

Black scabbardfish (*Aphanopus carbo*) in subareas 1, 2, 4–8, 10, and 14, and divisions 3.a, 9.a, and 12.b (Northeast Atlantic and Arctic Ocean)

ICES stock advice

ICES advises that when the precautionary approach is applied, catches should be no more than 5914 tonnes in each of the years 2019 and 2020.

Distributed by area this corresponds to annual catches of no more than 2812 tonnes in subareas 6 and 7 and divisions 5.b and 12.b, annual catches of no more than 2735 tonnes in Subarea 8 and Division 9.a, and annual catches of no more than 367 tonnes in subareas 1, 2, 4, and 10 and divisions 3.a and 5.a.

Stock development over time

The stock abundance index shows a generally increasing trend since 2010 for the northern and southern components combined. Harvest rates have been stable in recent years.

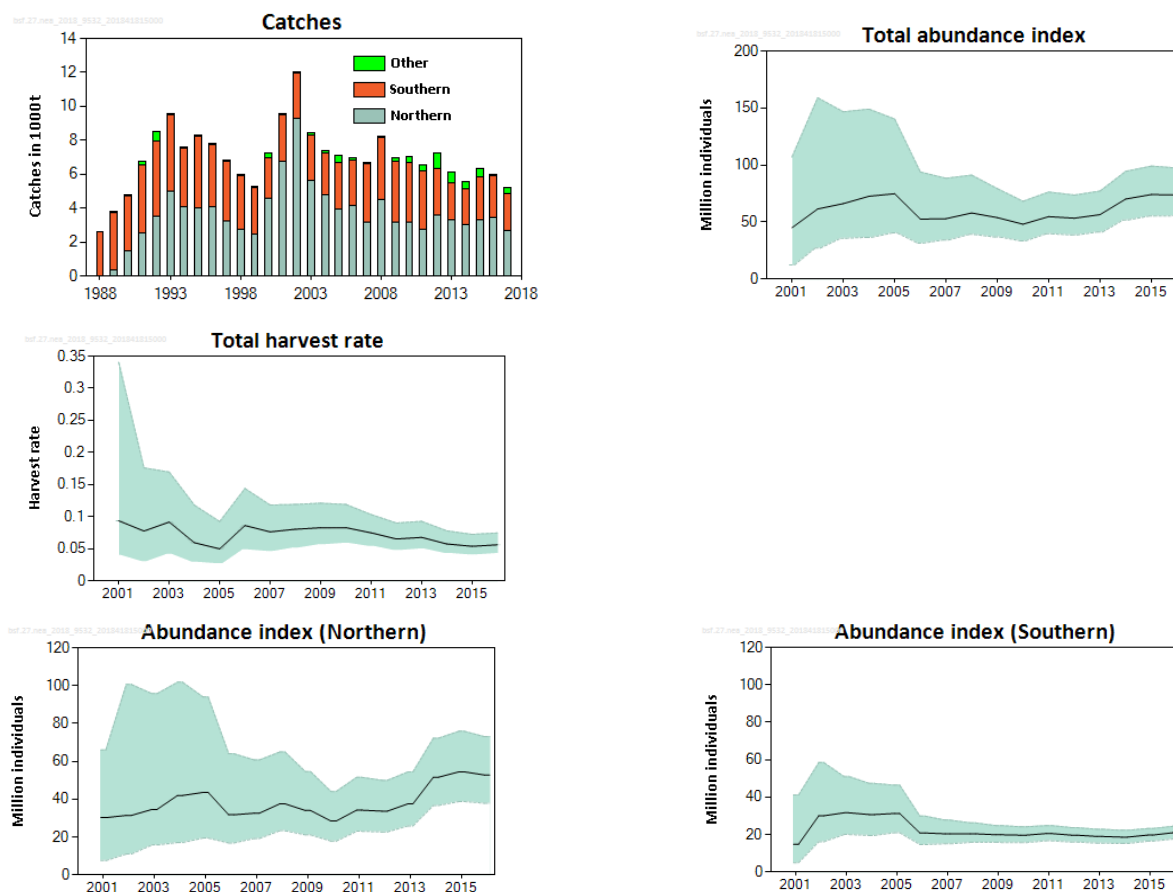


Figure 1 Black scabbardfish in the Northeast Atlantic. Top left: ICES estimates of catches (in thousand tonnes) in the northern part (subareas 6 and 7 and divisions 5.b and 12.b), southern part (Subarea 8 and Division 9.a), and the adjacent areas (labelled as “other”). Top right: Total abundance index (in millions). Middle: Estimated harvest rates for the total assessed area (subareas 6–8 and divisions 5.a, 9.a, and 12.b). Bottom: Abundance index in the northern part of the assessed area (left; subareas 6 and 7 and divisions 5.a and 12.b) and in the southern part (right; Subarea 8 and Division 9.a). Depicted ranges represent the 2.5 and 97.5 percentiles.

Stock and exploitation status

ICES cannot assess the stock and exploitation status relative to MSY and PA reference points because the reference points are undefined.

Table 1 Black scabbardfish in the Northeast Atlantic. State of the stock and fishery relative to reference points.

		Fishing pressure				Stock size				
		2015	2016	2017		2015	2016	2017		
Maximum sustainable yield	F_{MSY}	?	?	?	Undefined	$MSY B_{trigger}$?	?	?	Undefined
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Undefined	B_{pa}, B_{lim}	?	?	?	Undefined
Management plan	F_{MGT}	—	—	—	Not applicable	B_{MGT}	—	—	—	Not applicable
Qualitative evaluation	-	↘	→	→	Stable	-	↗	↗	→	Stable

Catch scenarios

ICES framework for category 3 stocks was applied (ICES, 2012). The abundance of the species in each area is estimated by six-month time intervals (semesters) and by using two different state space models, further linked by a northern–southern migration process. The annual abundance corresponds to the average of two consecutive semesters. Therefore, the 2016 estimate includes the first two months of 2017 and is taken as the index of abundance for 2017. The abundance indices from the northern and southern components were used as indicators of stock development. Stock trends by area have been estimated by the slope from a linear regression of the abundance estimate in a given year (Y) versus the abundance estimate in the previous year (Y–1), calculated for the most recent five years. Catch advice will increase when the abundance trends for the two components are increasing. If either component is stable or decreasing, the advised catch for each of the two components is calculated by multiplying the recent advised catch by the lower value of the slopes.

The slope value for the northern component abundance index is 1.075 and the slope for the southern component abundance index is 1.0034. The index is estimated to have changed by less than 20%; thus, the uncertainty cap was not applied. The exploitation of the stock is considered to be very low, leading to no additional precautionary buffer being applied. Discarding is negligible.

Table 2 Black scabbardfish in the Northeast Atlantic. The basis for the catch scenarios*.

Minimum slope	1.0034	
Uncertainty cap	Not applied	-
Recent advised catch for 2017–2018 issued in 2016	5894 t	
Discard rate	Negligible	
Precautionary buffer	Not applied	
Catch advice **	5914 t	
% advice change ***	+ 0.3%	

* The figures in the table are rounded. Calculations were done with unrounded inputs and computed values may not match exactly when calculated using the rounded figures in the table.

** [Recent advised catch for 2017–2018] × [Minimum slope (1.0034)].

*** Advice value for 2019 relative to advice value for 2018.

The advised catch for 2019 and 2020 is larger than that advised for 2017 and 2018 because the abundance indices have increased.

Basis of the advice

Table 3 Black scabbardfish in the Northeast Atlantic. The basis of the advice.

Advice basis	Precautionary approach.
Management plan	ICES is not aware of any agreed precautionary management plan for black scabbardfish in this area.

Quality of the assessment

The assessment would likely improve with the addition of appropriate fisheries-independent data that can inform on annual recruitment in the northern region. Survey data are available from the Scottish and Icelandic surveys, but the temporal and spatial coverage of these surveys does not provide robust recruitment estimates.

Fishery and biological time-series data from the CECAF (Fishery Committee for the Eastern Central Atlantic) area are required to provide information on stock status for the whole area.

Issues relevant for the advice

The advised catch is split among areas, based on the catch distribution in 2013 (ICES, 2014).

Catches in Division 10.a are likely to include *A. intermedius*, but the proportion is not quantified.

Reference points

No reference points are defined for this stock.

Basis of the assessment

Table 4 Black scabbardfish in the Northeast Atlantic. The basis of the assessment.

ICES stock data category	3 (ICES, 2016).
Assessment type	Trends-based assessment (ICES, 2018).
Input data	Commercial catches (international landings and length frequencies from catch sampling), commercial indices (CPUE from French trawlers and CPUE from Portuguese longliners).
Discards and bycatch	Considered negligible.
Indicators	None.
Other information	Last benchmarked in 2014 (ICES, 2014).
Working group	Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP)

Information from stakeholders

There is no additional available information.

History of the advice, catch, and management

Table 5 Black scabbardfish in the Northeast Atlantic. History of ICES advice, the agreed TAC, and ICES landings in subareas 6–9 and in divisions 5.b and 12.b. Weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice in Division 5.b, subareas 6–7, and Division 12.b	Predicted catch corresp. to advice in Subarea 8 and Division 9.a	EU TAC subareas 5–7 and 12	EU TAC Subareas 8–10	ICES landings in Division 5.b, subareas 6–7, and Division 12.b	ICES landings in subareas 8 and 9
2003	Significant effort reduction	-	-	3100	4000*	5661	2665
2004	Biennial	-	-	3100	4000*	4768	2503
2005	Significant effort reduction	-	-	3100	4000*	3923	2772
2006	Biennial	-	-	3100	4000*	4127	2726
2007	Constrain catches to the level before the expansion period (1990–1996)	3500	-	3000	4000	3192	3481
2008	Biennial	3500	-	3000	4000	4532	3647
2009	Constrain catches to the 50% level before the expansion period (1993–1997)	2000	2800	2700	3600	3160	3620
2010	Biennial	2000	2800	2400	3300	3202	3470
2011	Same advice as previously	2000	2800	2400	3300	2733	3494
2012	No new advice, same as 2011	2000	2800	2200	3300	3592	2711
2013	No more than 20% (in Division Vb, Subareas VI and VII, and Division XIIb) or 5% (in Subareas VIII and IX) catch increase	4700	3700	3100	3700	3332	2140
2014	No new advice, same as 2013	4700	3700	4000	3700	3048	2118
2015	Same catch as in 2013	2802	2726	3649	3700	3291	2532
2016	No new advice, same as 2015	2802	2726	3357	3700	3545	2476
2017	Precautionary approach (same value as advised catches for 2016)	≤ 2802	≤ 2726	2954	3330	2709	2151
2018	Precautionary approach (same value as advised catches for 2016)	≤ 2802	≤ 2726	2600	2997		
2019	Precautionary approach (5914 tonnes)	≤ 2812	≤ 2735				
2020	Precautionary approach (5914 tonnes)	≤ 2812	≤ 2735				

* Subarea 8 not included.

Table 6 Black scabbardfish in the Northeast Atlantic. History of ICES advice, the agreed TAC, and ICES landings in subareas 1, 2, 4, 10, and 14 and in divisions 3.a and 5.a (adjacent areas). Weights are in tonnes.

Year	ICES advice	Predicted catch corresp. to advice	EU TAC subareas 1–4	ICES landings in other areas*
2003	<i>Status quo</i> exploitation level	-	30	39
2004	Biennial	-	30	135
2005	Fishery should not be allowed to expand, unless proven to be sustainable	-	30	0.169
2006	Biennial	-	30	58
2007	Fishery should not be allowed to expand, unless proven to be sustainable	-	15	3
2008	Biennial	-	15	75
2009	Fishery should not be allowed to expand, unless proven to be sustainable	-	12	181**
2010	Biennial	-	12	336**
2011	Fishery should not be allowed to expand, and a reduction in catches should be considered	-	12	336**
2012	No new advice, same as 2011		9	867**
2013	Fisheries should not be allowed to expand until they can be shown to be sustainable		9	581
2014	No new advice, same as 2013		9	398
2015	should be maintained at same level as in 2013	366	9	508
2016	No new advice, same as 2015	366	9	441
2017	Precautionary approach (same advised catches value as given for 2016)	≤ 366	9	364
2018	Precautionary approach (same advised catches value as given for 2016)	≤ 366	9	
2019	Precautionary approach (5914 tonnes)	≤ 367		
2020	Precautionary approach (same value as advised catches for 2019)	≤ 367		

* Subareas 1–4, 10, and 14, and Division 5.a.

** Values revised in 2016.

History of catch and landings

Table 7 Black scabbardfish in the Northeast Atlantic. Catch distribution by fleet in 2017 as estimated by ICES.

Total catch (2017)	Landings			Discards
5224 t	52% in trawl fisheries (Northern part)	41% in longline fisheries (Southern part)	7% in trawl and longline fisheries (other areas)	Negligible
	2709 t	2151 t	364 t*	

* Catches are likely to include *A. intermedius*, but the proportion is not quantified.

Table 8 Black scabbardfish in the Northeast Atlantic. History of ICES estimated landings (in tonnes) in subareas 6, 7, and 12 and in Division 5.b, presented by each country participating in the fishery.

Year	Faroese	France	UK (E,W,S)	Spain	Germany	Ireland	Netherlands*	Lithuania*	Estonia*	Poland*	Russia	Iceland	Total
1988	0	0	0	0	0	0	0	0	0	0	0		0
1989	46	308	0	0	0	0	0	0	0	0	0		354
1990	12	1449	0	0	0	0	0	0	0	0	0		1461
1991	1	2536	0	0	0	0	0	0	0	0	0		2537
1992	7	3540	0	0	0	0	0	0	0	0	0		3547
1993	1315	3511	0	0	150	8	0	0	0	0	0		4984
1994	893	3102	2	0	91	3	0	0	0	0	0		4091
1995	550	3437	18	0	3	0	0	0	0	0	0		4008
1996	244	3775	37	41	2	0	0	0	0	0	0		4099
1997	123	2806	237	99	0	0	0	0	0	0	0		3265
1998	56	2416	149	136	0	0	0	0	0	0	0		2757
1999	13	2109	198	109	0	1	11	0	0	0	0		2440
2000	117	3745	426	237	0	59	7	0	0	0	0		4591
2001	406	5007	729	115	0	68	0	3	225	0	226		6779
2002	1362	4626	1080	1117	0	1050	23	9	0	2	0		9269
2003	1497	3423	104	444	0	160	2	13	7	3	7		5661
2004	859	3093	197	230	0	293	0	86	5	0	5		4768
2005	593	2884	101	239	0	79	0	5	12	0	11		3923
2006	758	2214	65	1009	0	72	0	1	5	0	3		4127
2007	754	2299	53	9	0	69	0	0	7	0	0		3192
2008	1747	2687	26	53	0	0	14	0	0	0	5		4532
2009	1165	1811	81	103	0	0	0	0	0	0	0		3160
2010	916	2002	104	180	0	0	0	0	0	0	0		3202
2011	493	2126	1	113	0	0	0	0	0	0	0		2733
2012	130	1752	34	78	0	0	0	0	0	0	0		1995
2013	583	2155	57	59	0	0	0	0	0	0	0		2854
2014	730	2055	110	149	0	0	3	0	0	0	0		3048
2015	730	2197	124	234	0	0	5	0	0	0	0		3291
2016	712	2479	96	256	0	0	1	0	0	0	0		3545
2017	492	1891	101	224	0	0	0	0	0	0	0		2709

* Official landings

Table 9 Black scabbardfish in the Northeast Atlantic. History of ICES estimated landings (in tonnes) in Subarea 8 and in Division 9.a, presented by each country participating in the fishery.

Year	France	Spain	Portugal	Total
1988	0	0	2602	2602
1989	0	0	3473	3473
1990	0	0	3274	3274
1991	1	0	3978	3979
1992	9	0	4389	4398
1993	11	0	4513	4524
1994	5	0	3429	3434
1995	0	0	4272	4272
1996	0	3	3686	3689
1997	1	1	3553	3555
1998	2	4	3147	3153
1999	11	0	2741	2753
2000	35	1	2371	2407
2001	28	1	2744	2773
2002	35	1	2692	2728
2003	34	1	2630	2665
2004	39	1	2463	2503
2005	25	1	2746	2772
2006	52	0	2674	2726
2007	28	1	3453	3481
2008	45	1	3602	3647
2009	19	1	3601	3620
2010	17	0	3453	3470
2011	18	0	3476	3494
2012	14	30	2668	2711
2013	7	3	2130	2140
2014	9	0	2109	2118
2015	5	0	2527	2532
2016	3	17	2456	2476
2017	2	32	2117	2151

Table 10 Black scabbardfish in the Northeast Atlantic. History of ICES estimated landings (in tonnes) in subareas 2, 4, 10, and 14, and in Division 5.a, presented by each country participating in the fishery.

Year	France	Faroes	UK(Scotland)	UK (E,W,S)	Germany*	Iceland	Portugal	Ireland	Spain	Unallocated	Total
1988	0	0	0	0	0	0	0	0	0	0	0
1989	3	0	0	0	0	0	0	0	0	0	3
1990	71	0	0	0	0	0	0	0	0	0	71
1991	107	0	0	0	0	0	166	0	0	0	273
1992	219	370	0	0	0	0	0	0	0	0	589
1993	34	0	0	0	0	0	2	0	0	0	36
1994	45	0	0	0	3	1	0	0	0	0	49
1995	6	0	2	0	0	0	3	0	0	0	11
1996	6	11	1	0	0	0	0	0	0	0	18
1997	0	3	2	0	0	1	0	0	0	0	6
1998	2	33	9	0	0	0	5	0	0	0	49
1999	4	0	3	0	0	6	46	0	0	0	58
2000	2	0	3	0	0	10	112	0	90	0	217
2001	1	0	10	1	0	5	0	0	0	0	18
2002	0	2	24	0	0	13	0	0	8	0	47
2003	1	0	4	0	0	14	91	0	2	0	112
2004	5	111	0	0	0	19	2	0	0	0	136
2005	2	83	0	0	0	19	323	0	0	0	427
2006	13	10	1	0	0	23	55	0	0	0	102
2007	1	1	0	0	0	1	0	0	0	0	3
2008	0	75	0	0	0	0	0	0	0	0	75
2009	5	157	0	0	0	15	5	0	0	0	182
2010	16	53	0	0	0	109	49	0	111	0	338
2011	1	25	0	0	0	172	139	0	0	0	337
2012	0	4	0	0	0	365	458	0	39	49	916
2013	1	0	0	0	0	324	206	0	50	40	621
2014	10	30	0	0	0	358	0	0	0	0	398
2015	2	234	0	0	0	265	7	0	0	0	508
2016	9	0	36	0	0	346	50	0	0		441
2017	0	0	63	0	0	294	7	0	0		364

* Official landings.

Table 11 Black scabbardfish in the Northeast Atlantic. Landings inside and outside the NEAFC Regulatory Area (RA) as estimated by ICES. Landings in tonnes. Differences in the total with other tables are caused by catches that are not allocated (inside or outside).

Year	Inside the NEAFC RA	Outside the NEAFC RA	Landings
2014	150	5414	5564
2015	223	6108	6331
2016	245	6217	6462
2017	221	5003	5224

Summary of the assessment

Table 12 Black scabbardfish in the Northeast Atlantic. Assessment summary. High and low refers to the credible intervals of the 3rd and 1st quartiles. The 2016 value includes the first two months of 2017 and is used as the abundance index for 2017.

Year	Total abundance index (millions)	Total abundance High	Total abundance Low	Total harvest rate	Total harvest rate High	Total harvest rate Low
2001	44.983	106.999	12.361	0.094	0.34	0.039
2002	61.364	158.972	27.096	0.078	0.176	0.030
2003	66.101	146.642	35.699	0.092	0.169	0.041
2004	72.54	148.989	36.51	0.059	0.118	0.029
2005	74.77	140.281	40.348	0.050	0.092	0.027
2006	52.494	93.802	31.435	0.086	0.144	0.048
2007	52.889	88.321	34.224	0.076	0.118	0.046
2008	57.855	91.087	39.083	0.080	0.119	0.051
2009	53.832	79.246	36.807	0.083	0.121	0.056
2010	48.026	68.138	33.441	0.083	0.119	0.058
2011	54.665	76.267	39.62	0.075	0.103	0.054
2012	53.275	73.555	38.599	0.065	0.090	0.047
2013	56.412	77.109	41.215	0.068	0.093	0.050
2014	70.142	94.409	51.784	0.057	0.078	0.043
2015	74.081	99	55.145	0.054	0.072	0.040
2016	73.647	97.36	55.406	0.056	0.075	0.042

Sources and references

- ICES. 2012. ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp.
- ICES. 2014. Report of the Benchmark Workshop on Deep-sea Stocks (WKDEEP), 3–7 February 2014, ICES Headquarters, Copenhagen. ICES CM 2014/ACOM:44. 119 pp.
- ICES. 2016. Advice basis. *In* Report of the ICES Advisory Committee, 2016. ICES Advice 2016, Book 1, Section 1.2.
- ICES. 2018. Report of the Working Group on the Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP), 11–18 April 2018, ICES HQ, Copenhagen, Denmark. ICES CM 2018/ACOM:14. 624 pp.