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 132 315 tonnes 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 above MSY $B_{escapement}$, B_{pa}, and B_{lim}. No reference points for fishing pressure have been defined for this stock.
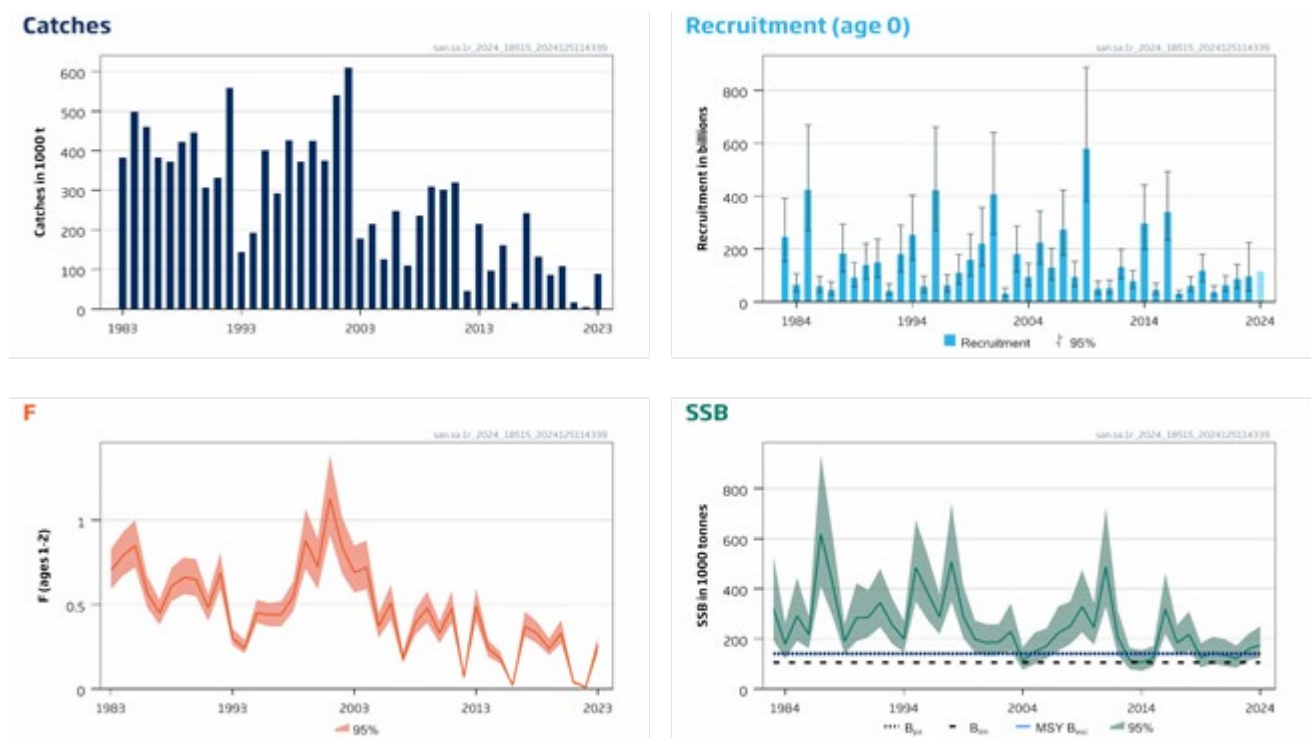
Figure 1   Sandeel in divisions 4.b–c, Sandeel Area 1r. Summary of the stock assessment. The assumed recruitment value for 2024 is shaded in a lighter colour.

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.[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.b–c, Sandeel Area 1r. Values in the forecast.

Variable	Value	Notes
$F_{ages\ 1-2}$ (2023)	0.26	Assessment model estimate.
Recruitment (2024)	116 079 425	Geometric mean recruitment (GM, 1983–2022); thousands
SSB (2024)	175 408	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 (2024)	F_{total} (2024)	SSB (2025)	% SSB change*	% TAC change**	% advice change***
ICES advice basis						
SSB(2025) ≥ MSY $B_{escapement}$ = B_{pa}	132 315	0.36	166 003	−5	13	9.9
Other scenarios						
F = 0	0	0	229 840	31	−100	−100
B_{lim}	260 657	0.87	105 809	−40	123	116
F = F_{2022}	98 714	0.26	182 078	4	−15	−18

* SSB_{2025} relative to SSB_{2024}.

** Catch scenario for 2024 relative to TAC in 2023 (116 815 t).

*** Advice value 2024 relative to advice value 2023 (120 428 t).

The estimated recruitment is similar to the previous year, and SSB continues to be above B_{pa}. This allows for similar catch advice as last year.

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
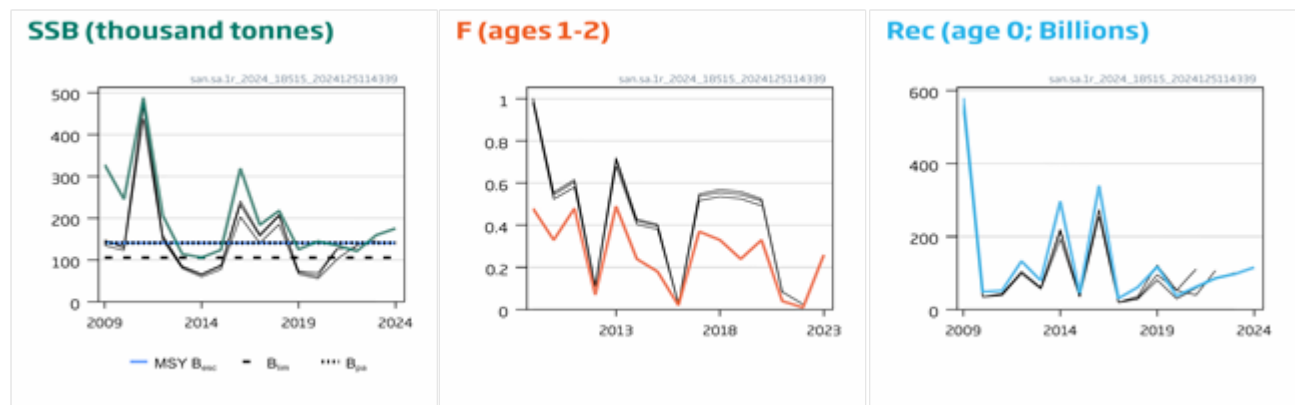
Figure 2 Sandeel in divisions 4.b–c, Sandeel Area 1r. Historical assessment results (final-year recruitment is the geometric mean). The stock was benchmarked in 2023. The biomass reference points were updated at the benchmark, and only the assessment results from the last year should be compared to the 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}).

In 2022, an area closure for bottom trawling was introduced on the Dogger Bank (Marine Management Organisation [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 of fishing activity.

ICES notes the announcement by the UK to close it's 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 change (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.
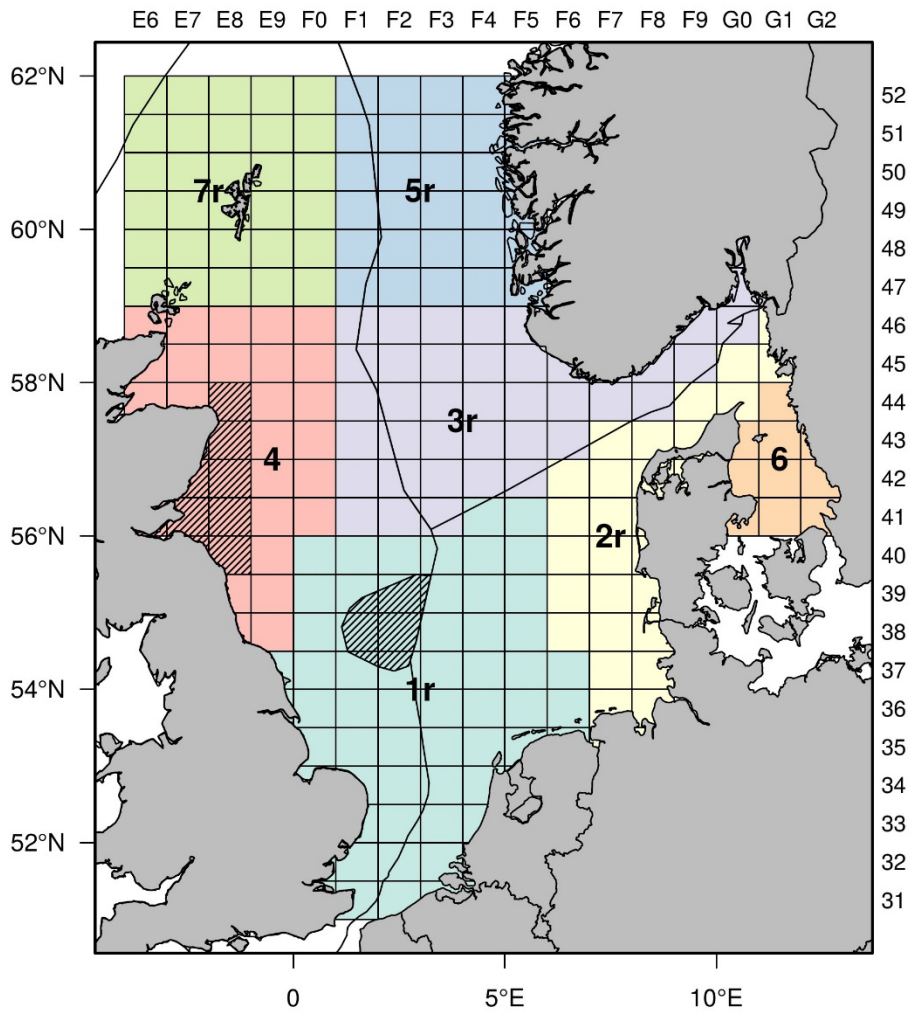
Figure 3   Sandeel in divisions 4.b–c, Sandeel Area 1r. Stock areas for the seven sandeel stocks. The closed part of Sandeel Area 1 (Dogger Bank) and 4 is shown with hatched markings. The UK and NO EEZ are also shown.

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 $B_{escapement}$	140 824	B_{pa}; tonnes	ICES (2024b)
	F_{MSY}	Not defined		
	F_{cap}*	0.36	Maximum F, estimated from the management strategy evaluation (MSE), resulting in < 5% probability of SSB < B_{lim}	ICES (2024b)
Precautionary approach	B_{lim}	105 809	The lowest SSB at which above median recruitment is observed; tonnes	ICES (2024b)
	B_{pa}	140 824	$B_{pa} = B_{lim} \times \exp(\sigma \times 1.645)$, with $\sigma = 0.17$ estimated from the assessment uncertainty in the terminal year; tonnes	ICES (2024b)
	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, 2023)
Assessment type	Age-structured model (SMS-effort) with half-yearly time-steps (ICES, 2024b)
Input data	One survey index (D9376) in December (dredge survey since 2004) and commercial catch rates in April (RTM); total international catch and fishing effort; annual natural mortality estimated from multispecies assessment (ICES, 2024a); maturity-at-age time-variable from 2005 onward from surveys; 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 for the Area South of 62°N (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

Year	ICES advice	Catch corresponding to advice	TAC	ICES catch SA 1	ICES catch SA 1r	Total ICES catch (SAs 1r–7r)
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
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		5195	166628
2023^	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 120428	116815		88581***	164535***
2024	MSY approach: allow for sufficient stock (MSY $B_{escapement}$) to remain for successful recruitment	≤ 132 315				

* 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 2023 as estimated by ICES (in tonnes).

Total catch (2023)	Landings	Discards
88 581	100% industrial trawl fisheries	Discarding is considered negligible
	88 581	

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 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	153183178	245077047	392097617	193971	321665	533422	382629	0.59	0.70	0.83
1984	40104784	65500662	106978178	120431	178732	265256	498671	0.67	0.79	0.93
1985	269304039	424615323	669496726	191753	292091	444933	460057	0.72	0.85	1.00
1986	36683981	59675539	97076978	161574	216717	290680	382844	0.48	0.57	0.67
1987	25971059	44482724	76189144	409586	619474	936918	373021	0.38	0.45	0.53
1988	114609121	183632700	294225871	288236	420061	612176	422805	0.52	0.61	0.72
1989	57137649	92470964	149654024	139233	190141	259664	446129	0.56	0.66	0.78
1990	87225797	138818658	220927988	191046	284383	423320	306302	0.55	0.65	0.77
1991	92993571	148637372	237576299	206189	285638	395699	332204	0.40	0.48	0.56
1992	25787948	42105123	68746896	247639	345202	481201	558602	0.59	0.69	0.81
1993	113536414	181486231	290102980	180751	256539	364106	144389	0.26	0.30	0.36
1994	158574562	252848163	403168028	146444	199871	272789	193241	0.21	0.24	0.29
1995	36189160	59314859	97218406	348242	485214	676058	400759	0.39	0.45	0.53
1996	268499272	421303514	661069394	274805	383415	534949	291709	0.37	0.44	0.51
1997	38574976	63014491	102937875	218237	287049	377558	426414	0.37	0.44	0.52
1998	67349097	109972300	179570439	348269	507826	740484	372604	0.46	0.55	0.64
1999	98107893	158808396	257065011	202483	288918	412250	425478	0.71	0.88	1.07
2000	136681741	220876438	356934296	142687	197260	272706	374724	0.59	0.72	0.89
2001	257448505	406183593	640847038	131546	184353	258358	540248	0.91	1.13	1.39
2002	19099383	31700748	52616226	135343	187478	259695	610161	0.68	0.84	1.02
2003	113957759	180874509	287085218	153043	229151	343106	178642	0.57	0.69	0.85
2004	61690456	94940920	146113010	76697	113179	167014	215352	0.59	0.72	0.88
2005	145165462	223195839	343169660	98421	148957	225441	126261	0.30	0.37	0.45
2006	83719381	130334943	202906389	121407	171502	242268	247510	0.41	0.51	0.62
2007	177531658	273978793	422822499	152089	224112	330241	110395	0.150	0.180	0.22
2008	58909202	95050587	153365074	179497	250450	349448	236069	0.32	0.39	0.47
2009	379376293	580173032	887247711	225889	328266	477041	309712	0.39	0.48	0.58
2010	29960148	48548431	78669508	175617	245337	342737	300896	0.27	0.33	0.40
2011	32438975	51769630	82619585	328995	488400	725039	320241	0.39	0.48	0.58
2012	88426420	132646258	198979330	135382	206415	314719	45954	0.060	0.070	0.080
2013	52918588	79321813	118898674	79500	114639	165309	214787	0.40	0.49	0.60
2014	199136167	296846755	442501216	71919	105780	155583	96430	0.190	0.24	0.29
2015	28523861	44965443	70884199	89372	124022	172105	160764	0.150	0.180	0.22
2016	234181189	339725775	492838912	219433	319035	463846	15407	0.020	0.020	0.020
2017	20778032	30615606	45110880	132499	183835	255061	242069	0.31	0.37	0.46
2018	39188368	61316958	95940953	152691	217841	310790	132213	0.27	0.33	0.40
2019	76536233	117436752	180194272	85271	125157	183699	86539	0.20	0.24	0.30
2020	23328085	37768054	61146291	100198	144524	208458	108944	0.27	0.33	0.41
2021	39505343	62569563	99099259	90783	134493	199248	17082	0.030	0.040	0.050
2022	52204835	86161161	142204178	84129	120968	173940	5195	0.0100	0.0100	0.020
2023	42042640	97295785	225163540	115093	159384	220719	88581^	0.21	0.26	0.31
2024		116079425**		122792*	175408*	250571*				

* Using mean weight-at-age from 2019 to 2023.
** Geometric mean (1983–2022).
^ Preliminary.

Sources and references

Collette, B., Fernandes, P., and Heessen, H. 2014. *Ammodytes tobianus. The IUCN Red List of Threatened Species* 2014: e.T18155960A44738727. https://dx.doi.org/10.2305/IUCN.UK.2014-3.RLTS.T18155960A44738727.en. Accessed on 21 February 2024.

Golet, G. H., Seiser, P. E., McGuire, A. D., Roby, D. D., Fischer, J. B., Kuletz, K. J., Irons, D. B., *et al*. 2002. Long-term direct and indirect effects of the 'Exxon Valdez' oil spill on pigeon guillemots in Prince William Sound, Alaska. Marine Ecology Progress Series, 241: pp. 287–304. http://dx.doi.org/10.3354/meps241287

ICES. 2023. Advice on fishing opportunities. *In* Report of the ICES Advisory Committee, 2023. ICES Advice 2023, section 1.1.1. https://doi.org/10.17895/ices.advice.22240624

ICES. 2024a. Working Group on Multispecies Assessment Methods (WGSAM; outputs from 2023 meeting). ICES Scientific Reports. 6:13. 218 pp. https://doi.org/10.17895/ices.pub.25020968

ICES. 2024b. Herring Assessment Working Group for the Area South of 62° N (HAWG). ICES Scientific Reports. 6:24. https://doi.org/10.17895/ices.pub.25305532. Publication of the full report is expected 28 June 2024.

ICES. 2024c. Benchmark Workshop on Sandeel (*Ammodytes spp.*) (Outputs from 2022 and 2023 meetings (WKSANDEEL). ICES Scientific Reports. 6:10. 267 pp. https://doi.org/10.17895/ices.pub.21581151

Marine Management Organisation (MMO). 2022. Statutory guidance: The Dogger Bank Special Area of Conservation (Specified Area) Bottom Towed Fishing Gear Byelaw 2022. https://www.gov.uk/government/publications/the-dogger-bank-special-area-of-conservation-specified-area-bottom-towed-fishing-gear-byelaw-2022. Last accessed: 27 February 2023.

Régnier, T., Gibb, F. M., and Wright, P. J. 2019. Understanding temperature effects on recruitment in the context of trophic mismatch. Scientific Reports, 9: p. 15179. https://doi.org/10.1038/s41598-019-51296-5

Wright, P. J., Jensen, H., and Tuck, I. 2000. The influence of sediment type on the distribution of the lesser sandeel *Ammodytes marinus*. Journal of Sea Research, 44: pp. 243–256. https://doi.org/10.1016/S1385-1101(00)00050-2

Download the stock assessment data and figures.

Recommended citation: ICES. 2024. Sandeel (*Ammodytes* spp.) in divisions 4.b and 4.c, Sandeel Area 1r (central and southern North Sea, Dogger Bank). *In* Report of the ICES Advisory Committee, 2024. ICES Advice 2024, san.sa.1r, https://doi.org/10.17895/ices.advice.25019648