

ECOREGION **Widely distributed and migratory stocks**
STOCK **Black scabbardfish (*Aphanopus carbo*) in the Northeast Atlantic:**
Subareas I, II, IV, VI, VII, VIII, X, and XIV, and Divisions IIIa, Va, Vb,
IXa, and XIIb

Advice for 2015 and 2016

ICES advises on the basis of the approach to data-limited stocks that there should be annual catches of no more than 2802 t in Subareas VI, VII, and Divisions Vb, IXIb, annual catches of no more than 2726 t in Subarea VIII and Division IXa; and annual catches of no more than 366 t in the adjacent areas (Subareas I, II, IV, X, and XIV, and Divisions IIIa and Va).

Stock status

Fishing pressure		
		2011–2013
MSY (F_{MSY})	?	Unknown
Precautionary approach (F_{pa}, F_{lim})	?	Unknown
Qualitative evaluation	⬇	Declining
Stock size		
		2012–2014
MSY ($B_{trigger}$)	?	Unknown
Precautionary approach (B_{pa}, B_{lim})	?	Unknown
Qualitative evaluation	✓	Stable

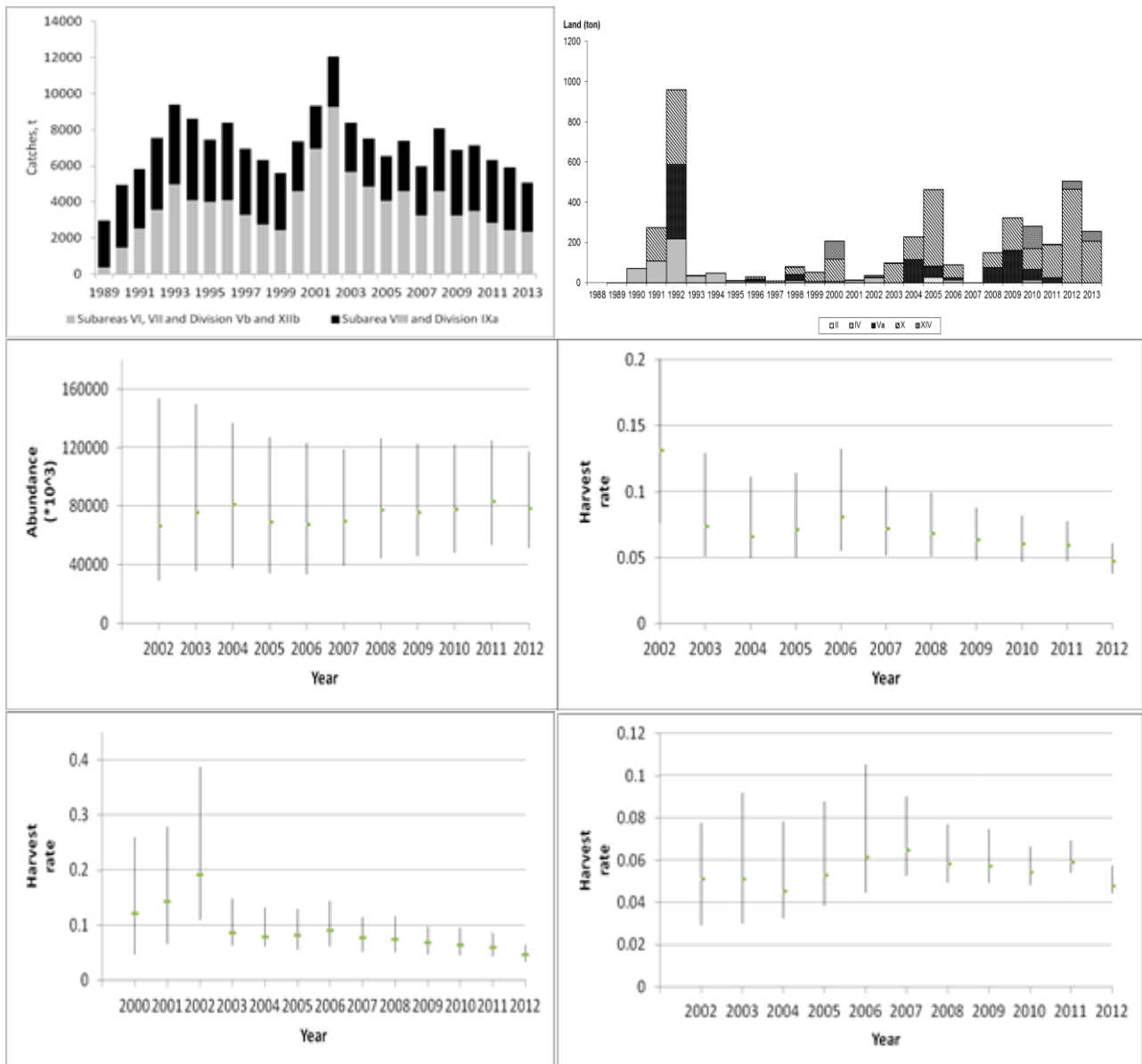


Figure 9.3.4.1 Black scabbardfish in the Northeast Atlantic. Top: ICES estimates of catches (tonnes) in the northern part (Subareas VI, VII, and Divisions Vb and XIIb) and southern part (Subarea VIII and Division IXa) (left) and Total landings (tonnes) in adjacent areas from 1988 to 2013 by ICES subareas and divisions (2013 landings are preliminary) (right). Middle: Stock size indicator (abundances in numbers) (left) and estimated harvest rates (right) for the total assessed area (Subareas VI, VII, and VIII and Divisions Vb, IXa, and XIIb). Bottom: Harvest rates for the northern part of the assessed area (Subareas VI, VII, and Divisions Vb and XIIb) (left), and harvest rate for the southern part (Subarea VIII and Division IXa) (right).

The stock abundance has been stable since 2002. Harvest rates indicate a slight decrease in exploitation for fisheries in Subareas VI and VII, and in Division Vb and XIIb (northern parts) and a stable exploitation for fisheries in Subarea VIII and Division IXa (southern part). Catches in the assessed area have decreased since 2002 and catches in the remaining stock areas, Subareas I, II, IV, X, and XIV, and Divisions IIIa and Va, have fluctuated over time.

Management plans

No specific management objectives are known to ICES.

Biology and distribution area

Scabbardfish is considered by ICES as one stock. The main distribution area has been identified as Subareas VI, VII, VIII, and IX and Divisions Vb, IXa, and XIIb. The stock assessment is based on the data from this main area. Adjacent areas, Subareas I, II, IV, X, and XIV, and Divisions IIIa and Va include a low proportion of the stock catches.

Assessed area: Subareas VI, VII, VIII, and IX, and Divisions Vb, IXa, and XIIb

Adjacent areas: Subareas I, II, IV, X, and XIV, and Divisions IIIa and Va

All the available studies suggest that a single stock migrates through the Northeast Atlantic. In the ICES areas there are only immature specimens and available studies suggest that fish from the northern part of the assessed area (Subareas VI and VII, and Divisions Vb and XIIb) are pre-adults that migrate to the southern part of the assessed area (Subareas VIII and IX). Catches from the two parts of the assessed area show a difference in modal length and body weight; on average, specimens from the southern part are 40% heavier than those from the northern part. The only known spawning areas are in the CECAF area (Madeira and Canary Islands waters). Compared to other deep-water species the growth rate of black scabbardfish is relatively high. Black scabbardfish has a longevity of 15 years.

The fisheries

In Subareas VI, VII, and XII, and Division Vb, black scabbardfish is mainly taken in mixed-trawl fisheries along with roundnose grenadier and blue ling, although species targeting may occur within the mixed fishery. The bulk of the landings come from Subarea VI. In recent years landings from Subarea VII have been greatly reduced. Due to the mixed nature of the trawl fisheries in Subareas VI, VII, and XII, and Division Vb, any measure taken to manage this species in these areas should take into account the advice given for other species taken in the same mixed fishery. Fisheries on the adjacent areas are variable and generally contribute a low proportion of the stock catches.

Black scabbardfish is taken in the waters of ICES Division IXa by a targeted longline fishery that started in the late 1980s on restricted fishing grounds.

Discarding is considered negligible.

Effects of the fisheries on the ecosystem

Deep-water trawls impact the seabed, causing potential damage to deep-water coral communities. This is mitigated in some areas by area closures to protect vulnerable marine ecosystems (VMEs). As trawl fisheries for black scabbardfish are part of mixed fisheries, effort on black scabbardfish also impacts other commercial and non-commercial deep-water species.

Deep-water sharks are bycatch species from both trawl and longline fisheries. The previous discard rate of bycatch species was low. However, the zero TAC for deep-water sharks (since 2008) may potentially lead to increased discarding of sharks.

Quality considerations

The assessment could be improved with the addition of appropriate fisheries-independent data. The only available survey data are from the Scottish deep-water survey. However, though the area coverage of this survey is small relative to the assessment area, it coincides with the main fishing area (ICES Division VIa) in the northern part.

Fishery and biological data from the CECAF area are required to improve the overall perception of the stock status and particularly of the spawning stock.

Scientific basis

Stock data category	3.NEW (ICES, 2014b).
Assessment type	Bayesian state space assessment.
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	Not included, considered negligible.
Indicators	None.
Other information	Last benchmark in 2014 (ICES, 2014b).
Working group	Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources (WGDEEP).

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IXa, and XIIb

Reference points

No reference points have been defined for this stock.

Outlook for 2015 and 2016

No forecast is presented for this stock.

ICES approach to data-limited stocks

The advisory rule based on proposals from WKDEEP 2014, follows the general principles of the ICES DLS approach, though the rule is modified to provide additional protection against local depletion in the northern and southern parts of the assessed area.

This rule adjusts total catches for both parts of the assessed area according to recent trends in abundance for the northern and southern parts separately. The abundance trends from both parts in the most recent five years are applied in combination with a rule that specifies that catch advice should only increase when the abundance trends for both parts are increasing. If either part is stable or decreasing, the advised catch for both parts is adjusted according to the rate of change in the part showing the decrease.

It is not considered necessary to apply an additional precautionary buffer because the estimated harvest rates have been observed to decline over the last 5 years. They are considered low (less than 0.05), below and any potential candidates for a proxy for F_{MSY} .

For the catches in the adjacent area which has no assessment, the catch advice follows the same advised change.

For this year, the abundance indices in both parts are constant (Figure 9.3.4.2). Thus, according to the advisory rule the catches should be maintained at the same level as in 2013.

This implies catches of 5528 t in the assessed area and 366 t in the adjacent area (Subareas I, II, IV, X, XIV, and Divisions IIIa and Va). For the assessed areas this corresponds to catches of no more than 2802 t for Subareas VI, VII, and Divisions Vb, IXIb, and catches of no more than 2726 t for Subarea VIII and Division IXa.

Additional considerations

Comparison of the basis of previous assessment and advice

ICES previously had three advice areas. At the most recent benchmark it was decided to combine the largest two of these (in terms of catch) in an assessment model based on a single population that is exploited differently in each part and migrates between these parts. The third area, where around 6% of recent total catch is taken, was originally provided with a separate advice sheet. The biology indicates that the fisheries is exploiting a single population that migrates through the whole area. Therefore ICES advises on the basis of an assessment of the main part of the area where sufficient data are available.

The basis for the assessment changed compared to last year. This year's assessment is based on a Bayesian life stage model and was benchmarked in 2014.

The basis for the advice this year is the same as last year: ICES approach to data-limited stocks.

Sources

ICES. 2014a. Advice basis. *In* Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.2.
 ICES. 2014b. Report of the Benchmark Workshop on Deep-sea Stocks (WKDEEP), 3–7 February 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:44.

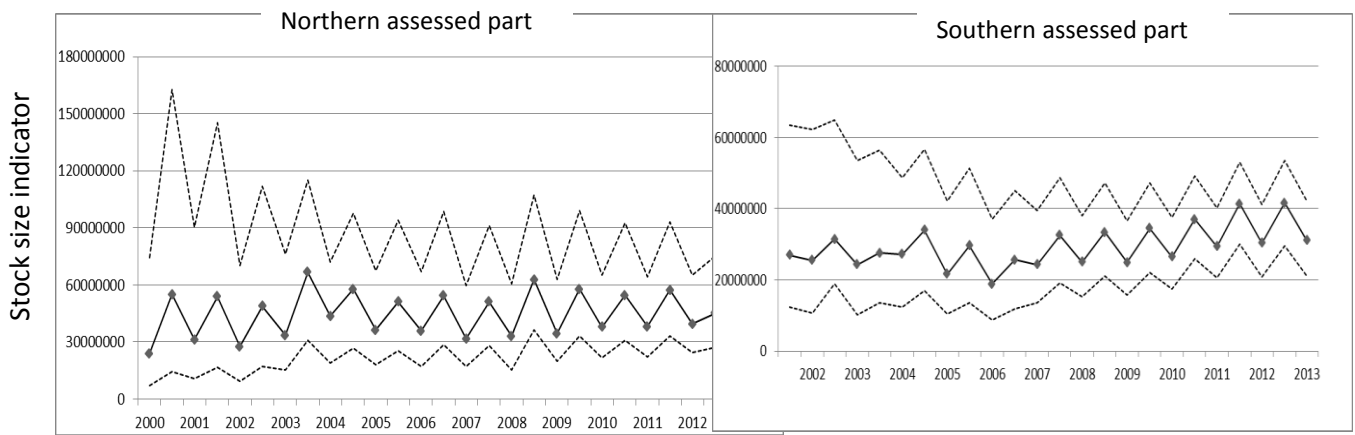


Figure 9.3.4.2 Black scabbardfish (*Aphanopus carbo*) in the Northeast Atlantic. Left: Stock size indicator (abundances in numbers) for the northern assessed part (Subareas VI and VII, and Divisions Vb and XIIb). Right: Stock size indicator (abundances in numbers) for the southern assessed part (Subarea VIII and Division IXa). Please note the semi-annual time steps applied.

Table 9.3.4.1 Black scabbardfish in Subareas VI, VII, and VIII, and in Divisions Vb, IX, and XIIb. ICES advice, management, and landings.

Year	ICES Advice	Predicted catch to advice in Division Vb, Subareas VI and VII, and Division XIIb	Predicted catch to advice in Subareas VIII and IX	TAC EU Subareas V, VI, VII, XII	TAC EU Subareas VIII, IX, and X	ICES landings in Division Vb, Subareas VI and VII, and Division XIIb	ICES landings in Subareas VIII and IX
2003	Significant effort reduction	-	-	3.1	4 ¹	5.7	2.7
2004	Biennial	-	-	3.1	4 ¹	4.8	2.6
2005	Significant effort reduction	-	-	3.1	4 ¹	4.0	2.5
2006	Biennial	-	-	3.1	4 ¹	8.3	2.7
2007	Constrain catches to the level before the expansion period (1990–1996)	3.5	-	3.0	4	5.7	2.7
2008	Biennial	3.5	-	3.0	4	5.6	3.5
2009	Constrain catches to the 50% level before the expansion period (1993–1997)	2.0	2.8	2.7	3.6	4.3	3.6
2010	Biennial	2.0	2.8	2.4	3.3	3.9	3.6
2011	Same advice as previously	2.0	2.8	2.4	3.3	3.0	3.5
2012	No new advice, same as 2011		2.8	2.2	3.3	2.2	3.5
2013	No more than 20% (in Division Vb, Subareas VI and VII, and Division XIIb) or 5% (in Subareas VIII and IX) catch increase	4.7	3.7	3.1	3.7	2.8	2.7
2014	No new advice, same as 2013	4.7	3.7	4.0	3.7		
2015	Same catch as in 2013	2.802	2.726				
2016	No new advice, same as 2015						

Weights in thousand tonnes.

¹ Subarea VIII not included.

Table 9.3.4.2 Black scabbardfish in Subareas VI, VII, and VIII, and in Divisions Vb, IXa, and XIIb. ICES estimates of catches by country (tonnes).

Year	Total Vb, VI, VII and XII											VIII & IXa			Total
	Faroese Islands	France	UK (E,W,S)	Spain	Germany	Ireland	Netherlands **	Lituania**	Estonia **	Poland**	Russia	France	Spain	Portugal	
1988															
1989	46	308	0	0	0	0	0	0	0	0	0	0	0	2602	2956
1990	12	1449	0	0	0	0	0	0	0	0	0	0	0	3473	4934
1991	1	2536	0	0	0	0	0	0	0	0	0	0	0	3274	5812
1992	7	3540	0	0	0	0	0	0	0	0	0	1	0	3978	7526
1993	1315	3511	0	0	150	8	0	0	0	0	0	9	0	4389	9382
1994	893	3102	2	0	91	3	0	0	0	0	0	11	0	4513	8616
1995	550	3437	18	0	3	0	0	0	0	0	0	5	0	3429	7442
1996	244	3775	37	41	2	0	0	0	0	0	0	0	0	4272	8371
1997	123	2806	237	99	0	0	0	0	0	0	0	0	3	3686	6955
1998	56	2416	149	136	0	0	0	0	0	0	0	1	1	3553	6313
1999	13	2109	198	109	0	1	11	0	0	0	0	2	4	3147	5593
2000	117	3745	426	238	0	59	7	0	0	0	0	11	0	2741	7345
2001	406	5007	729	265	0	68	0	3	225	0	226	35	1	2371	9336
2002	1362	4626	1080	1117	0	1050	23	9	0	2	0	28	1	2744	12042
2003	1497	3423	104	444	0	160	2	13	7	3	7	35	1	2692	8389
2004	859	3093	197	292	0	293	0	86	5	0	5	34	1	2630	7494
2005	593	2881	101	364	0	79	0	5	12	0	11	39	1	2463	6549
2006	758	2214	65	1484	0	72	0	1	5	0	3	25	1	2746	7373

Year	Total Vb, VI, VII and XII											VIII & IXa			Total
	Faroese Islands	France	UK (E,W,S)	Spain	Germany	Ireland	Netherlands **	Lithuania**	Estonia **	Poland**	Russia	France	Spain	Portugal	
2007	754	2299	53	59	0	69	0	0	7	0	0	52	0	2674	5969
2008	1747	2687	26	114	0	0	14	0	0	0	5	28	1	3453	8074
2009	1165	1795	81	198	0	0	0	0	0	0	0	45	1	3602	6887
2010	916	2002	104	476	0	0	0	0	0	0	0	19	1	3601	7118
2011	493	2121	1	229	0	0	0	0	0	0	0	17	0	3453	6313
2012	419	1855	34	115	0	0	0	0	0	0	0	18	0	3476	6117***
2013	8	2165	57	94	0	0	0	0	0	0	0	6	52	2668	5528***

* From Statlant. ** Preliminary. *** Including 200 and 478 t unallocated in 2012 and 2013 respectively, from Subareas VI, VII, and XII, and Division Vb.

Table 9.3.4.3 Black scabbardfish in Subareas I, II, IV, X, and XIV, and in Divisions IIIa and Va (adjacent areas). ICES advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	TAC EU Subareas I, II, III, IV	ICES landings in other areas ¹
2003	<i>Status quo</i> exploitation level	-	0.03	0.039
2004	Biennial	-	0.03	0.135
2005	Fishery should not be allowed to expand, unless proven to be sustainable	-	0.03	0.169
2006	Biennial	-	0.03	0.058
2007	Fishery should not be allowed to expand, unless proven to be sustainable	-	0.015	0.003
2008	Biennial	-	0.015	0.075
2009	Fishery should not be allowed to expand, unless proven to be sustainable	-	0.012	0.178
2010	Biennial	-	0.012	0.299
2011	Fishery should not be allowed to expand, and a reduction in catches should be considered	-	0.012	0.226
2012	No new advice, same as 2011		0.009	0.462
2013	Fisheries should not be allowed to expand until they can be shown to be sustainable		0.009	0.366
2014	No new advice, same as 2013		0.009	
2015	should be maintained at same level as in 2013	0.366		
2016	No new advice, same as 2015	0.366		

Weights in thousand tonnes.

¹ Subareas I, II, III IV, X, and XIV, and Division Va.

Table 9.3.4.4 Black scabbardfish in Subareas I, II, IV, X, and XIV, and in Divisions IIIa and Va (adjacent areas). ICES estimates of landings by country (tonnes).

Year	I, II, IIIa, IV, X, Va, XIV									Total
	Faroese Isl	France	UK E&W&NI	UK Sco	Spain	Germany	Ireland	Iceland	Portugal *	
1988	0	0	0	0	0	0	0	0	-	
1989	0	3	0	0	0	0	0	0	-	3
1990	0	71	0	0	0	0	0	0	-	71
1991	0	107	0	0	0	0	0	0	-	33
1992	370	219	0	0	0	0	0	0	-	589
1993	0	34	0	0	0	0	0	0	0	0
1994	0	45	3	0	0	0	0	0	1	49
1995	0	6	0	2	0	0	0	0	+	1
1996	11	6	0	1	0	0	0	0	0	0
1997	3	0	0	2	0	0	0	0	1	0
1998	33	2	0	9	0	0	0	0	0	1
1999	0	4	0	3	0	0	0	0	6	9
2000	0	2	0	3	90	0	0	10	22	127
2001	0	1	0	10	0	0	0	5		17
2002	2	0	0	24	8	0	0	13		47
2003	0	1	0	4	2	0	0	14	18	39
2004	111	5	0	0	0	0	0	19	0	135
2005	83	2	0	0	0	0	0	19	65	169
2006	10	13	0	1	0	0	0	23	11	58
2007	1	1	0	0	0	0	0	1	0	3
2008	75	0	0	0	0	0	0	0	0	75
2009	157	5	0	0	0	0	0	15	1	178
2010	53	16	0	0	111	0	0	109	10	299
2011	25	1	0	0	0	0	0	172	28	226
2012	4	0	0	0	0	0	0	365	92	462
2013	0	1	0	0	0	0	0	324	41	366

* *A. carbo* represent 20% of the reported catches.