ICES Advice on fishing opportunities, catch, and effort
Greater North Sea ecoregion
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Sandeel (*Ammodytes* spp.) in divisions 4.b–c, Sandeel Area 1r (central and southern North Sea, Dogger Bank)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, catches should be no more than 120 428 tonnes in 2023.

ICES advice on conservation aspects

ICES has not identified any conservation aspects.

Stock development over time

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

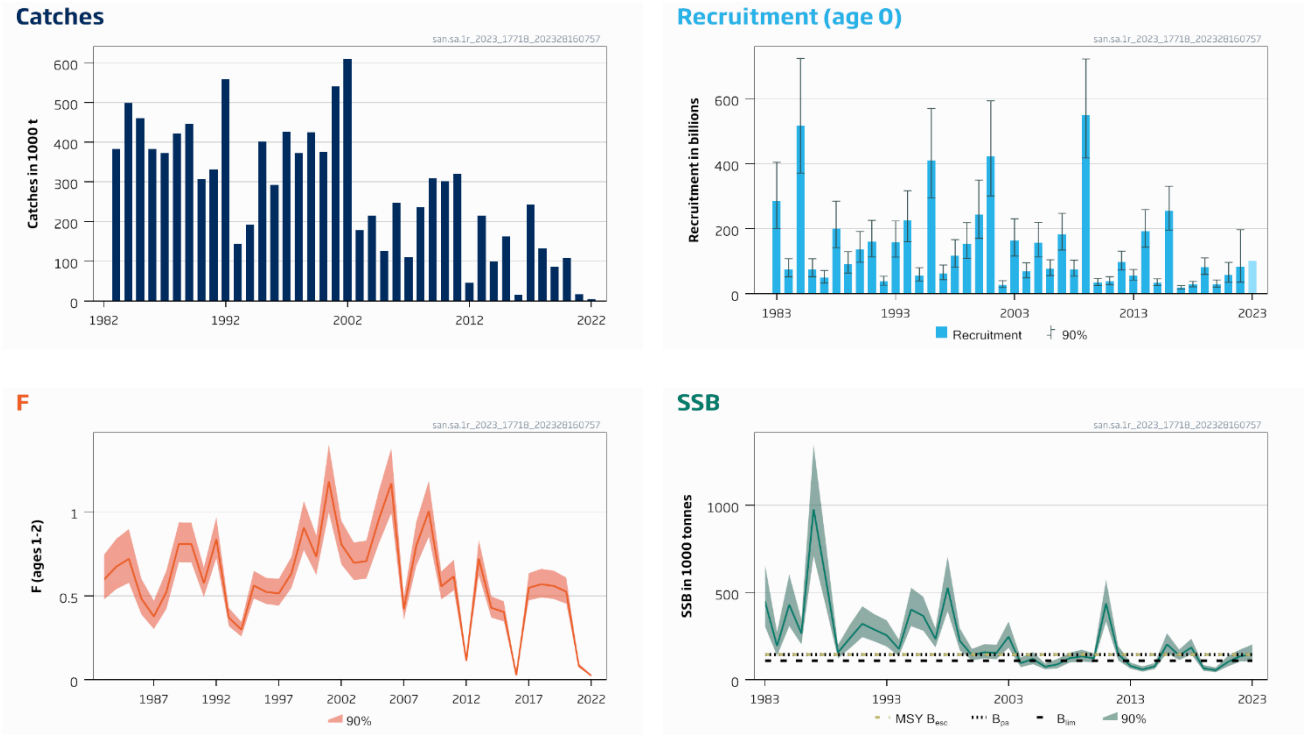

Figure 1 Sandeel in divisions 4.b–c, Sandeel Area 1r. Summary of the stock assessment. The assumed recruitment value for 2023 is shaded in a lighter colour.

Conservation status

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

Catch scenarios

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

Variable	Value	Notes
$F_{ages\ 1–2}$ (2022)	0.025	Assessment model estimate. Selection pattern in 2023 assumed to be the same as 2022
Recruitment (2023)	101 314 109	Geometric mean recruitment (GM, 1983–2021); Thousands
SSB (2023)	146 825	Assessment model estimate; Tonnes

Table 2 Sandeel in divisions 4.b–c, Sandeel Area 1r. 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) ≥ MSY $B_{escapement}$ = B_{pa}	120 428	0.42	145 000	−1	2309	-
Other scenarios						
F = 0	0	0	217 821	48	−100	-
B_{lim}	180 743	0.74	110 000	−25	3515	-
F = F_{2022}	8827	0.025	212 382	45	77	-

* SSB_{2024} relative to SSB_{2023}.
** Catch scenario for 2023 relative to TAC in 2022 (5000 t).
*** Advice value 2023 relative to advice value 2022 (0 t).

Although recruitment has been below average between 2020 and 2022, the low fishing mortality in 2021 and 2022 has allowed the stock to rebuild sufficiently to allow a fishery in 2023 that should result in the SSB 2024 being at the MSY $B_{escapement}$.

Basis of the advice

Table 3 Sandeel in divisions 4.b–c, Sandeel Area 1r. 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

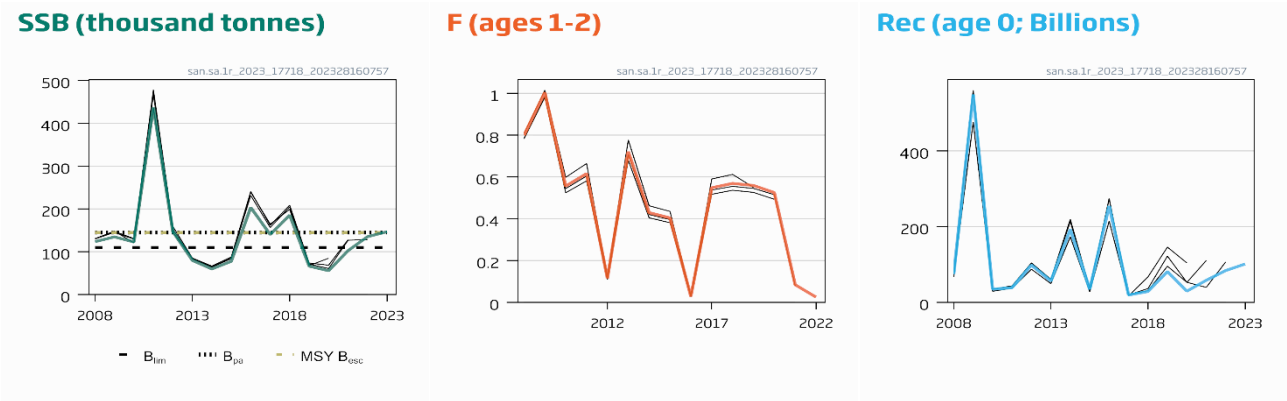

Figure 2 Sandeel in divisions 4.b–c, Sandeel Area 1r. Historical assessment results (final-year recruitment is the geometric mean).

Issues relevant for the advice

The large change in the advice from year to year is caused by the marked interannual variability of recruitment and biomass as well as 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 transfer arrangements for this fishery; such a practice may, therefore, not be precautionary (ICES, 2017).

In 2022, an area closed for bottom trawling was introduced on Dogger Bank (MMO, 2022). The change in fishable area is not accounted for in the assessment or the forecast, but it is expected to have an effect on the distribution and productivity of fishing activity.

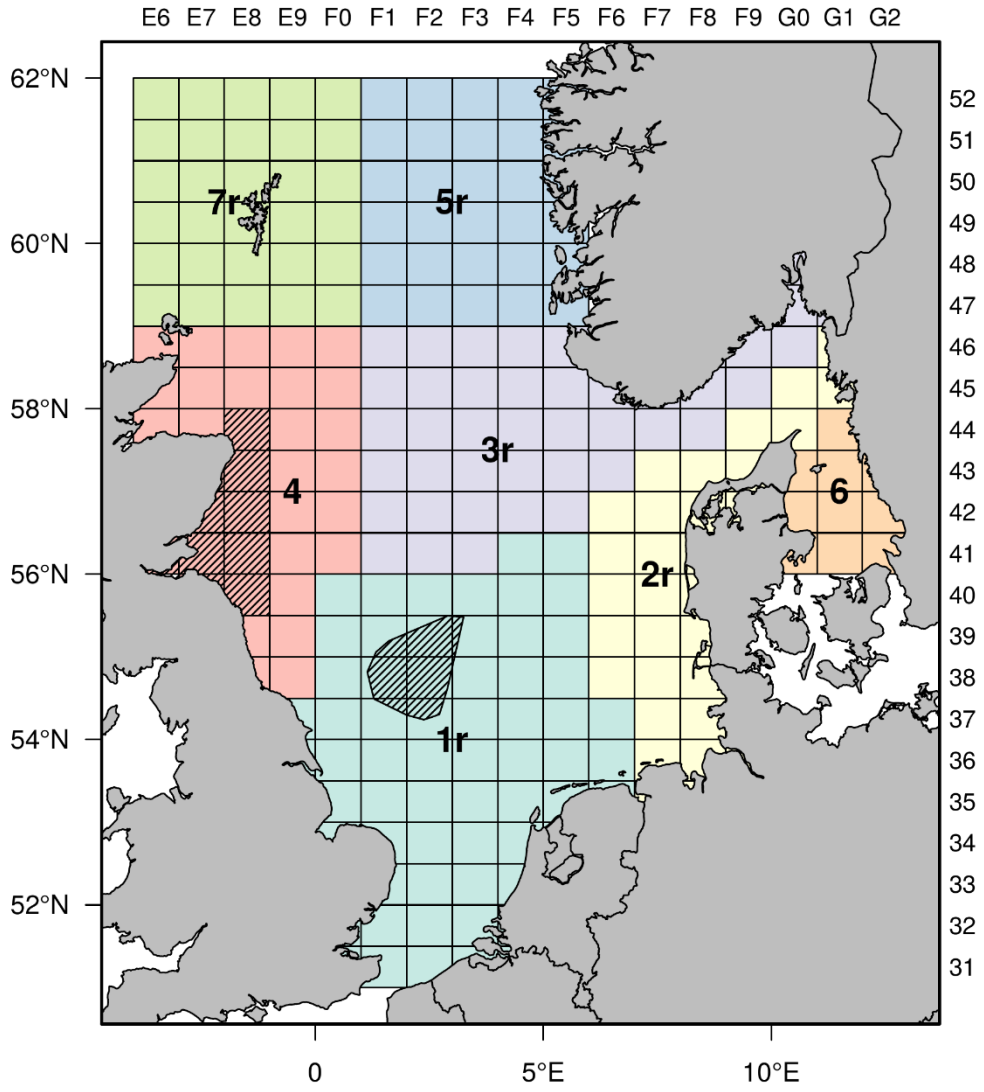

Figure 3 Sandeel in divisions 4.b–c, Sandeel Area 1r. Stock areas for the seven sandeel stocks. The closed part of Sandeel Area 1 (Dogger Bank) and 4 is shown with hatched markings.

Reference points

Table 4 Sandeel in divisions 4.b–c, Sandeel Area 1r. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{escapement}$	145 000	B_{pa}; tonnes	ICES (2017)
	F_{MSY}	Not defined		
	F_{cap}*	0.49	Maximum F, estimated from the management strategy evaluation (MSE), resulting in < 5% probability of SSB < B_{lim}	ICES (2017)
Precautionary approach	B_{lim}	110 000	The lowest SSB at which a high recruitment is observed; tonnes	ICES (2017)
	B_{pa}	145 000	$B_{pa} = B_{lim} \times \exp(\sigma \times 1.645)$, with $\sigma = 0.17$ 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, Sandeel Area 1r. The basis of the assessment and advice.

ICES stock data category	1 (see ICES, 2022a)
Assessment type	Age-structured model (SMS-effort), half-yearly time-steps (ICES, 2023)
Input data	One survey index (D9376) in December (dredge survey since 2004) and commercial catch rates in April. Total international catch and fishing effort. Annual natural mortality estimated from multispecies assessment (ICES, 2021). Constant maturity-at-age from surveys. Age frequencies from catch sampling.
Discards and bycatch	Discarding is considered to be negligible
Indicators	None
Other information	Last benchmarked in 2016 (ICES, 2017)
Working group	Herring Assessment Working Group (HAWG)

History of the advice, catch, and management

Table 6 Sandeel in divisions 4.b–c, Sandeel Area (SA) 1r. History of ICES advice, the agreed TAC, and ICES estimates of catch. All weights are in tonnes. Values of catches for the period 2005 to 2015 are presented to the nearest thousand tonnes.

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 1	ICES catch SA 1r	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**	104000		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**	238000		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**	109000		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**	239000		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**	309000		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**	301000		414000
2011	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 320000	320000	312000		438000
2012	MSY approach: allowfor sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 23000	23000	46000		102000
2013	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 224544	225000	210000		278000
2014	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 57000	57000	99000		264000
2015	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	< 133000	133000	163000		312000
2016	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	13000	12751	15407	75405
2017^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 255956	255956		242069	517499

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 1	ICES catch SA 1r	Total ICES catch (SAs 1r–7r)
2018^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 134461	134461		131898	269579
2019^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 91916	91916		86723	235537
2020^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 113987	113987		108944	446765
2021^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 5464	5351		16615	232610
2022^	MSY approach: zero catch	0	5000		5156***	166238***
2023^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 120428				

* 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, Sandeel Area 1r. Catch distribution by fleet in 2022 as estimated by ICES (in tonnes).

Total catch (2022)	Landings	Discards
5156	100% industrial trawl fisheries	Discarding is considered negligible.
	5156	

Summary of the assessment

Table 8 Sandeel in divisions 4.b–c, Sandeel Area 1r. Assessment summary. Weights are in tonnes, recruitment is in thousands. The SSB is estimated for 1 January. High and Low refer to 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	200709063	285000075	404690458	307520	452254	665108	382629	0.48	0.60	0.74
1984	52771793	75526942	108094090	136696	194269	276092	498671	0.54	0.67	0.84
1985	371099778	518266424	723794791	307364	431059	604534	460057	0.58	0.72	0.90
1986	52616996	75376039	107979318	202400	265402	348014	382844	0.39	0.48	0.60
1987	33438554	49081856	72043445	708828	977741	1348673	373021	0.30	0.38	0.47
1988	141935577	201037095	284748295	420971	577810	793081	422805	0.42	0.52	0.65
1989	63770028	90966330	129761168	122810	157157	201109	446129	0.70	0.81	0.94
1990	96888273	136386047	191985605	181417	240626	319160	306302	0.70	0.81	0.94
1991	113588752	160210639	225968227	244667	321258	421826	332204	0.49	0.57	0.67
1992	26387085	37806817	54168752	219475	287219	375873	558602	0.72	0.84	0.97
1993	113124920	159252253	224188271	190487	254995	341349	144389	0.32	0.37	0.43
1994	160430054	225538177	317069451	135580	176840	230657	193241	0.26	0.30	0.35
1995	39389792	56288454	80436833	307218	402721	527912	400759	0.48	0.56	0.65
1996	295136774	410136258	569945075	281308	366224	476772	291709	0.45	0.52	0.61
1997	43554808	62146186	88673297	185526	234216	295684	426414	0.44	0.52	0.60
1998	81817707	116803080	166748251	392772	527551	708578	372604	0.55	0.63	0.73
1999	109047227	154545638	219027615	168565	223463	296239	425478	0.77	0.91	1.06
2000	170731472	244322590	349634004	111000	140505	177853	374724	0.62	0.73	0.86

[†] Version 2: Values for SSB low corrected.

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			
2001	300930081	422626767	593537819	122892	158419	204217	540248	1.00	1.18	1.40
2002	19506139	28064051	40376568	117843	154045	201368	610161	0.69	0.81	0.95
2003	116231970	163774330	230762939	182694	247212	334514	178642	0.59	0.70	0.82
2004	49275916	68544930	95348962	72376	96086	127563	215352	0.60	0.71	0.83
2005	113450842	157825413	219556423	89807	119731	159625	126261	0.81	0.96	1.13
2006	56208801	76745092	104784466	59979	75207	94302	247510	0.99	1.17	1.38
2007	134693096	182634966	247640985	65893	88965	120116	110395	0.36	0.42	0.50
2008	54088263	74850249	103581804	98485	123624	155180	236069	0.68	0.80	0.94
2009	417664380	549214701	722198978	104800	134726	173198	309712	0.85	1.00	1.19
2010	25771068	34865209	47168505	99802	122884	151306	300896	0.48	0.56	0.65
2011	28343729	38647784	52697767	332797	437574	575338	320241	0.53	0.62	0.72
2012	73386106	98149266	131268423	110740	147119	195450	45954	0.099	0.115	0.133
2013	41964746	56175990	75199833	63988	79858	99663	214787	0.62	0.72	0.84
2014	143350067	192768395	259223138	46362	59814	77170	99059	0.37	0.43	0.50
2015	25551448	34414894	46352947	62171	77653	96989	162861	0.35	0.40	0.47
2016	196108933	254802680	331062970	154704	203414	267461	15407	0.024	0.028	0.033
2017	14559158	19230344	25400241	112799	140225	174318	242069	0.47	0.55	0.64
2018	21534359	28688302	38218861	145740	185350	235724	131898	0.49	0.57	0.66
2019	59854084	81327925	110505933	51703	66304	85027	86723	0.48	0.56	0.65
2020	20431084	29532444	42688153	43582	55770	71368	108944	0.45	0.53	0.61
2021	35270672	58351755	96537070	76590	102744	137831	17082	0.073	0.084	0.098
2022	35854123	84056521	197062376	105031	135266	174205	5156^	0.022	0.025	0.029
2023		101314109**		106275*	146825*	202848*				

* Using mean weight-at-age from 2018 to 2022.
** Geometric mean (1983–2021).
^ Preliminary.

Sources and references

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Download the stock assessment data and figures.

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