

Sandeel (*Ammodytes* spp.) in divisions 4.a–b, Sandeel Area 4 (northern and central North Sea)

ICES advice on fishing opportunities

ICES advises that when the MSY approach is applied, there should be zero catch in 2024.

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 below MSY $B_{\text{escapement}}$ and B_{pa} and above B_{lim} . No reference points for fishing pressure have been defined for this stock.

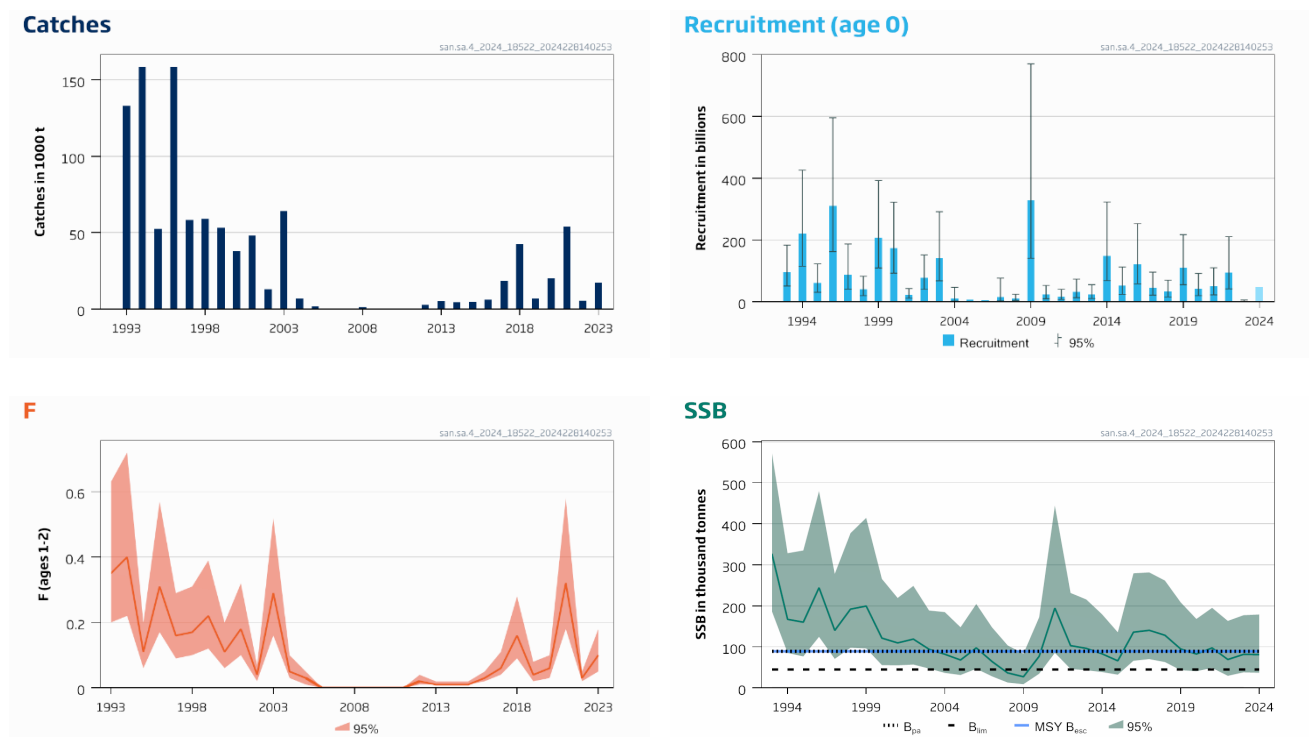


Figure 1 Sandeel in divisions 4.a–b, Sandeel Area 4. Summary of the stock assessment. The assumed recruitment value for 2024 is shaded in a lighter colour. Uncertainty bounds of recruitment in 2005 and 2006 are not shown as these could not be reliably estimated.

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.¹

¹ 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.a–b, Sandeel Area 4. Values in the forecast.

Variable	Value	Notes
F_{1-2} (2023)	0.10	Assessment model estimate. Selection pattern in 2024 assumed to be the same as 2023.
Recruitment (2024)	61 501 687	Geometric mean 2013–2022; thousands
SSB (2024)	81 162	Assessment model estimate; tonnes

Table 2 Sandeel in divisions 4.a–b, Sandeel Area 4. 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(2025) \geq MSY $B_{escapement}$ with F_{cap}	0	0	69 406	-14	-100	-100
Other scenarios						
$F = 0$	0	0	69 406	37	-100	-100
SSB(2025) = B_{lim}	44 423	0.41	44 716	-45	31	27
$F = F_{2023}$	12 847	0.1	62 146	-23	-62	-63
Monitoring TAC	5002	0.04	66 570	-18	-85	-86

* SSB₂₀₂₅ relative to SSB₂₀₂₄.

** Catch scenario for 2024 relative to the TAC in 2023 (33 969 t).

*** Advice value 2024 relative to advice value 2023 (35 020 t).

The downward revision of the advice for 2024 is because of the 2023 year class being the lowest observed.

Basis of the advice

Table 3 Sandeel in divisions 4.a–b, Sandeel Area 4. 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

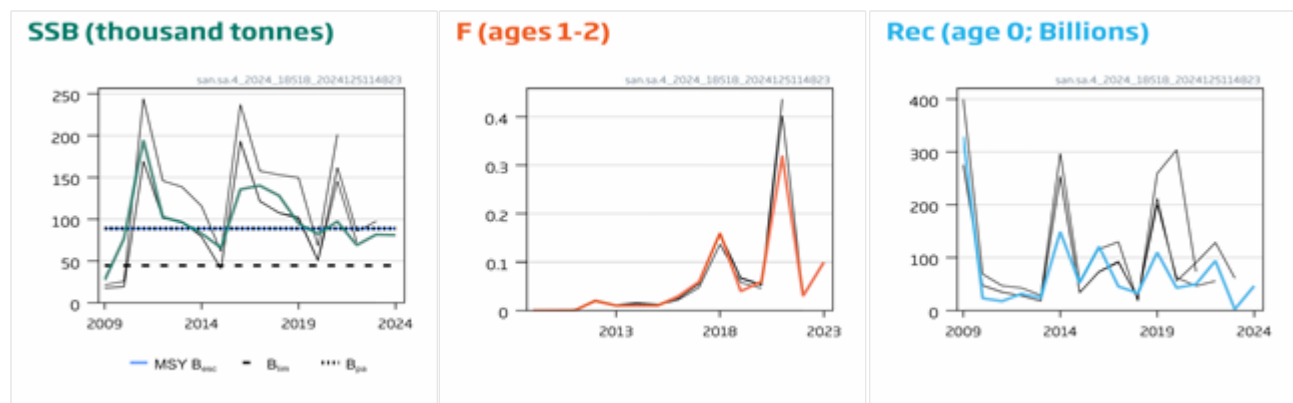


Figure 2 Sandeel in divisions 4.b–c, Sandeel Area 4. Historical assessment results (final-year recruitment includes geometric means). The stock was benchmarked in 2023. The biomass reference points were updated at the benchmark, and only the assessment results from the last year should be compared to the reference points indicated.

The uncertainty of the estimated SSB and F is large in the assessment. This uncertainty results from a period of low commercial fishing effort (2004–2016), no data on catch age composition (2006–2011), and no survey indices (2004–2007).

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.

There is a mismatch between the location of the dredge survey samples, mostly taken from the area under fishery closure, and the area where the fishery takes place. This may increase the uncertainty in the assessment.

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}).

In order to obtain samples to assess the status of the stock in 2025, ICES recommends a monitoring TAC in 2024. Catches should not exceed 5 000 tonnes and should have an associated sampling protocol in the fishery (ICES, 2024b).

ICES notes the announcement by the UK to close its waters of ICES subarea 4 to sandeel fishing, and while no account has been made of this in the assessment or the forecast it would be expected to have an effect on the distribution of fishing activity.

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.

In 2000, an area closed for sandeel fishing was introduced in SA4 to minimize the impact of low sandeel abundance on seabird productivity (ICES, 2024c).

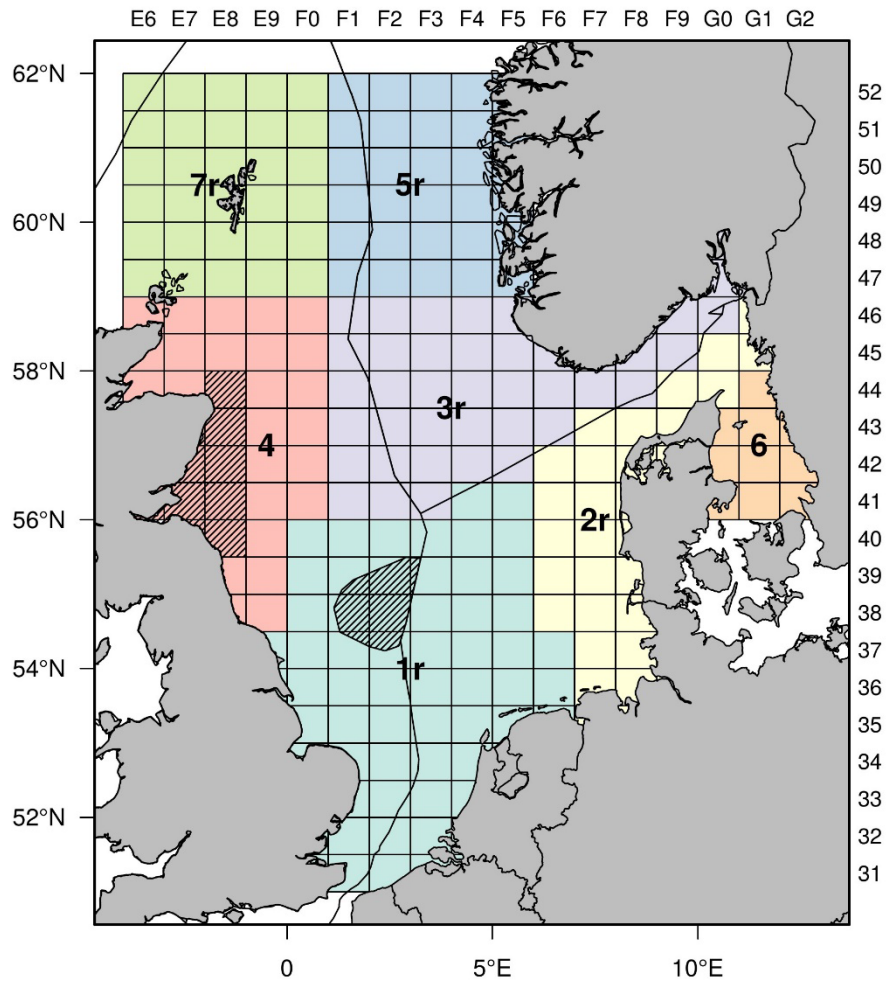


Figure 3 Sandeel in divisions 4.a–b, Sandeel Area 4. Stock areas for the seven sandeel stocks. The borders of the Norwegian Exclusive Economic Zone (EEZ) and the UK Exclusive Economic Zone are shown as a black line. The closed area in Sandeel Area 1 (Dogger Bank) and 4 is shown with hatched markings.

Reference points

Table 4 Sandeel in divisions 4.a and 4.b, Sandeel Area 4. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{\text{escapement}}$	88 995	B_{pa} ; tonnes	ICES (2024c)
	F_{MSY}	Not defined		
	F_{cap}^*	0.36	The maximum F estimated from the management strategy evaluation (MSE) conducted in SA1 that results in < 5% probability of $SSB < B_{\text{lim}}$	ICES (2024c)
Precautionary approach	B_{lim}	44 716	The average SSB of the two lowest SSB estimates that provide above median recruitment (2014, 2009); tonnes.	ICES (2024c)
	B_{pa}	88 995	$B_{\text{pa}} = B_{\text{lim}} \times \exp(\sigma \times 1.645)$, with $\sigma = 0.42$ estimated from the assessment uncertainty in the terminal year; tonnes	ICES (2024c)
	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.a and 4.b, Sandeel Area 4. The basis of the assessment.

ICES stock data category	1 (see ICES, 2023).
Assessment type	Analytical age-based (SMS-effort) with half-yearly time-steps (ICES, 2024c)
Input data	One survey index available in January (dredge survey treated as two time series 1999–2003 and 2008–2023; D9376); total international catch and fishing effort; fixed maturity data; natural mortality estimated from multispecies assessment (assumed constant 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, 2024b)
Working group	Herring Assessment Working Group (HAWG)

History of advice, catch, and management

Table 6 Sandeel in divisions 4.a–b, Sandeel Area 4. 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 4	Total ICES catch (SAs 1r–7r)
2005*	Exploitation to be kept below level of 2003. Adjustment to be made conditional on the abundance of the 2004 year class	-	661000**	1557	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**	55	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**	11	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**	1168	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**	0	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**	275	414000
2011	A TAC at 5000–10 000 tonnes will impose a low risk of overfishing sandeel in this area	5000–10000	10000	272	438000

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 4	Total ICES catch (SAs 1r–7r)
2012	Catches for monitoring purposes should not exceed 5000 tonnes	< 5000	5000	2585	102000
2013	Catch in 2012 reduced by 20% as a precautionary buffer	< 2041	4000	5225	278000
2014	Catches for monitoring purposes should not exceed 5000 tonnes (with associated sampling protocol)	< 5000	5000	4414	264000
2015	Catches for monitoring purposes should not exceed 5000 tonnes (with associated sampling protocol)	< 5000	5000	4392	312000
2016	Precautionary approach	≤ 6000	6000	6232	75405
2017	MSY approach: allow for sufficient stock (MSY B _{escapement}) to remain for successful recruitment	≤ 54043	54043	18474	517499
2018	MSY approach: allow for sufficient stock (MSY B _{escapement}) to remain for successful recruitment	≤ 59345	59345	42298	269579
2019	Catches for monitoring purposes should not exceed 5000 tonnes	≤ 5000	5000	6666	235537
2020	MSY approach: allow for sufficient stock (MSY B _{escapement}) to remain for successful recruitment	≤ 39611	39611	20116	446765
2021	MSY approach: allow for sufficient stock (MSY B _{escapement}) to remain for successful recruitment	≤ 77512	68989	51448	232610
2022	MSY approach: zero catch	0	5000	5541	166628
2023	MSY approach: allow for sufficient stock (MSY B _{escapement}) to remain for successful recruitment	≤ 35020	33969	17269***	164535***
2024	MSY approach: zero catch	0			

* Advice for Subarea 4, excluding the Shetland area.

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

*** Preliminary.

History of catch and landings

Table 7 Sandeel in divisions 4.a–b, Sandeel Area 4. Catch distribution by fleet in 2023 as estimated by ICES (in tonnes).

Total catch (2023)	Landings	Discards
33 969	100% industrial trawl fisheries	Discarding is considered negligible
	33 969	

Summary of the assessment

Table 8 Sandeel in divisions 4.a–b, Sandeel Area 4. Assessment summary. All weights are in tonnes, recruitment age 0 is in thousands. The SSB is estimated for 1 January. “High” and “Low” refer to 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		
1993	51121947	96871460	183562643	186635	327310	574019	133136	0.20	0.35	0.63
1994	115106278	221564535	426482762	85041	167124	328435	158690	0.22	0.40	0.72
1995	30761816	61533546	123086923	76534	160125	335017	52591	0.060	0.110	0.20
1996	162309737	310958592	595745196	124275	244237	479996	158490	0.170	0.31	0.57
1997	41052153	87716707	187425512	70484	140018	278151	58446	0.090	0.160	0.29
1998	19842609	40484216	82598604	97623	191897	377211	58911	0.100	0.170	0.31
1999	109768368	207666431	392875901	95980	199515	414735	53338	0.120	0.22	0.39
2000	92900727	173122934	322619113	55311	121244	265769	37792	0.060	0.110	0.20

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	11532839	22249691	42925142	54849	109679	219320	47918	0.100	0.180	0.32
2002	40432031	78402088	152030140	56793	118872	248809	12762	0.020	0.040	0.070
2003	68052237	140952392	291945977	46906	94070	188659	64049	0.160	0.29	0.52
2004	2508810	10874687	47137409	36329	81947	184851	6882	0.030	0.050	0.100
2005	***	6651044	***	31212	67937	147873	1557	0.0100	0.030	0.050
2006	***	4435231	***	46473	97532	204690	86	0.00	0.00	0.00
2007	3314469	15960674	76857908	27999	64312	147724	11	0.00	0.00	0.00
2008	4198512	10141960	24499003	12788	36380	103493	1168	0.00	0.00	0.00
2009	140967249	329532842	770334207	8812	27135	83559	0	0.00	0.00	0.00
2010	10160171	23253475	53219981	34299	76885	172349	275	0.00	0.00	0.00
2011	7815712	17791747	40501266	85232	194679	444666	270	0.00	0.00	0.00
2012	13783083	31842437	73564153	45804	102971	231489	2618	0.0100	0.020	0.040
2013	10721389	24466035	55831090	42955	96225	215558	5119	0.0100	0.0100	0.020
2014	68670746	148981236	323214905	38441	83070	179513	4505	0.0100	0.0100	0.020
2015	24228026	52223991	112569848	31986	65887	135720	4736	0.0100	0.0100	0.020
2016	57999617	121200949	253271844	65988	135801	279475	6232	0.020	0.030	0.050
2017	21555033	45545811	96238353	69947	140341	281578	18474	0.040	0.060	0.110
2018	15648195	33126323	70126505	62831	128252	261791	42515	0.090	0.160	0.28
2019	55574875	109961138	217570476	43096	94839	208708	6648	0.020	0.040	0.080
2020	20052347	42993895	92182480	40465	82485	168140	20116	0.030	0.060	0.100
2021	22648573	49966979	110236481	48583	97382	195198	53765	0.180	0.32	0.58
2022	42005928	94156062	211050307	29241	69103	163309	5541	0.020	0.030	0.050
2023	1017860	2482901	6056625	37692	81750	177309	17269^	0.050	0.100	0.180
2024		46694233*		36795**	81162**	179028**				

* Geometric mean (2013–2022).

** Using mean weight-at-age (2019–2023).

*** Uncertainty bounds not reliably estimated.

^ Preliminary.

Sources and references

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[Download the stock assessment data and figures.](#)

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