

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

### ICES advice on fishing opportunities

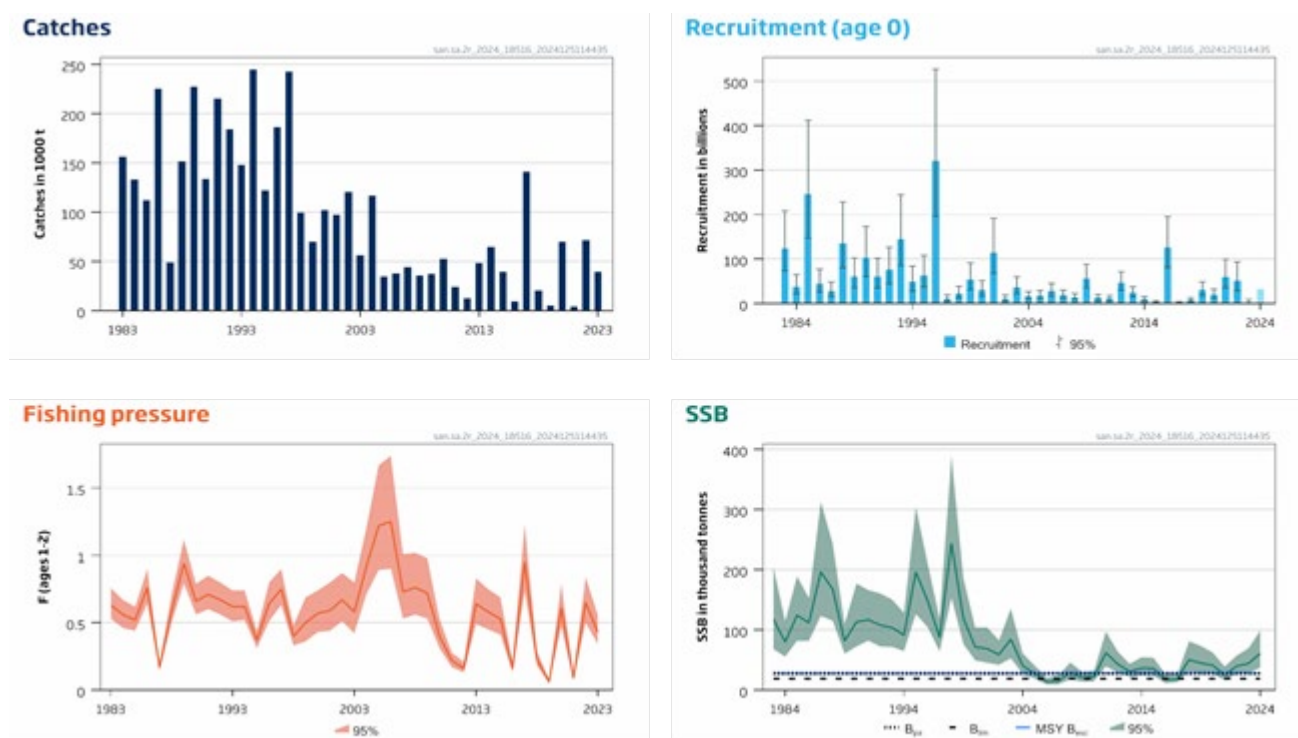
ICES advises that when the MSY approach is applied, catches in 2024 should be no more than 35 925 tonnes.

### ICES non-fisheries conservation considerations

ICES advises that any activity leading to the degradation of sandeel habitat should be avoided.

### Stock development over time

Spawning-stock size is above MSY  $B_{\text{escapement}}$ ,  $B_{\text{pa}}$ , and  $B_{\text{lim}}$ . 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 2024 is shaded in a lighter colour.

### Conservation status

*Ammodytes tobianus* is listed on the IUCN Red List as data deficient (Collette *et al.*, 2014); however, the dominant species in the catches, *A. marinus*, is not included in the list.<sup>1</sup>

<sup>1</sup> This is for information purposes and ICES does not formally endorse the methods used by third parties to create lists.

**Catch scenarios**

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

Variable	Value	Notes
F (2023)	0.43	Assessment model estimate
Recruitment (2024)	18 491 928	Geometric mean 2013–2022; thousands
SSB (2024)	60 736	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 (2024)	F <sub>total</sub> (2024)	SSB (2025)	% SSB change*	% TAC change**	% advice change***
ICES advice basis						
SSB <sub>2025</sub> ≥ MSY B <sub>escapement</sub> = B <sub>pa</sub>	35 925	0.51	27 757	-54	-12	-12
Other scenarios						
F = 0	0	0	49 824	-18	-100	-100
B <sub>lim</sub>	51 026	0.85	18 949	-69	24	24
F = F <sub>2023</sub>	31 638	0.43	30 322	-50	-23	-23

\* SSB<sub>2025</sub> relative to SSB<sub>2024</sub>.

\*\* Catch scenario for 2024 relative to TAC in 2023 (40 997 t).

\*\*\* Advice value 2024 relative to advice value 2023 (40 997 t).

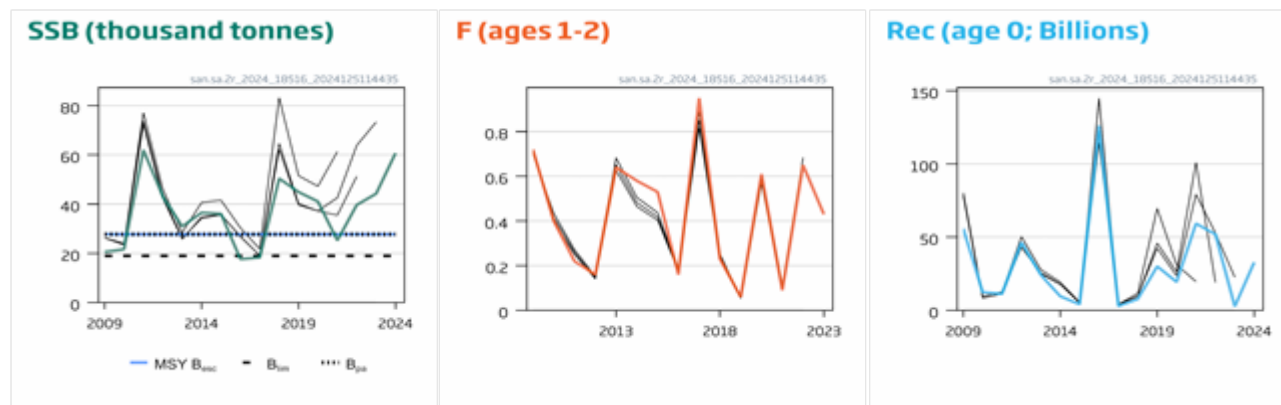
The estimated recruitment in 2023 is low compared to previous years; however, SSB continues to be above B<sub>pa</sub>. This allows for a similar catch as last year.

**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 <sub>cap</sub> )
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 and Subdivision 20, Sandeel Area 2r. Historical assessment results (final-year recruitment is the geometric mean). The stock was benchmarked in 2023. The biomass reference points were updated at the benchmark, and only the assessment results from the last year should be compared to the reference points indicated.

This stock was benchmarked in 2023. The 2024 assessment has updated the natural mortalities from the 2023 Working Group on Multispecies Assessment Methods (WGSAM; ICES, 2024a) key-run to account for predation.

## Issues relevant for the advice

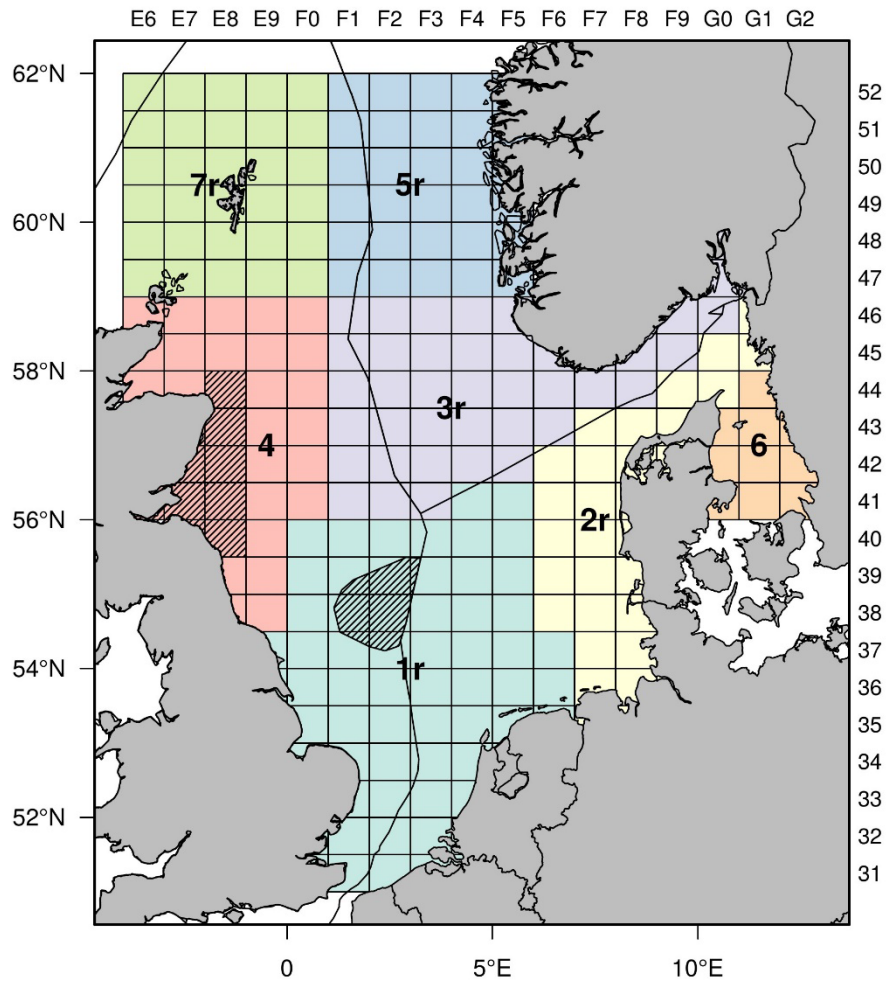
### On fishing opportunities

The 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 at the benchmark evaluated interannual quota transfer arrangements for this fishery and found that this marginally increased risk of SSB falling below  $B_{lim}$  (0.2% higher risk at  $F_{cap}$ ).

### On conservation aspects

The lesser sandeel (*A. marinus*) spends large parts of its life burrowed in sandy seabed, where the proportion of silt is low. During spawning, sandeel eggs are glued to the sand. After hatching, the larvae are dispersed by oceanographic processes. Following metamorphosis, juveniles settle in the same sandy habitats as adults. The strong habitat preference (Wright *et al.*, 2000) makes post-settled lesser sandeel stationary and vulnerable to seabed deterioration, climate changes (Régnier *et al.*, 2019), and oil pollution (Golet *et al.*, 2002). The effect of activities that might have a negative impact on sandeel habitats (e.g., extraction of gravel, offshore wind development, and oil exploration) should be assessed.



**Figure 3** Sandeel in divisions 4.b–c and Subdivision 20, Sandeel Area 2r. Stock areas for the seven sandeel stocks. The borders of the Norwegian Exclusive Economic Zone (EEZ) and the UK Exclusive Economic Zone are shown as a black line. 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 $B_{\text{escapement}}$	27 757	$B_{\text{pa}}$ ; tonnes	ICES (2024b)
	$F_{\text{MSY}}$	Not defined		
	$F_{\text{cap}}^*$	0.52	Maximum F, estimated from a management strategy evaluation (MSE), resulting in < 5% probability of $\text{SSB} < B_{\text{lim}}$	ICES (2024b)
Precautionary approach	$B_{\text{lim}}$	18 949	Year of the lowest SSB estimate (2016) that provides above median recruitment; tonnes	ICES (2024b)
	$B_{\text{pa}}$	27 757	$B_{\text{pa}} = B_{\text{lim}} \times \exp(\sigma \times 1.645)$ , with $\sigma = 0.23$ estimated from the assessment uncertainty in the terminal year; tonnes	ICES (2024b)
	$F_{\text{lim}}$	Not defined		
Management plan	$\text{SSB}_{\text{MGT}}$	Not defined		
	$F_{\text{MGT}}$	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 <a href="#">ICES, 2023</a> )
Assessment type	Analytical age-based (SMS-effort) with half-yearly time-steps (ICES, 2024b)
Input data	One survey index (D9376; dredge survey since 2004); total international catch and fishing effort; constant maturity-at-age from surveys; natural mortality estimated from multispecies assessment (average over time; ICES, 2024a); age frequencies from catch sampling
Discards and bycatch	Discarding is considered to be negligible
Indicators	None
Other information	Last benchmarked in 2023 (ICES, 2024c)
Working group	Herring Assessment Working Group ( <a href="#">HAWG</a> )

## 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 $B_{\text{pa}}$ by 2007	-	300000**	35000		293000
2007*	The fishery should remain closed until information is available which assures that the stock can be rebuilt to $B_{\text{pa}}$ 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 $B_{\text{pa}}$ 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 $B_{\text{pa}}$ 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 $B_{\text{pa}}$ by 2011	-	377000**	32000		414000

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 2	ICES catch SA 2r	Total ICES catch (SAs 1r–7r)
2011	MSY approach: allow for sufficient stock (MSY $B_{\text{escapement}}$ ) to remain for successful recruitment	< 34 000	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 $B_{\text{escapement}}$ ) to remain for successful recruitment	< 17 544	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 $B_{\text{escapement}}$ ) to remain for successful recruitment	< 29 000	29000	21000		312000
2016	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	5000	4037	9569	75405
2017 <sup>^</sup>	MSY approach: allow for sufficient stock (MSY $B_{\text{escapement}}$ ) to remain for successful recruitment	≤ 175 941	175941		141314	517499
2018 <sup>^</sup>	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	5000		20240	269579
2019 <sup>^</sup>	Catches for monitoring purposes should not exceed 5000 t	≤ 5000	5000		5151	235537
2020 <sup>^</sup>	MSY approach: allow for sufficient stock (MSY $B_{\text{escapement}}$ ) to remain for successful recruitment	≤ 62 658	62658		70198	446765
2021 <sup>^</sup>	MSY approach: zero catch. Monitoring TAC should not exceed 5000 t.	≤ 5000	5000		4146	232610
2022 <sup>^</sup>	MSY approach: allow for sufficient stock (MSY $B_{\text{escapement}}$ ) to remain for successful recruitment	≤ 71 859	71859		71614	166628
2023 <sup>^</sup>	MSY approach: allow for sufficient stock (MSY $B_{\text{escapement}}$ ) to remain for successful recruitment	≤ 40 997	40997		39653 <sup>***</sup>	164535 <sup>***</sup>
2024	MSY approach: allow for sufficient stock (MSY $B_{\text{escapement}}$ ) to remain for successful recruitment	≤ 35 925				

\* Advice for Subarea 4, excluding the Shetland area.

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

\*\*\* Preliminary.

<sup>^</sup> 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 2023 data as estimated by ICES (in tonnes).

Total catch (2023)	Landings	Discards
39 653	100% industrial trawl fisheries	Discarding is considered negligible
	39 653	

**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 95% 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	73477224	123674288	208164228	68113	118395	205794	156208	0.53	0.63	0.76
1984	22060576	37915230	65164422	55455	79907	115141	133398	0.46	0.56	0.67
1985	147447968	246491158	412063263	81769	124414	189298	111889	0.44	0.52	0.62
1986	26078079	44948897	77475160	81681	111897	153290	225581	0.64	0.76	0.90
1987	16211667	28008431	48389362	123084	196406	313406	49067	0.140	0.170	0.20
1988	80545717	135635566	228404530	115097	167687	244304	151543	0.50	0.59	0.71
1989	35534643	60457329	102859867	60375	81564	110190	227292	0.79	0.94	1.12
1990	61081539	102968083	173578240	72375	113277	177294	133796	0.56	0.66	0.79
1991	35414050	60145601	102148537	82119	116884	166366	215565	0.60	0.71	0.85
1992	44901451	75439939	126748340	72392	107921	160886	184241	0.56	0.67	0.80
1993	85568385	144703712	244706782	71676	103943	150736	147964	0.51	0.62	0.74
1994	28330078	48867331	84292602	64757	91380	128949	244944	0.52	0.62	0.74
1995	37306158	63569666	108322662	126237	196073	304544	122155	0.31	0.37	0.44
1996	195910102	321307369	526968360	104274	148225	210699	186460	0.51	0.64	0.80
1997	6237181	11037585	19532590	64230	87607	119492	242680	0.63	0.75	0.90
1998	12891231	22353693	38761821	153030	244183	389630	99305	0.33	0.40	0.48
1999	31618934	53824536	91624866	76531	119667	187115	70085	0.36	0.50	0.69
2000	17323243	29975024	51866851	49163	71577	104209	101952	0.43	0.57	0.74
2001	68443626	114610572	191918283	45336	68805	104423	97210	0.44	0.59	0.80
2002	6310653	10933558	18942998	41902	58997	83066	120520	0.51	0.67	0.87
2003	22395871	36690057	60107522	52695	84526	135584	56248	0.42	0.58	0.80
2004	10318144	16675214	26948912	26681	40439	61291	116837	0.71	0.92	1.21
2005	11017326	17952422	29252965	18927	27861	41012	34569	0.89	1.22	1.67
2006	16559391	27481310	45606896	9301	14007	21095	37952	0.90	1.25	1.74
2007	11918528	19025175	30369294	9317	14980	24086	44069	0.53	0.73	1.01
2008	8979765	14268916	22673418	18095	28871	46064	35655	0.56	0.76	1.02
2009	35222199	55854309	88572091	13837	20579	30608	37049	0.53	0.72	0.98
2010	7513356	12431878	20570247	14597	21666	32160	52470	0.31	0.40	0.53
2011	6841359	11203734	18347766	39325	61971	97658	24310	0.170	0.22	0.28
2012	30044783	46404649	71672724	29051	43172	64156	12672	0.130	0.160	0.21
2013	15482640	24182165	37769857	21920	30961	43732	48172	0.49	0.64	0.83
2014	5928120	9620241	15611871	24350	36502	54718	64707	0.45	0.58	0.75
2015	2501889	4071265	6625072	24023	36076	54174	39492	0.41	0.53	0.69
2016	81253471	126157455	195877212	11486	17687	27235	9569	0.130	0.160	0.21
2017	1679641	2823549	4746508	13111	18301	25547	141314	0.73	0.95	1.23
2018	4648711	7724069	12833933	31240	50406	81330	20226	0.180	0.23	0.29
2019	18544719	30045964	48680163	27449	44909	73475	5132	0.050	0.060	0.080
2020	11612088	19397165	32401583	26972	41060	62507	70198	0.47	0.61	0.79
2021	35370881	59290298	99385124	16223	25217	39198	4146	0.070	0.090	0.120
2022	28773990	51921706	93690988	27431	39671	57372	71614	0.50	0.65	0.84
2023	767192	2641494	9094837	28109	44234	69607	39653^	0.34	0.43	0.56
2024		32828956*		37162**	60736**	99266**				

\* Geometric mean (2013–2022).

\*\* Using mean weight-at-age from 2019 to 2023.

^ Preliminary.

## Sources and references

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