

6.3.42 Sandeel (*Ammodytes* spp.) in Divisions 4b and 4c, SA 2 (Central and South North Sea)

ICES stock advice

ICES advises that catches in 2016, on the basis of the MSY approach, would correspond to zero tonnes. However, in order to obtain samples to assess the status of the stock in 2017, ICES advises a monitoring TAC in 2016 with catches that should not exceed 5000 tonnes and an associated sampling protocol in the fishery.

Stock development over time

The spawning-stock biomass (SSB) in sandeel area 2 (SA 2) has not been above the precautionary biomass level ($B_{pa} = MSY B_{escapement}$) since 2011 and is close to B_{lim} in 2016. Recruitment has been below average since 2010 and it is estimated to be among the lowest values in the time series in 2015.

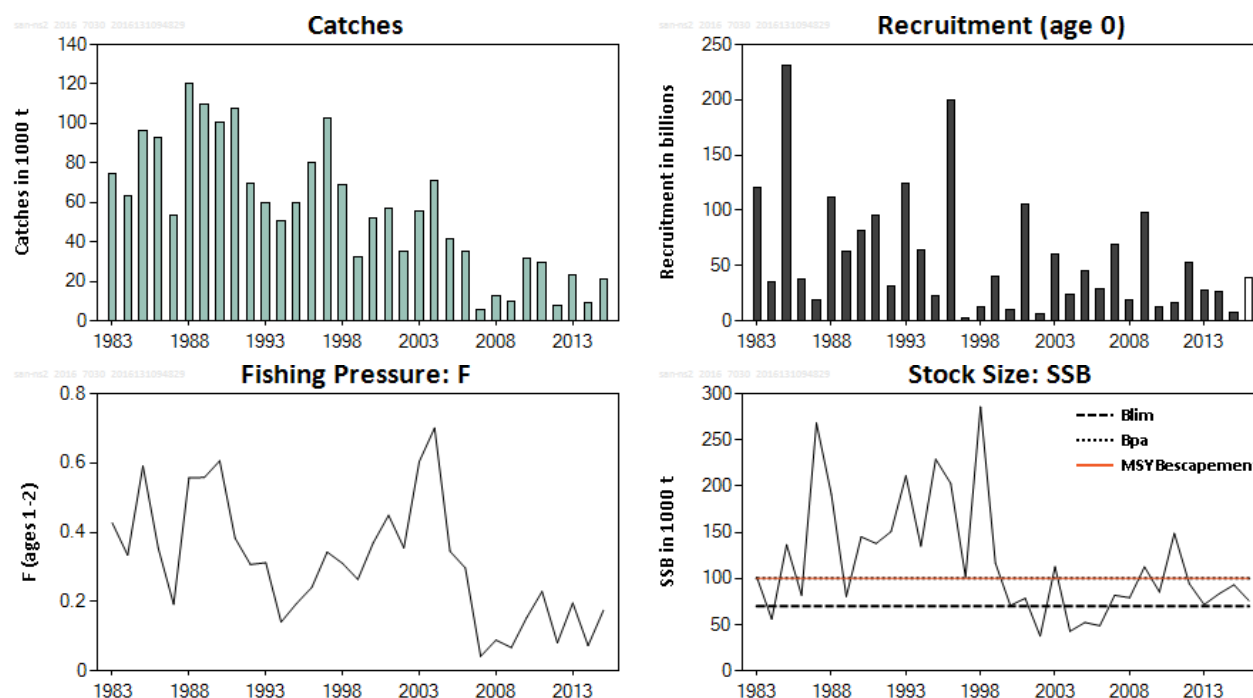


Figure 6.3.42.1 Sandeel in the North Sea (SA 2). Historical development of the stock from the summary of the stock assessment (weights in thousand tonnes and recruitment in billions of fish). Predicted values are not shaded.

Stock and exploitation status

Table 6.3.42.1 Sandeel in the North Sea (SA 2). 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}	?	?	?	Undefined	$MSY B_{escapement}$	✘ ✘ ✘	Below escapement
Precautionary approach	F_{pa}, F_{lim}	?	?	?	Undefined	B_{pa}, B_{lim}	○ ○ ○	Increased risk
Management plan	F_{MGT}	?	?	?	Undefined	SSB_{MGT}	? ? ?	Undefined

Catch options

Table 6.3.42.2 Sandeel in the North Sea (SA 2). The basis for the catch options.

Variable	Value	Source	Notes
F (2015)	0.143	ICES (2016a)	Sum of half-yearly Fs
R (2015)	8 billion	ICES (2016a)	
R (2016)	39 billion	ICES (2016a)	Geometric mean (1983–2014)
SSB (2016)	76 kt	ICES (2016a)	

Table 6.3.42.3 Sandeel in the North Sea (SA 2). Annual catch options. All weights are in thousand tonnes.

Rationale	Catches (2016)	Basis	F (2016)	SSB (2017)	%SSB change*	%TAC change**
MSY approach	0	$SSB_{2017} = MSY B_{\text{escapement}}$	0	56	-25%	-100%
Zero catch	0	$F = 0$	0	56	-25%	-100%
Other options	5.0	Monitoring TAC	0.053	53	-30%	-83%
	3.400	$F_{2015} \times 0.25$	0.036	54	-28%	-88%
	6.669	$F_{2015} \times 0.5$	0.071	52	-31%	-77%
	9.815	$F_{2015} \times 0.75$	0.107	50	-33%	-66%
	12.842	$F_{2015} \times 1$	0.143	49	-36%	-56%

* SSB 2017 relative to SSB 2016.

** Catch option for 2016 relative to TAC in 2015 (29 kt).

Basis of the advice

Table 6.3.42.4 Sandeel in the North Sea (SA 2). The basis of the advice.

Advice basis	MSY approach (Escapement strategy)
Management plan	There is no management plan for sandeel in this area.

Quality of the assessment

The assessment relies on the assumption that the fisheries age selection pattern has remained the same since 1999 and that the commercial fishery supplies sufficient sampling information on older age groups. A change in the fishing pattern would make the current advice less accurate. The available survey time-series in SA 2 is still short (2010–2015) and has not yet been reviewed by ICES; therefore, the survey index from SA 1 (age 0) is applied in the SA 2 assessment. There appears to be a sufficiently robust relationship between the recruitments in SAs 1 and 2 to be able to apply the data sources and procedures from SA 1 to estimate the incoming year-class strength in SA 2 as well. The assessment is considered to be of medium quality, but will be further improved once a longer time-series of dredge survey catches from SA 2 exists.

This year’s assessment results in a considerable reduction in the estimated size of the 2014 year-class, however, the estimates of both F and SSB in 2014 have remained largely unchanged from the previous assessment.

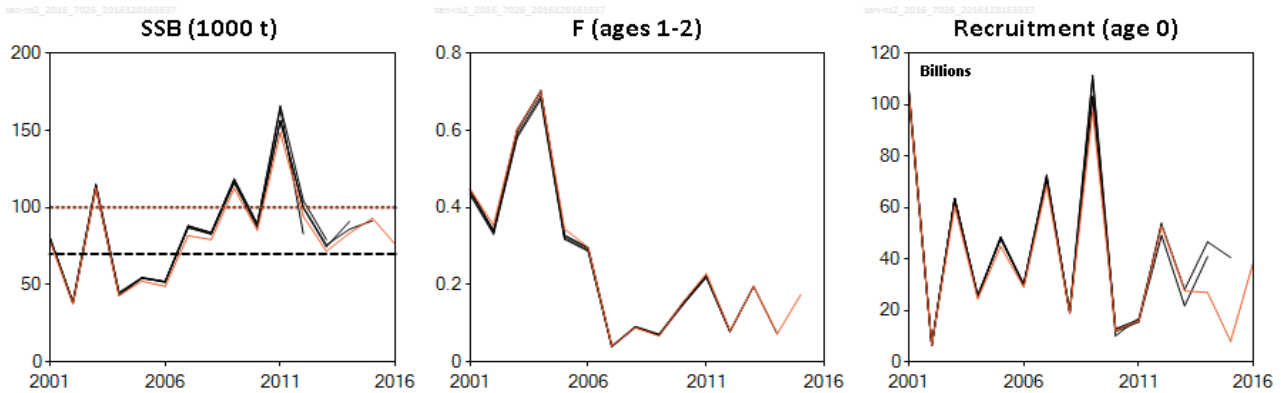


Figure 6.3.42.2 Sandeel in the North Sea (SA 2). Historical assessment results (final-year recruitment estimates included).

Issues relevant for the advice

The advised monitoring TAC in 2016 of 5000 t is based on obtaining a minimum of 30 samples to provide biological information on older fish for the assessment. This is calculated based on past average sandeel tonnes per haul (commercially around 55 t) and the fact that it would be preferable to sample no more than one in every three hauls in order to reduce correlation (ICES 2014). Catches equal to the monitoring TAC would result in an F of 0.053 in 2016, slightly above the lowest value of estimated F in the time series (1983–2015).

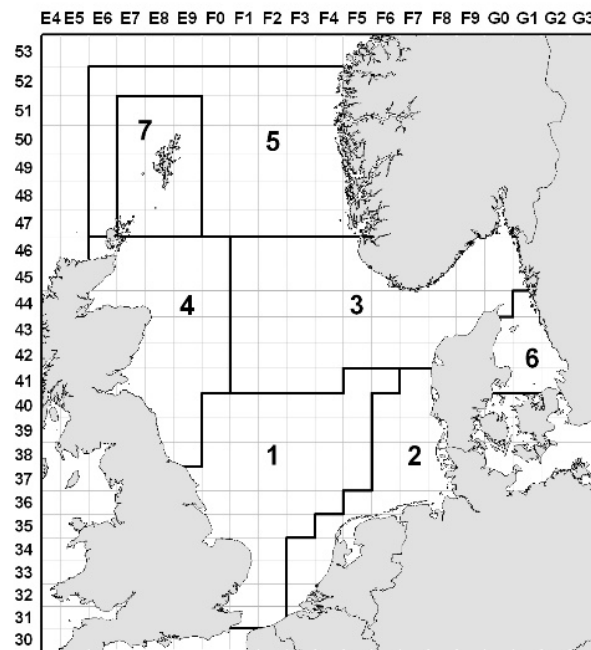


Figure 6.3.42.3 Sandeel in the North Sea (SA 2). Sandeel are largely sedentary after settlement and form a complex of local (sub-)stocks in the North Sea. To avoid local depletion, ICES advice for sandeel is provided separately for seven areas in Division 3a and Subarea 4. Advice for sandeel in the North Sea (SA 2) specifically applies to sandeel in rectangles 31–34 F3–F4; 35 F4–F6; 36 F5–F8; 37–40 F6–F8; and 41 F7–F8.

Reference points

Table 6.3.42.5 Sandeel in the North Sea (SA 2). Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{\text{escapement}}$	100 000 t	$= B_{\text{pa}}$	ICES (2010)
	F_{MSY}	Not defined		
Precautionary approach	B_{lim}	70 000 t	Median SSB in the years (2000–2006) of lowest SSB and no impaired recruitment.	ICES (2010)
	B_{pa}	100 000 t	$B_{\text{pa}} = B_{\text{lim}} \times \exp(\sigma \times 1.645)$, with $\sigma = 0.23$ estimated from assessment uncertainty in the terminal year.	ICES (2010)
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{MGT}	Not defined		
	F_{MGT}	Not defined		

Basis of the assessment

Table 6.3.42.6 Sandeel in the North Sea (SA 2). The basis of the assessment and advice.

ICES stock data category	1 (see ICES, 2016b)
Assessment type	Seasonal age-based analytical (SMS-effort) (ICES, 2016a)
Input data	One survey index (dredge survey since 2004) from SA 1 is applied. Total international catch and fishing effort. Annual maturity data from the dredge survey. Natural mortality estimated from multispecies assessment (assumed constant over time). Age and length frequencies from catch sampling.
Discards and bycatch	Discarding is considered to be negligible.
Indicators	None
Other information	Last benchmark in 2010 (ICES, 2010). This stock will be benchmarked in 2016.
Working group	Herring Assessment Working Group (HAWG)

Information from stakeholders

There is no available information.

History of advice, catch, and management

Table 6.3.42.7 Sandeel in the North Sea (SA 2). History of ICES advice, the agreed TAC, and ICES estimates of catch. All weights are in thousand tonnes.

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 2	Total ICES catch (SAs 1–7)
2005*	Exploitation to be kept below the level of 2003. Adjustment to be made conditional on the abundance of the 2004 year class.	-	661**	41	177
2006*	The fishery should remain closed until information is available which assures that the stock can be rebuilt to B_{pa} by 2007.	-	300**	35	293
2007*	The fishery should remain closed until information is available which assures that the stock can be rebuilt to B_{pa} by 2008.	-	173**	6	230
2008*	The fishery should only be allowed if monitoring information is available and shows that the stock can be rebuilt to B_{pa} by 2009.	-	375**	13	348
2009*	The fishery should only be allowed if monitoring information is available and shows that the stock can be rebuilt to B_{pa} by 2010.	-	377**	10	353
2010*	The fishery should only be allowed if monitoring information is available and shows that the stock can be rebuilt to B_{pa} by 2011.	-	377**	32	414
2011	MSY approach: allow for sufficient stock ($MSY B_{escapement}$) to remain for successful recruitment.	< 34	34	30	438
2012	Catches for monitoring purposes should not exceed 5 000 t.	< 5	5	8	102
2013	MSY approach: allow for sufficient stock ($MSY B_{escapement}$) to remain for successful recruitment.	< 17.544	18	23	278
2014	Catches for monitoring purposes should not exceed 5 000 t.	< 5	5	8.9	255
2015	MSY approach: allow for sufficient stock ($MSY B_{escapement}$) to remain for successful recruitment.	< 29	29	21***	307***
2016	Catches for monitoring purposes should not exceed 5 000 t.	≤ 5			

* Advice for Subarea 4, excluding the Shetland area.

** Set for EU waters of Divisions 2a and 3a and Subarea 4.

*** Preliminary.

History of catch and landings

Table 6.3.42.8 Sandeel in the North Sea (SA 2). Catch distribution by fleet in 2015 data as estimated by ICES.

Total catch (2015)	Landings	Discards
21 kt	100 % industrial trawl fisheries	Negligible
	21 kt	

Table 6.3.42.9 Sandeel in the North Sea (SA 2). History of total catch (tonnes) as estimated by ICES.

Year	Catch
1982	86059
1983	80482
1984	66352
1985	99428
1986	94604
1987	53761
1988	121394
1989	109691
1990	100960
1991	107663
1992	69848
1993	59820
1994	49766
1995	59847
1996	62121
1997	100918
1998	69461
1999	31646
2000	52299
2001	58758
2002	36974
2003	56304
2004	71085
2005	43395
2006	35435
2007	5891
2008	12709
2009	9578
2010	30738
2011	29848
2012	8246
2013	23534
2014	8929
2015	20993

Summary of the assessment

Table 6.3.42.10 Sandeel in the North Sea (SA 2). Assessment summary with weights (in tonnes) and recruits (at age 0, in thousands). The SSB is estimated for 1 January. Yield values used for the assessment do not include catches of age 0 in the first half of the year and, hence, may differ slightly from the ICES catch estimates presented in other tables.

Year	Recruitment Age 0	Stock size (SSB)	Catches	Fishing pressure (F) Ages 1–2
	thousands	tonnes	tonnes	
1983	120164000	101515	74481	0.427
1984	35178000	55992	63046	0.334
1985	231198000	136525	96645	0.591
1986	37338000	81810	93146	0.353
1987	18419000	268206	53284	0.192
1988	112320000	190959	120382	0.557

Year	Recruitment Age 0	Stock size (SSB)	Catches	Fishing pressure (F) Ages 1–2
	thousands	tonnes	tonnes	
1989	62659000	80482	109703	0.558
1990	82303000	145100	100917	0.606
1991	94953000	137791	107795	0.383
1992	31919000	150629	69825	0.307
1993	124732000	211031	59652	0.312
1994	63947000	135042	50656	0.141
1995	22537000	228959	60138	0.194
1996	199505000	202891	80012	0.241
1997	3109000	101589	102726	0.343
1998	13311000	285733	68953	0.310
1999	39949000	116689	32108	0.264
2000	10513000	70863	52228	0.369
2001	105003000	78574	56934	0.449
2002	6643000	37731	35494	0.355
2003	60508000	112722	55924	0.604
2004	24532000	42888	71413	0.701
2005	44921000	52380	41420	0.345
2006	29011000	48923	35351	0.297
2007	68809000	81871	5911	0.042
2008	18866000	79244	13064	0.089
2009	97604000	112492	10240	0.067
2010	12232000	85361	31747	0.154
2011	15884000	148742	29807	0.229
2012	52774000	94356	8098	0.081
2013	27600000	71780	23534	0.196
2014	27020000	83434	8928	0.073
2015	7997000	93118	20992	0.175
2016	39194000**	76000*		
Average	57136824	117689	55896	0.313

* Using mean weight-at-age from 2013 to 2015.

** Geometric mean (1983–2014).

Sources and references

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