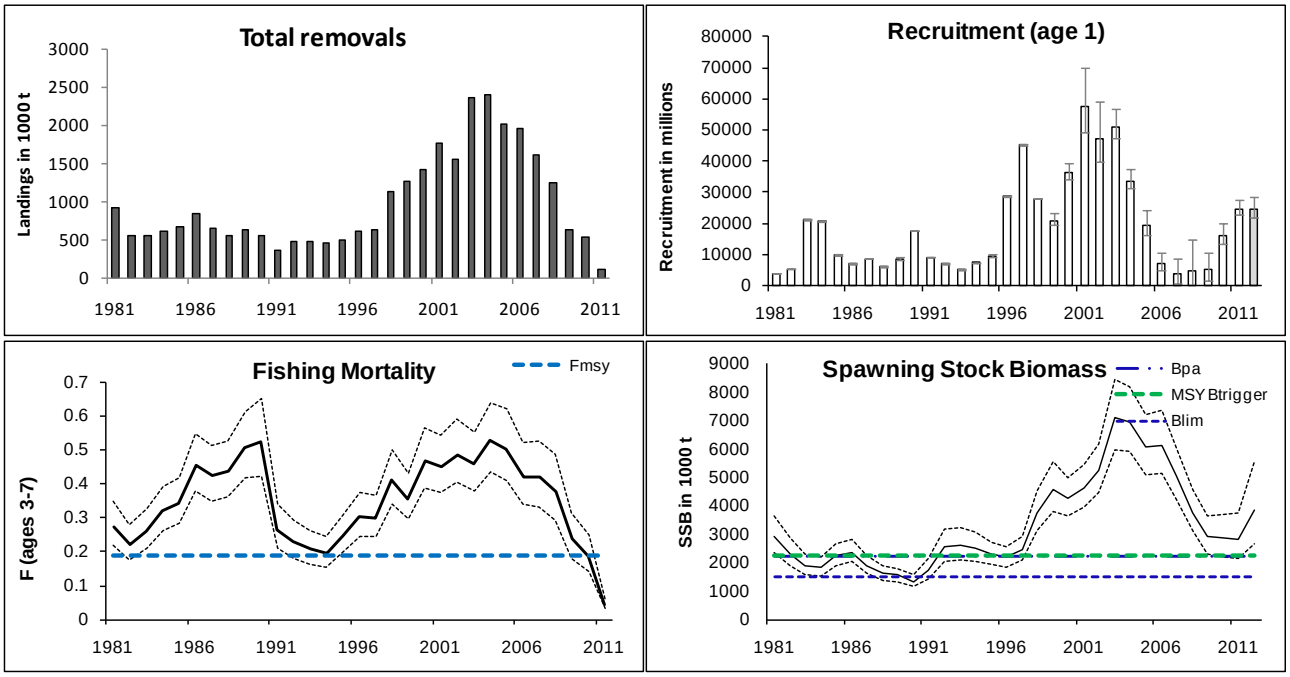


Figure 9.4.4.1 Blue whiting in Subareas I–IX, XII, and XIV. Summary of stock assessment (weights in thousand tonnes; the estimated shaded recruitment is assumed equal to the 2011 recruitment). Top right: SSB and F over the years.

Historical low landings and fishing mortality at 0.04 in 2011, in combination with an increase in recruitment since 2010, have stopped the steep decline in SSB since 2004. SSB has increased by one million tonnes from 2011 to 2012 (3.8 million tonnes) and is above B_{pa} at the beginning of 2012. An increase in recruitment has been observed for the last two years, but the absolute recruitment strength is uncertain (Table 9.4.4.5).

Management plans

A management plan (Section 9.4.4.1 Annex) was agreed by Norway, the EU, the Faroe Islands, and Iceland in 2008. The plan uses i) a target fishing mortality (F = 0.18) if SSB is above SSB_{MP} (= B_{pa}), ii) a linear reduction to F = 0.05 if SSB is between B_{pa} and B_{lim}, and iii) F = 0.05 if SSB is below B_{lim}. ICES has evaluated the plan in 2008 and concluded that it is in accordance with the precautionary approach (PA; ICES, 2008). Work is underway to evaluate a NEAFC request concerning an alternative management plan. ICES will issue advice in advance of WGWIDE 2013.

For assessment purposes ICES considers blue whiting in ICES Subareas I–IX, XII, and XIV as a single stock.

Biology

Blue whiting is widely distributed in the eastern part of the North Atlantic from Norway to the South of Portugal with the highest concentrations along the edge of the continental shelf between 300 and 600 m. Most spawning takes place along the shelf edge and on banks west of the British Isles. Juveniles are also widely distributed, including the Bay of Biscay and Iberian Waters, with the main nursery area believed to be in the Norwegian Sea.

Environmental influence on the stock

The position and strength of the North Atlantic sub-polar gyre (SPG) appears to influence the spawning distribution of blue whiting (ICES, 2009a). This gyre may influence recruitment success through food availability and predation levels. However, these mechanisms are not fully understood and are being explored further.

The fishery

The main fisheries on blue whiting in 2011 were conducted south of the Faroes, west of Scotland, and around the Porcupine Bank. Most blue whiting catches occurred in the first half of the year. Catches have become increasingly used for human consumption rather than industrial purposes. The Russian fishery took a larger proportion of the 2011 catch.

Catch distribution	Total landings (2011) = 104 kt, where ~100% are landings (mainly pelagic trawl). Discards are considered negligible.

Effects of the fisheries on the ecosystem

Blue whiting feed on zooplankton and small fish in the same areas as herring and mackerel. Blue whiting plays an important role in the pelagic ecosystems as both predator and prey.

Quality considerations

The principal survey for this stock conducted in 2012 had high quality coverage of the survey area in space and time and is considered to have provided good quality data. The new modelling framework used is likely to result in more stable assessments than in previous years. Recruitment is poorly estimated in the last few years of the assessment due to a lack of juvenile indices suitable for inclusion in the assessment model.

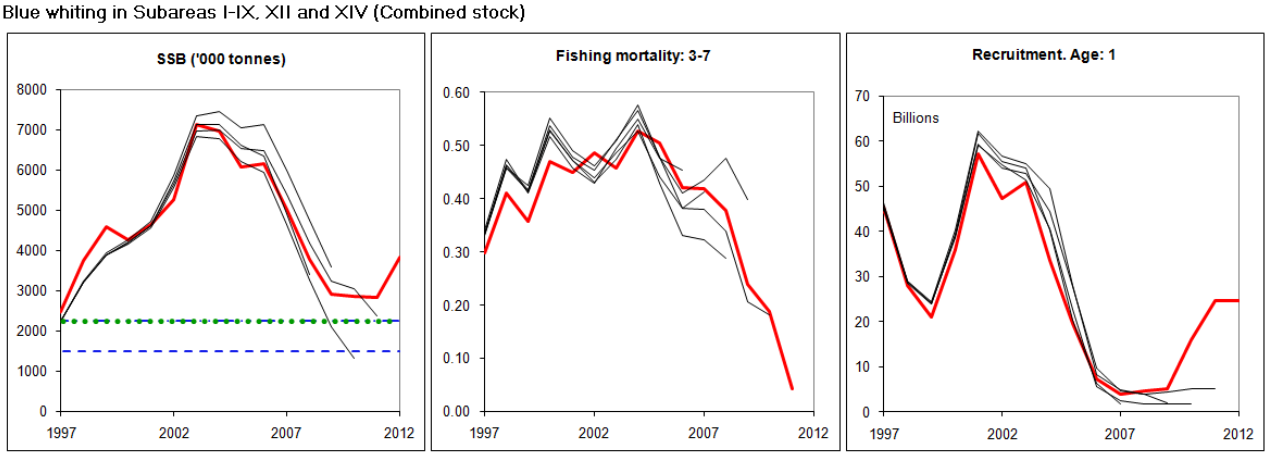


Figure 9.4.4.2 Blue whiting in Subareas I–IX, XII, and XIV. Historical assessment results. Horizontal lines represent reference points.

Scientific basis

Assessment type	Age-based analytical (SAM).
Input data	One survey: International blue whiting spawning stock survey (IBWSS) 2004–2012, excluding 2010.
Discards and bycatch	Discards are not included in the assessment; considered to be negligible.
Indicators	Not used.
Other information	The stock was benchmarked in February 2012 (ICES, 2012b).
Working group report	WGWIDE

ECOREGION Widely distributed and migratory stocks
STOCK Blue whiting in Subareas I–IX, XII, and XIV

Reference points

	Type	*Value*	*Technical basis*
Management plan	SSB_{MP}	2.25 million t	B_{pa}
	F_{MP}	0.18	Management strategy evaluation conducted in 2008 (Anon., 2008; ICES, 2008).
MSY Approach	MSY $B_{trigger}$	2.25 million t	B_{pa}
	F_{MSY}	0.18	Management strategy evaluation conducted in 2008 (Anon., 2008; ICES, 2008).
Precautionary Approach	B_{lim}	1.50 million t	B_{loss}
	B_{pa}	2.25 million t	B_{lim} exp(1.645*σ), with σ = 0.25.
	F_{lim}	Undefined.	Previous estimates are not considered valid (ICES, 2012b).
	F_{pa}	Undefined.	Previous estimates are not considered valid (ICES, 2012b).

(unchanged since: 2012)

MSY reference points should be considered provisional.

Outlook for 2013

Basis: F (2012) = 0.13 (catch constraint = 391 = TAC); SSB (2013) = 5130; R (2012) =24594 million at age 1; R (2013) and R (2014) = GM (1981–2009) = 13250 million.

Rationale	Catch (2013)	Basis	F (2013)	SSB (2014)	% SSB change[1)]	% TAC change[2)]
Management plan	643	F = 0.18 for SSB(2013)>2250	0.18	5674	12	64
MSY framework	643	F_{MSY}	0.18	5674	12	64
Zero catch	0	F = 0	0.00	6305	25	-100
Other	162	1.00*F(2011)	0.04	6144	22	-59
	249	0.50*F(2012)	0.07	6058	20	-36
	484	1.00*F(2012)	0.13	5824	15	24
	708	1.50*F(2012)	0.20	5609	11	81
	921	2.00*F(2012)	0.27	5400	7	136

Weights in thousand tonnes.
[1)] SSB 2014 relative to SSB 2013.
[2)] Catch 2013 relative to TAC 2012 (391 kt).

Management plan

The management plan agreed by Norway, EU, the Faroe Islands, and Iceland November 2008 (see Section 9.4.4.1 Annex) implies a TAC of 643 000 tonnes in 2013, compared to 391 000 tonnes in 2012. This is expected to lead to an increase in SSB in 2014 to 5.67 million tonnes, which is above SSB_{MP}. The stock projection for 2012–2014, with uncertainties included for this option, is shown in Figure 9.4.4.6.

MSY approach

Following the ICES MSY framework implies fishing mortality to be at F_{MSY} = 0.18, corresponding to catches of 643 000 tonnes in 2013. This is expected to lead to an increase in SSB in 2014 to 5.67 million tonnes, which is above MSY $B_{trigger}$.

Precautionary approach

No PA F-reference points are available for this stock. Even with an F twice the size of F in 2012 SSB will be above B_{pa} in 2014.

Additional considerations

Management considerations

The assessment shows a moderate uncertainty of the absolute estimate of F and SSB, and a higher uncertainty on the recruiting year classes. SSB and F are estimated from good quality catch data and from survey (IBWSS) information for 2012. Due to good planning and favorable weather conditions the implementation of the survey in 2012 resulted in high quality data. It is essential that this survey be maintained and it is important to maintain good geographical survey coverage within the agreed time window to avoid increases in assessment uncertainty.

Recruitment (age 1) is estimated significantly higher in 2011 than in the years 2007–2009 with the historically low recruitments. Information from surveys and the fishery indicates a steep increase in recruitment in the two most recent years. Although juvenile indices are not appropriate for use in the assessment model as quantitative indices of abundance they do provide a qualitative indication of recruitment strength. An examination of available regional survey indices of blue whiting recruitment from 2000 onwards (Table 9.4.4.5) shows that the level of recruitment (age 1) for 2011 estimated by the model seems to be appropriate. Also, indices suggest that recruitment (age 1) in 2012 is at a similar or higher level. The forecast and catch options for 2013 use recruitment (age 1) in 2011 from the assessment and an assumed above-average recruitment in 2012 as suggested by the surveys. A TAC derived from the target F at 0.18 from the management plan is expected to lead to an SSB safely above B_{pa} in 2014, even with a slightly overestimation of the recruitment in the most recent years.

ICES (2012b) evaluated available evidence on sub-stock structure and came to the conclusion that there is no scientific evidence in support of multiple stocks with distinct spawning locations or timings. The emerging picture is one of a single stock whose large-scale spatial spread varies as a function of hydrographic conditions and total abundance; this is commonly described as an abundance–occupancy relationship. Further, there seem to be a number of core nursery and feeding areas with marginal areas being occupied at times of high stock abundance. As a result, ICES considers blue whiting in ICES Subareas I–IX, XII, and XIV as a single stock for assessment purposes.

Information from the fishing industry

The industry has observed an increase in the abundance of juvenile blue whiting over the past 12 months. In addition, the industry has also seen an increase in the abundance of adult fish.

Data and methods

The assessment is based on catch-at-age data from commercial catches in 1981–2011 and one international blue whiting spawning stock survey (IBWSS) 2004–2012. The IBWSS survey is the only survey that covers almost the entire distributional area of the spawning stock.

Due to the large uncertainties in the 2010 survey data the IBWSS index has been excluded from the assessment since 2011, because the survey in 2010 is believed to have missed significant concentrations, making it not comparable with the remainder of the time-series.

Limited information was available on discarding and discards were therefore not included in the assessment. However, discarding is considered to be minor.

Comparison with previous assessment

The assessment this year is made with a new assessment model (SAM) as agreed during the benchmark (ICES, 2012b). The SAM model gives a picture of the stock development that is very similar to the one provided by the models previously applied.

In the 2012 assessment, SSB in 2011 was estimated 19% higher than in the previous assessment. Estimated fishing mortality in 2010 was 3% higher than in the previous assessment. The basis for advice was the same as last year.

Sources

Anon. 2008. Report of the Working Group established by the Blue Whiting Coastal States on Blue Whiting Management Strategies, 26–30 May 2008, Charlottenlund Castle, Denmark. 65 pp.

ICES. 2008. Report of the ICES Advisory Committee, 2008. ICES Advice, 2008. Book 9. 345 pp.

ICES. 2009a. Report of the Workshop on Blue Whiting Recruitment (WKBLUR), 10–12 November 2009, ICES Headquarters, Copenhagen. ICES CM 2009/RMC:09. 62 pp.

ICES. 2009b. Report of the Stock Identification Methods Working Group (SIMWG). ICES CM 2009/LRC:12.

ICES. 2010a. Report of the Working Group on Northeast Atlantic Pelagic Ecosystem Surveys (WGNAPES), 17–20 August 2010, Hamburg, Germany. ICES CM 2010/SSGESST:20.

ICES. 2010b. Blue whiting in Subareas I–IX, XII, and XIV (Combined stock). ICES Advice 2010, Book 9: 77–88.

ICES. 2011. Report of the Working Group on Northeast Atlantic Pelagic Ecosystem Surveys (WGNAPES), 16–19 August 2011, Kaliningrad, Russia. ICES CM 2011/SSGESST:16.

ICES. 2012a Report of the Working Group on Widely Distributed Stocks (WGWIDE), 21–27 August 2012, Lowestoft, UK. ICES CM 2012/ACOM:15.

ICES 2012b. Report of the Benchmark Workshop on Pelagic Stocks (WKPELA 2012), 13–17 February 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:47.

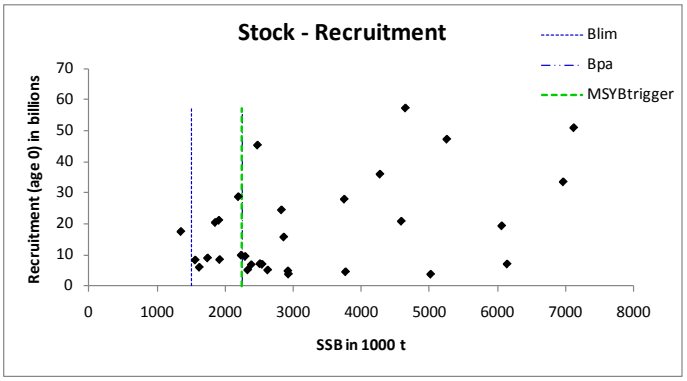


Figure 9.4.4.3 Blue whiting in Subareas I–IX, XII, and XIV stock–recruitment relationship and survey biomass (2004–2012).

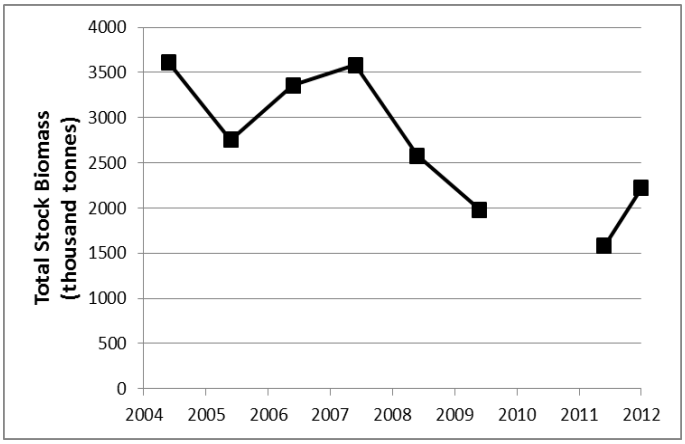


Figure 9.4.4.4 Blue whiting in Subareas I–IX, XII, and XIV. Total stock biomass from the IBWSS survey, 2004–2012. The SSB index from the 2010 survey was excluded from the assessment.

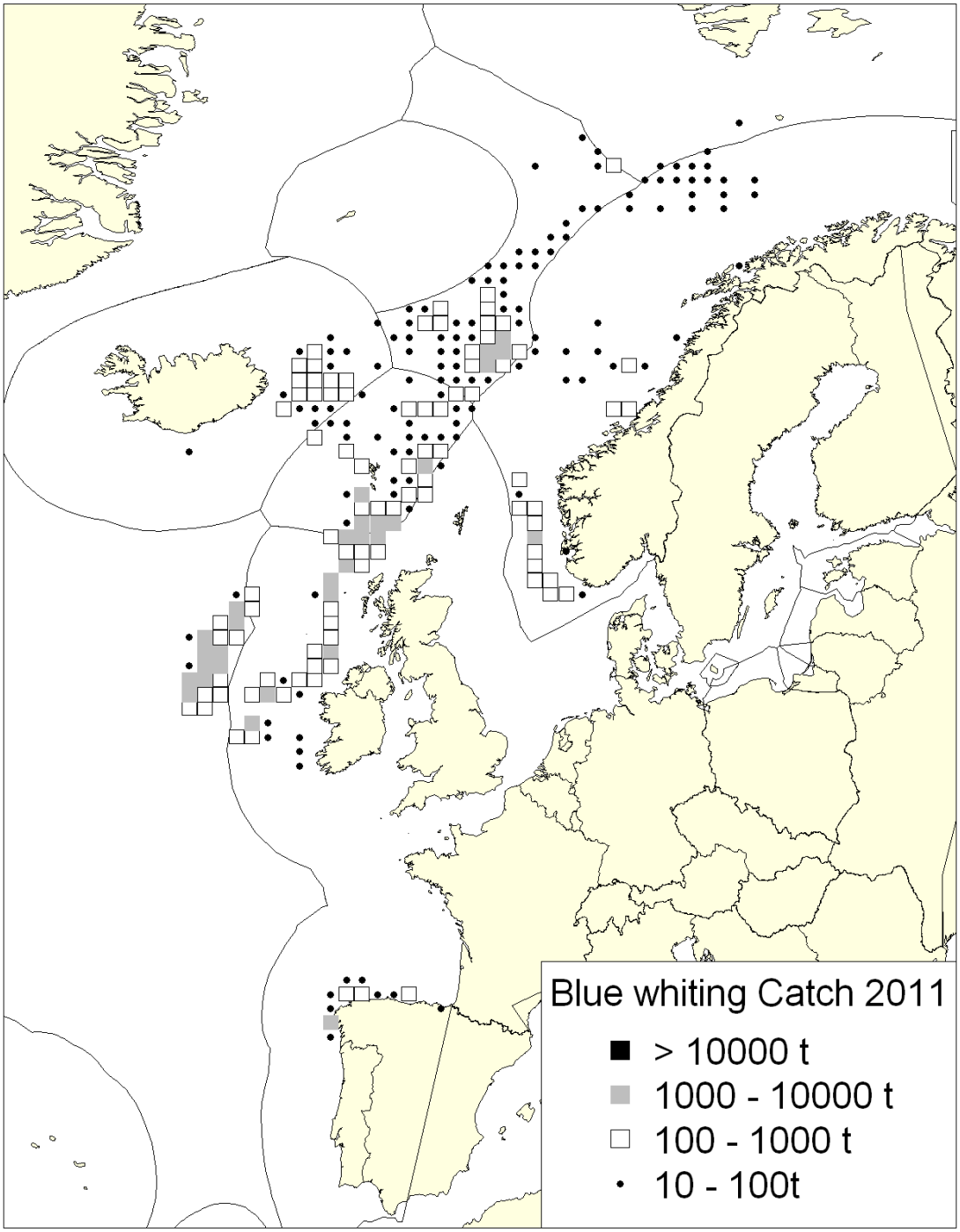


Figure 9.4.4.5 Blue whiting in Subareas I–IX, XII, and XIV. Total blue whiting catches (t) in 2011 by ICES rectangle. Catches below 10 t are not shown in the map.

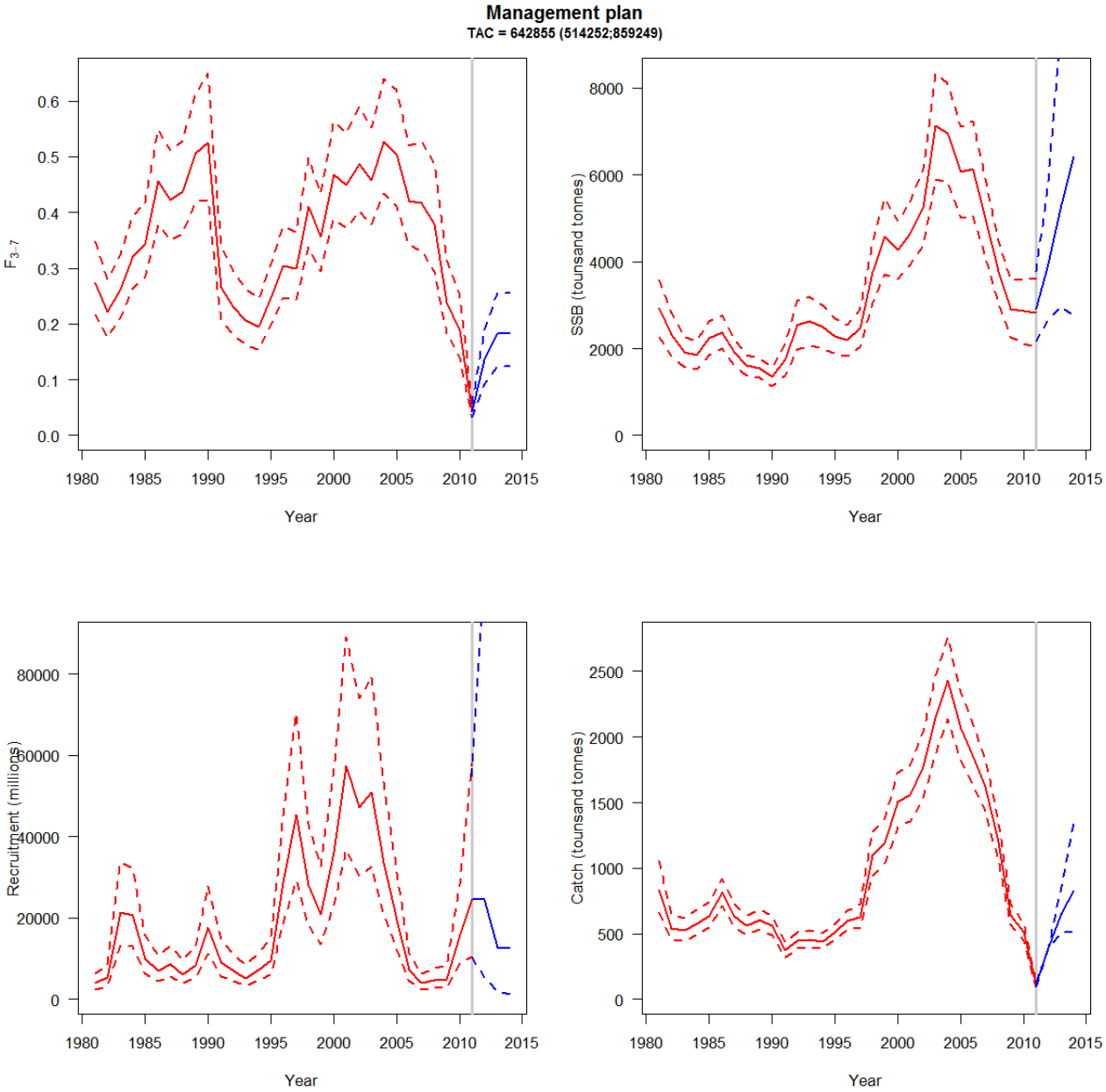


Figure 9.4.4.6 Blue whiting in Subareas I–IX, XII, and XIV. Stock projection 2012–2014 following the management plan. Mean value and 95% confidence intervals are shown.

Table 9.4.4.1 Blue whiting in Subareas I–IX, XII, and XIV. ICES advice, management, and landings.

Year	ICES Advice	Predicted Catch corresp. to advice	Agreed TAC	ICES catch
1987	TAC for northern areas; no advice for southern areas	950	-	665
1988	TAC for northern areas; no advice for southern areas	832	-	558
1989	TAC for northern areas; no advice for southern areas	630	-	627
1990	TAC for northern areas; no advice for southern areas	600	-	562
1991	TAC for northern areas; no advice for southern areas	670	-	370
1992	No advice	-	-	475
1993	Catch at *status quo* F (northern areas); no assessment for southern areas	490	-	481
1994	Precautionary TAC (northern areas); no assessment for southern areas	485	650[1]	459
1995	Precautionary TAC for combined stock	518	650[1]	579
1996	Precautionary TAC for combined stock	500	650[1]	646
1997	Precautionary TAC for combined stock	540		672
1998	Precautionary TAC for combined stock	650		1125
1999	Catches above 650 000 t may not be sustainable in the long run	650		1256
2000	F should not exceed the proposed F_{pa}	800		1412
2001	F should not exceed the proposed F_{pa}	628		1780
2002	Rebuilding plan	0		1556
2003	F should be less than the proposed F_{pa}	600		2321
2004	Achieve 50% probability that F will be less than F_{pa}	925		2378
2005	Achieve 50% probability that F will be less than F_{pa}	1075		2027
2006	F old management plan	1500	2100[2]	1966
2007	F should be less than the proposed F_{pa}	980	1847[3]	1612
2008	F should be less than F_{pa}	835	1250[4]	1246
2009	Maintain stock above B_{pa}	384	606[5]	636
2010	Follow the agreed management plan	540	548	540
2011	See scenarios	40–223	40	105
2012	Follow the agreed management plan	391	391	
2013	Follow the agreed management plan	643		

Weights in thousand tonnes.
[1]NEAFC proposal for NEAFC regions 1 and 2.
[2] Agreed TAC from four Coastal States of 2 million tonnes, and an additional allocation to Russia in the international zone of 100 000 t.
[3]Agreed TAC from four Coastal States of 1.7 million tonnes, and an additional allocation to Russia and Greenland of 147 000 t.
[4]Agreed TAC from four Coastal States of 1.1 million tonnes, and an additional allocation to Russia and Greenland.
[5]Agreed TAC from four Coastal States of 0.59 million tonnes, and an additional allocation to Russia (0.016 million tonnes).

Table 9.4.4.2 Blue whiting in Subareas I–IX, XII, and XIV. Landings (tonnes) by country for the period 1991–2011, as estimated by the Working Group.

Country	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Denmark	34 356	41 053	20 456	12 439	52 101	26 270	61 523	64 653	57 686	53 333	51 279	82 935	89 500	41 450	56 979	48 659	18 134	248	140	165
Estonia	6 156	1 033	4 342	7 754	10 982	5 678	6 320						**							
Faroes	13 436	16 506	24 342	26 009	24 671	28 546	71 218	105 006	147 991	259 761	205 421	329 895	322 322	266 799	321 013	317 859	225 003	58 354	49979	16405
France		1 195		720	6 442	12 446	7 984	6 662	13 481	13 480	14 688	14 149		8 046	18 009	16 638	11 723	8 831	7839	4337
Germany	1 332	100	2	6 313	6 876	4 724	17 969	3 170	12 655	19 060	17 050	22 803	15 293	22 823	36 437	34 404	25 259	5 044	9108	278
Iceland				369	302	10 464	68 681	160 430	260 857	365 101	287 336	501 493	379 643	265 516	309 508	236 538	159 307	120 202	87942	5887
Ireland	781		3	222	1 709	25 785	45 635	35 240	25 200	29 854	17 825	22 580	75 393	73 488	54 910	31 132	22 852	8 776	8324	1195
Japan	918	1 742	2 574																	
Latvia	10 742	10 626	2 582																	
Lithuania		2 046													4 635	9 812	5 338			
Netherlands	11 036	18 482	21 076	26 775	17 669	24 469	27 957	35 843	46 128	73 595	37 529	45 832	95 311	147 783	102 711	79 875	78 684	35 686	33762	4595
Norway	181 622	211 489	229 643	339 837	394 950	347 311	560 568	528 797	533 280	573 311	571 479	834 540	957 684	738 490	642 451	539 587	418 289	225 995	194317	20539
Poland																				
Portugal	4 928	1 236	1 350	2 285	3 561	2 439	1 900	2 625	2 032	1 746	1 659	2 651	3 937	5 190	5 323	3 897	4 220	2 043	1482	603
Spain	23 794	31 020	28 118	25 379	21 538	27 683	27 490	23 777	22 622	23 218	17 506	13 825	15 612	17 643	15 173	13 557	14 342	20 637	12891	2416
Sweden ***	2 058	2 867	3 675	13 000	4 000	4 568	9 299	12 993	3 319	2 086	18 549	65 532	19 083	2 960	101	464				
UK / Scotland	6 867	2 284	4 470	10 583	14 326	33 398	92 383	98 853	42 478	50 147	26 403	27 382	57 028	104 539	72 106	43 540	38 150	173	5496	1331
USSR / Russia *	177 000	139 000	116 781	107 220	86 855	118 656	130 042	178 179	245 198	315 478	290 068	355 319	346 762	332 226	329 100	236 369	225 163	149 650	112553	45841
TOTAL	475 026	480 679	459 414	578 905	645 982	672 437	1 128 969	1 256 228	1 412 927	1 780 170	1 556 792	2 318 935	2 377 568	2 026 953	1 968 456	1 612 330	1 246 465	635 639	523 832	103 592

* From 1992 only Russia.

** Reported to the EU but not to the ICES WGNPBW. (Landings of 19 467 tonnes).

*** Imprecise estimates for Sweden: reported catch of 34 265 t in 1993 is replaced by the mean of 1992 and 1994, i.e. 2867 t, which is used in the assessment.

Table 9.4.4.3 Blue whiting in Subareas I–IX, XII, and XIV. Landings (tonnes) by main areas.

Area	Norwegian Sea fishery (SAs 1+2; Divs. Va, XIVa–b)	Fishery in the spawning area (SA XII; Divs. Vb, VIa–b, VIIa–c)	Directed- and mixed fisheries in the North Sea (SA IV; Div. IIIa)	**Total northern areas**	Total southern areas (SAs VIII+IX; Divs. VIId–k)	**Grand total**
1988	55 829	426 037	45 143	**527 009**	30 838	**557 847**
1989	42 615	475 179	75 958	**593 752**	33 695	**627 447**
1990	2 106	463 495	63 192	**528 793**	32 817	**561 610**
1991	78 703	218 946	39 872	**337 521**	32 003	**369 524**
1992	62 312	318 081	65 974	**446 367**	28 722	**475 089**
1993	43 240	347 101	58 082	**448 423**	32 256	**480 679**
1994	22 674	378 704	28 563	**429 941**	29 473	**459 414**
1995	23 733	423 504	104 004	**551 241**	27 664	**578 905**
1996	23 447	478 077	119 359	**620 883**	25 099	**645 982**
1997	62 570	514 654	65 091	**642 315**	30 122	**672 437**
1998	177 494	827 194	94 881	**1 099 569**	29 400	**1 128 969**
1999	179 639	943 578	106 609	**1 229 826**	26 402	**1 256 228**
2000	284 666	989 131	114 477	**1 388 274**	24 654	**1 412 928**
2001	591 583	1 045 100	118 523	**1 755 206**	24 964	**1 780 170**
2002	541 467	846 602	145 652	**1 533 721**	23 071	**1 556 792**
2003	931 508	1 211 621	158 180	**2 301 309**	20 097	**2 321 406**
2004	921 349	1 232 534	138 593	**2 292 476**	85 093	**2 377 569**
2005	405 577	1 465 735	128 033	**1 999 345**	27 608	**2 026 953**
2006	404 362	1 428 208	105 239	**1 937 809**	28 331	**1 966 140**
2007	172 709	1 360 882	61 105	**1 594 695**	17 634	**1 612 330**
2008	68 352	1 111 292	36 061	**1 215 704**	30 761	**1 246 465**
2009	46 629	533 996	22 387	**603 012**	32 627	**635 639**
2010	36 214	441 521	17 545	**495 280**	28 552	**523 832**
2011	20 599	72 279	7 524	**100 401**	3 191	**103 592**

Table 9.4.4.4 Blue whiting in Subareas I–IX, XII, and XIV. Summary of stock assessment.

Year	Recruits Age 1 (million)	TSB (1000 tonnes)	SSB (1000 tonnes)	Mean F Ages 3–7	Landings SOP (1000 tonnes)
1981	3981	3423	2928	0.275	923
1982	5325	2822	2329	0.222	551
1983	21253	3076	1905	0.262	553
1984	20563	3355	1851	0.322	616
1985	10059	3475	2233	0.344	678
1986	6983	3230	2381	0.456	847
1987	8641	2769	1916	0.423	655
1988	6175	2376	1617	0.437	552
1989	8495	2398	1557	0.507	630
1990	17646	2434	1346	0.525	558
1991	9157	3147	1738	0.266	364
1992	7117	3660	2541	0.230	475
1993	5288	3534	2623	0.207	475
1994	7312	3352	2508	0.194	458
1995	9645	3338	2292	0.247	505
1996	28832	3749	2191	0.304	621
1997	45399	5510	2473	0.298	640
1998	28036	6990	3749	0.411	1132
1999	20957	7415	4588	0.357	1261
2000	36071	7378	4274	0.469	1412
2001	57311	9066	4648	0.449	1772
2002	47299	10049	5257	0.487	1557
2003	50983	12079	7124	0.458	2365
2004	33599	10692	6969	0.527	2401
2005	19482	8606	6065	0.504	2018
2006	7217	7945	6144	0.421	1956
2007	3937	6004	5020	0.418	1612
2008	4718	4511	3768	0.378	1252
2009	5005	3559	2920	0.239	635
2010	15887	3929	2859	0.187	540
2011	24594	4833	2825	0.043	104
2012	24594*	6306	3836		
Average	18612	5157	3327	0.351	972

* Assumed equal to the 2011 value.

Table 9.4.4.5 Blue whiting in Subareas I–IX, XII, and XIV. Recruitment survey values and ranks from the 2010 year class onwards.

Year class(age 0):	2010					
Survey	*Year*	*Age*	*Value*	*Rank*	*# Yrs.*	*Percentile Rank*
Assessment	2011	1	24228	6	12	50%
IESNS	2011	1	467	8	13	38%
IBWSSS	2012	2	1832	3	9	67%
Faroese bottom trawl	2011	1	11406	5	13	62%
Icelandic bottom trawl	2011	1	10800	5	13	62%

Year class(age 0):	2011					
Survey	*Year*	*Age*	*Value*	*Rank*	*# Yrs.*	*Percentile Rank*
Barents Sea	2012	1	9	7	13	46%
IESNS	2012	1	9425	6	13	54%
Faroese bottom trawl	2012	1	5345	6	13	54%
Icelandic bottom trawl	2012	1	29900	2	13	85%

9.4.4.1 Annex

The management plan below was agreed by Norway, the EU, the Faroe Islands, and Iceland, and endorsed by NEAFC in November 2008.

1. *The Parties agree to implement a long term management plan for the fisheries on the Blue Whiting stock, which is consistent with the precautionary approach, aiming at ensuring harvest within safe biological limits and designed to provide for fisheries consistent with maximum sustainable yield, in accordance with advice from ICES.*
2. *For the purpose of this long term management plan, in the following text, "TAC" means the sum of the coastal State TAC and the NEAFC allowable catches.*
3. *As a priority, the long term plan shall ensure with high probability that the size of the stock is maintained above 1.5 million tonnes (B_{lim}).*
4. *The Parties shall aim to exploit the stock with a fishing mortality of 0.18 on relevant age groups as defined by ICES.*
5. *While fishing mortality exceeds that specified in paragraph 4 and 6, the Parties agree to establish the TAC consistent with reductions in fishing mortality of 35% each year until the fishing mortality established in paragraph 4 and 6 has been reached. This paragraph shall apply only during 2009 and 2010.*

For the purposes of this calculation, the fishing percentage mortality reduction should be calculated with respect to the year before the year in which the TAC is to be established. For this year, it shall be assumed that the relevant TAC constrains catches.

6. *When the fishing mortality in paragraph 4 has been reached, the Parties agree to establish the TAC in each year in accordance with the following rules:*

    - *In the case that the spawning biomass is forecast to reach or exceed 2.25 million tonnes (SSB trigger level) on 1 January of the year for which the TAC is to be set, the TAC shall be fixed at the level consistent with the specified fishing mortality.*
    - *In the case that the spawning biomass is forecast to be less than 2.25 million tonnes on 1 January of the year for which the TAC is to be set (B), the TAC shall be fixed that is consistent with a fishing mortality given by:*

        $$F = 0.05 + [(B - 1.5)(0.18 - 0.05) / (2.25 - 1.5)]$$

        In the case that spawning biomass is forecast to be less than 1.5 million tonnes on 1 January of the year for which the TAC is to be set, the TAC will be fixed that is consistent with a fishing mortality given by F = 0.05.

7. *When the fishing mortality rate on the stock is consistent with that established in paragraph 4 and the spawning stock size on 1 January of the year for which the TAC is to be set is forecast to exceed 2.25 million tonnes, the Parties agree to discuss the appropriateness of adopting constraints on TAC changes within the plan.*
8. *The Parties, on the basis of ICES advice, shall review this long term management plan at intervals not exceeding five years and when the condition specified in paragraph 4 is reached*