Sandeel (*Ammodytes* spp.) in divisions 4.b–c and Subdivision 20, Sandeel Area 2r (central and southern North Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches in 2023 should be no more than 40 997 tonnes.

ICES advice on conservation aspects

ICES has not identified any conservation aspects.

Stock development over time

Spawning-stock size is below MSY $B_{escapement}$ and between B_{pa}, and B_{lim}. No reference points for fishing pressure have been defined for this stock.
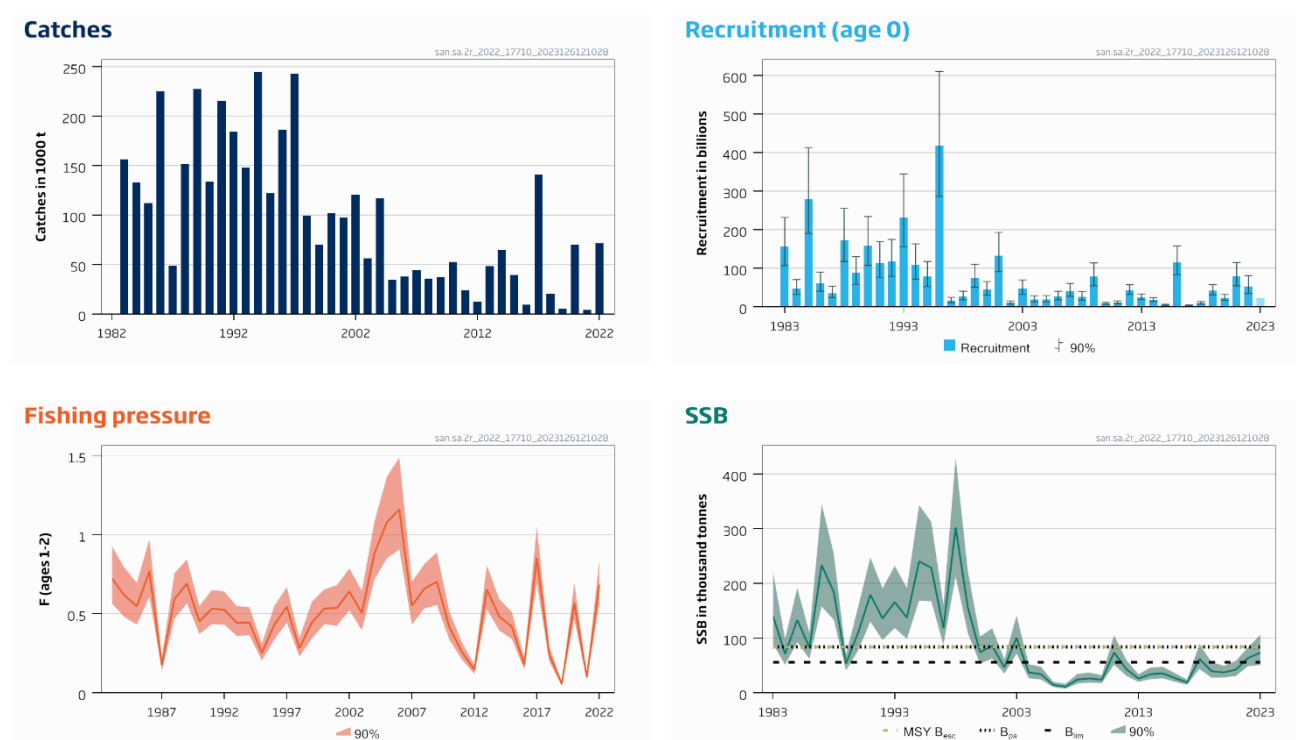

Figure 1   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Summary of the stock assessment. The assumed recruitment value for 2023 is shaded in a lighter colour.

Conservation status

ICES is not aware of any information on stock specific conservation status.

Catch scenarios

Table 1   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Values in the forecast.

Variable	Value	Notes
F (2022)	0.68	Assessment model estimate
Recruitment (2023)	22 601 859	Geometric mean 2012–2021; thousands
SSB (2023)	73 350	Assessment model estimate; tonnes

Table 2   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	F_{total} (2023)	SSB (2024)	% SSB change *	% TAC change **	% advice change ***
ICES advice basis						
$SSB_{2024} \geq$ MSY $B_{escapement} = B_{pa}$	40 997	0.29	84 000	15	−43	−43
Other scenarios						
F = 0	0	0	110 821	51	−100	−100
B_{lim}	85 165	0.73	56 000	−24	19	19
F = F_{2022}	81 334	0.68	58 379	−20	13	13

* SSB_{2024} relative to SSB_{2023}.
** Catch scenario for 2023 relative to TAC in 2022 (71 859 t).
*** Advice value 2023 relative to advice value 2022 (71 859 t).

The decrease in advice from 2022 is due to a lower recruitment in 2022 than in 2021.

Basis of the advice

Table 3   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. The basis of the advice for fishing opportunities.

Advice basis	MSY approach (escapement strategy with F_{cap})
Management plan	ICES is not aware of any agreed precautionary management plan for sandeel in this area

Quality of the assessment

The update assessment has revised estimates of SSB upwards, and estimates of fishing mortality downwards, for several recent years; the reasons for this are not fully understood.
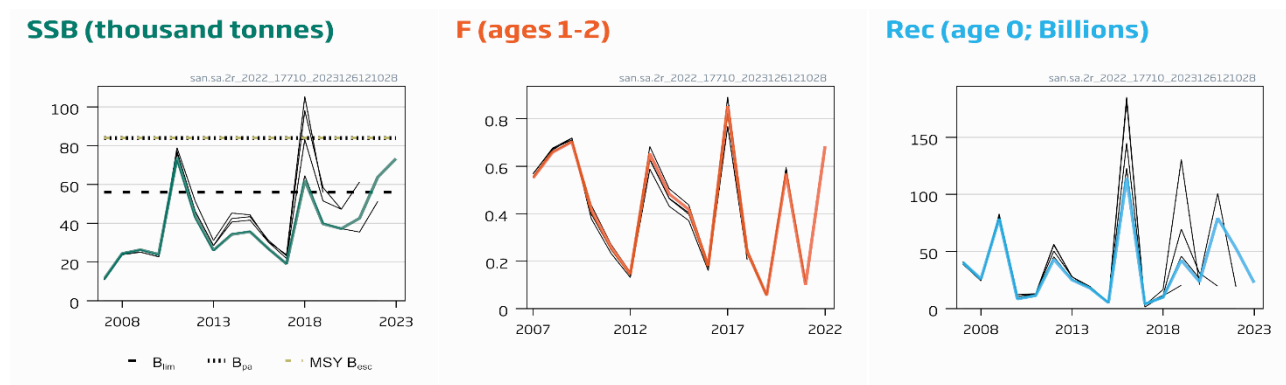

Figure 2   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Historical assessment results (final-year recruitment is the geometric mean).

Issues relevant for the advice

The large change in the advice from year to year is caused by the marked interannual variability of biomass and recruitment as well as the early maturation, both of which are typical for a short-lived species.

The management strategy evaluation (MSE) conducted for this stock has not accounted for any interannual quota flex arrangements for this fishery; such a practice may, therefore, not be precautionary (ICES, 2017).
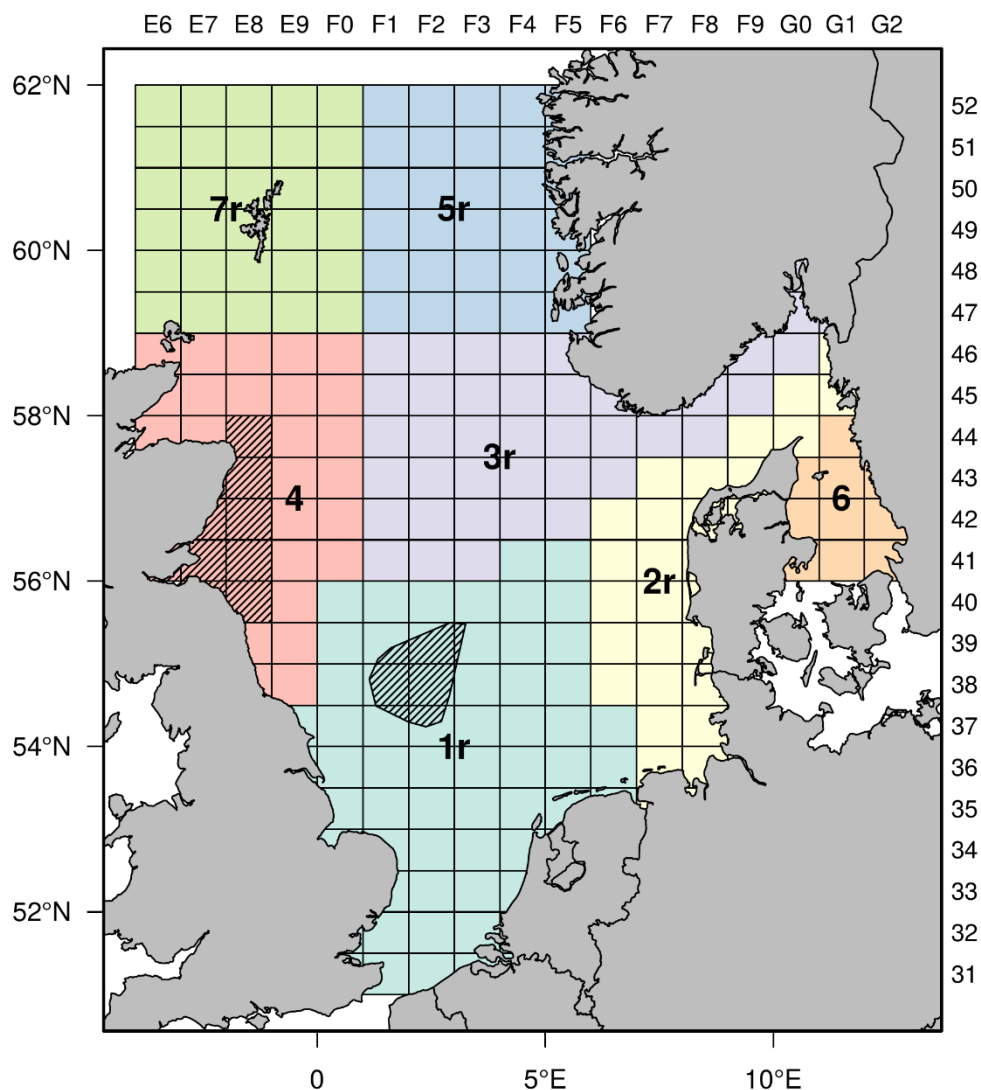
Figure 3   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Stock areas for the seven sandeel stocks. The closed part of Sandeel Area 1 (Dogger Bank) and 4 is shown with hatched markings.

Reference points

Table 4   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{escapement}$	84 000	B_{pa}; tonnes	ICES (2017)
	F_{MSY}	Not defined		
	F_{cap}*	0.44	Maximum F, estimated from a management strategy evaluation (MSE), resulting in < 5% probability of SSB < B_{lim}	ICES (2017)
Precautionary approach	B_{lim}	56 000	Average SSB of the two lowest SSB estimates (in 2001 and 2009) that provide high recruitment; tonnes	ICES (2017)
	B_{pa}	84 000	$B_{pa} = B_{lim} \times \exp(\sigma \times 1.645)$, with $\sigma = 0.25$ estimated from the assessment uncertainty in the terminal year; tonnes	ICES (2017)
	F_{lim}	Not defined		
Management plan	SSB_{MGT}	Not defined		
	F_{MGT}	Not defined		

* Not used as a biological reference point, but used in ICES MSY approach for stocks of short-lived species.

Basis of the assessment

Table 5   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. The basis of the assessment and advice.

ICES stock data category	1 (see ICES, 2022)
Assessment type	Analytical age-based (SMS-effort), half-yearly time-steps (ICES, 2023)
Input data	One survey index (D9376; dredge survey since 2010). Total international catch and fishing effort. Constant maturity-at-age from surveys. Natural mortality estimated from multispecies assessment (assumed constant over time; ICES, 2018). Age frequencies from catch sampling.
Discards and bycatch	Discarding is considered to be negligible
Indicators	None
Other information	Last benchmarked in 2016 (ICES, 2017). Interbenchmarked in 2020 (ICES, 2020).
Working group	Herring Assessment Working Group (HAWG)

History of advice, catch, and management

Table 6   Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. History of ICES advice, the agreed TAC, and ICES estimates of catch. All weights are in tonnes. Values of catch for the period 2005 to 2015 are presented to the nearest thousand tonnes.

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 2	ICES catch SA 2r	Total ICES catch (SAs 1r–7r)
2005*	Exploitation to be kept below the level of 2003. Adjustment to be made conditional on the abundance of the 2004 year class	-	661000**	41000		177000
2006*	The fishery should remain closed until information is available which assures that the stock can be rebuilt to B_{pa} by 2007	-	300000**	35000		293000
2007*	The fishery should remain closed until information is available which assures that the stock can be rebuilt to B_{pa} by 2008	-	173000**	6000		230000
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	-	375000**	13000		348000
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	-	377000**	10000		353000
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	-	377000**	32000		414000
2011	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 34000	34000	30000		438000
2012	Catches for monitoring purposes should not exceed 5000 t	< 5000	5000	8000		102000
2013	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 17544	18000	23000		278000
2014	Catches for monitoring purposes should not exceed 5000 t	< 5000	5000	8900		264000
2015	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 29000	29000	21000		312000
2016	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	5000	4037	9569	75405
2017^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 175941	175941		141314	517499
2018^	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	5000		20240	269579

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 2	ICES catch SA 2r	Total ICES catch (SAs 1r–7r)
2019^	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	5000		5151	235537
2020^	MSY approach: allow for sufficient stock (MSY B$_{escapement}$) to remain for successful recruitment	≤ 62658	62658		70198	446765
2021^	MSY approach: zero catch. Monitoring TAC should not exceed 5000 t.	≤ 5000	5000		4146	232610
2022^	MSY approach: allow for sufficient stock (MSY B$_{escapement}$) to remain for successful recruitment	≤ 71859	71859		71569***	166238***
2023^		≤ 40997				

* Advice for Subarea 4, excluding the Shetland area.
** Set for EU waters of divisions 2.a and 3.a and Subarea 4.
*** Preliminary.
^ ICES statistical rectangles included in this sandeel area changed with the 2017 assessment and advice.

History of catch and landings

Table 7 Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Catch distribution by fleet in 2022 data as estimated by ICES (in tonnes).

Total catch (2022)	Landings	Discards
71 569	100% industrial trawl fisheries	Discarding is considered negligible
	71 569	

Summary of the assessment

Table 8 Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Assessment summary. Weights are in tonnes, recruitment is in thousands. The SSB is estimated for 1 January. High and Low represent 90% confidence intervals.

Year	Recruitment (age 0)			SSB			Total Catch	Fishing Pressure Ages 1–2		
	Low	Mid-point	High	Low	Mid-point	High		Low	Mid-point	High
	Thousands			Tonnes			Tonnes			
1983	106793079	157352646	231848875	90122	141634	222589	156208	0.56	0.72	0.93
1984	31765827	47393706	70710057	51083	71182	99191	133398	0.48	0.62	0.79
1985	190499549	280476360	412951048	92508	133252	191941	111889	0.43	0.55	0.70
1986	40270171	60249209	90140347	62205	82951	110615	225581	0.61	0.77	0.97
1987	23986321	35676401	53063812	157833	233515	345486	49067	0.138	0.177	0.23
1988	117576251	173380646	255671090	133296	184425	255167	151543	0.47	0.59	0.76
1989	58436662	87312134	130455922	40799	53370	69814	227292	0.57	0.69	0.84
1990	107359054	158616516	234346320	77436	110525	157755	133796	0.37	0.45	0.55
1991	75994979	113464435	169408271	130068	179512	247754	215565	0.43	0.53	0.65
1992	79075369	117623570	174963511	96606	135944	191301	184241	0.43	0.53	0.64
1993	155435909	231479066	344724449	118464	165877	232265	147964	0.36	0.44	0.55
1994	71470186	108038694	163317883	98536	137585	192110	244944	0.36	0.45	0.54
1995	52512525	78609255	117675068	168276	240386	343395	122155	0.21	0.25	0.31
1996	286652207	418421560	610763141	167369	228891	313027	186460	0.34	0.43	0.55
1997	10644526	16191549	24629209	87024	118421	161145	242680	0.44	0.54	0.67
1998	18100979	27125912	40650571	212627	302549	430501	99305	0.23	0.28	0.35
1999	50964376	75000100	110371506	108968	156061	223505	70085	0.34	0.44	0.58
2000	29773603	44189599	65585635	53463	74236	103080	101952	0.43	0.53	0.66
2001	91196527	132752892	193245628	62432	85905	118204	97210	0.42	0.54	0.68
2002	6874065	10293261	15413184	35247	46583	61566	120520	0.52	0.64	0.79
2003	32229964	47441124	69831298	71586	100710	141682	56248	0.40	0.51	0.65
2004	12598811	19077115	28886559	26744	37459	52466	116837	0.72	0.88	1.08
2005	12649089	19249584	29294321	24413	34235	48008	34569	0.85	1.08	1.37
2006	17904603	26882874	40363305	10541	14647	20354	37952	0.91	1.16	1.49

Year	Recruitment (age 0)			SSB			Total Catch	Fishing Pressure Ages 1–2		
	Low	Mid-point	High	Low	Mid-point	High		Low	Mid-point	High
	Thousands			Tonnes			Tonnes			
2007	27149206	40629298	60802510	7503	11167	16621	44069	0.43	0.55	0.70
2008	17248086	26114467	39538612	17103	24441	34927	35655	0.53	0.66	0.81
2009	54383837	78766631	114081362	18761	26370	37067	37049	0.56	0.70	0.89
2010	6182558	8393767	11395821	17721	24005	32517	52470	0.34	0.42	0.52
2011	8333133	11262622	15221964	51520	73718	105479	24310	0.21	0.26	0.32
2012	32129690	43012443	57581329	31217	43478	60554	12672	0.119	0.146	0.180
2013	18769908	25015345	33338869	19959	26134	34220	48172	0.53	0.65	0.81
2014	13204962	17716377	23769095	25194	34201	46426	64707	0.39	0.48	0.59
2015	3688950	5075827	6984106	26603	35668	47821	39492	0.34	0.42	0.51
2016	83360729	114719434	157874681	20124	26984	36183	9569	0.147	0.180	0.22
2017	2803728	4024857	5777834	14887	19051	24380	141314	0.69	0.85	1.05
2018	7155686	9869897	13613632	43534	62193	88850	20240	0.197	0.24	0.30
2019	31194295	42414464	57670378	27827	39656	56514	5151	0.045	0.056	0.068
2020	17112443	23511495	32303417	28043	37235	49440	70198	0.46	0.57	0.70
2021	54637370	79240651	114922823	30836	42574	58780	4146	0.081	0.100	0.122
2022	34523724	52851677	80909573	48822	63831	83454	71569^	0.56	0.68	0.84
2023		22601859*		50729**	73350**	106058**				

* Geometric mean (2012–2021).

** Using mean weight-at-age from 2018 to 2022.

^ Preliminary.

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Download the stock assessment data and figures.

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