

## Spurdog (*Squalus acanthias*) in subareas 1–10, 12, and 14 (the Northeast Atlantic and adjacent waters)

### ICES advice on fishing opportunities

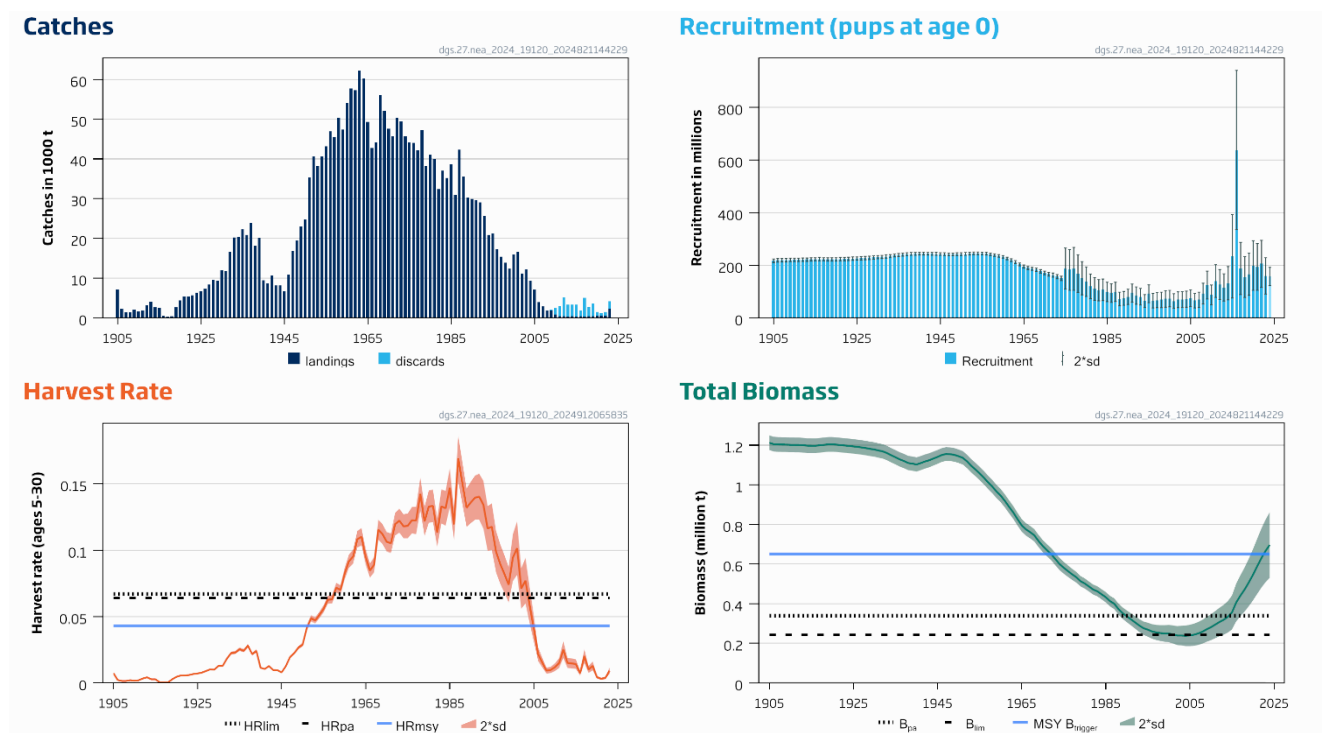
ICES advises that when the maximum sustainable yield (MSY) approach is applied, catches in 2025 and 2026 should be no more than 22 309 tonnes and 22 594 tonnes, respectively.

### Non-fisheries conservation considerations

Conservation aspects and associated management measures may exist at a national or regional level but were not reviewed by ICES.

### Stock development over time

Fishing pressure on the stock is below  $HR_{MSY}$ , and stock size is above  $MSY B_{trigger}$ ,  $B_{pa}$ , and  $B_{lim}$ .



**Figure 1** Spurdog in subareas 1–10, 12, and 14. Summary of the stock assessment. Long-term trends in catches (including assumed discards since 2010), mean harvest rate, recruitment, and total biomass. Horizontal lines indicate the associated reference points. The assumed recruitment in 2024 is shaded in a lighter colour.

### Catch scenarios

**Table 1** Spurdog in subareas 1–10, 12, and 14. Values in the forecast and for the interim year.

Variable	Value	Notes
Harvest rate (2024)	0.0092	Status quo harvest rate (ages 5–30), assuming same proportional split among fleets as in 2023
$B_{tot}$ (2025)	724050	Short-term forecast (STF) total biomass; in tonnes
Recruitment (2024)	158	Modelled stock–recruitment relationship, based on the number of pregnant females in the population; number of pups in millions
Recruitment (2025)	167	
Catch (2024)	4720	STF catch resulting from status quo harvest rate; in tonnes

**Table 2** Spurdog in subareas 1–10, 12, and 14. Annual catch scenarios. Total biomass ( $B_{tot}$ ) is estimated at the start of the year. All weights are in tonnes.

Basis	Catch		Harvest rate* (ages 5–30)		$B_{tot}$		% $B_{tot}$ change**		% advice change***	
	2025	2026	2025	2026	2026	2027	2026	2027	2025	2026
ICES advice basis										
MSY approach, HR = $HR_{MSY}$	22309	22594	0.044	0.043	731311	736711	1.00	1.75	25	27
Other scenarios										
HR = 0	0	0	0	0	753815	781926	4.1	8.0	-100	-100
$HR_{sq}$	5195	5417	0.0092	0.0092	748570	771215	3.4	6.5	-71	-70
Harvest rate = $HR_{pa}$	34237	33914	0.067	0.067	719271	713253	-0.66	-1.49	92	90
Harvest rate = $HR_{lim}$	35494	35076	0.069	0.069	718003	710811	-0.84	-1.83	99	96

\* Harvest rates differ slightly between years and from their respective reference points owing to differences in age structure over time.

\*\* Total biomass for 2026 or 2027 relative to the total biomass for 2025.

\*\*\* Advice value for 2025 and 2026 relative to advice value for 2024 (17 855 tonnes).

The advice change for 2025 and 2026 relative to 2024 (25% and 27%, respectively) is due to a continued increase in the total biomass, as well as an upward revision of recruitment and total biomass in recent years.

### Basis of the advice

**Table 3** Spurdog in the Northeast Atlantic. The basis of the advice.

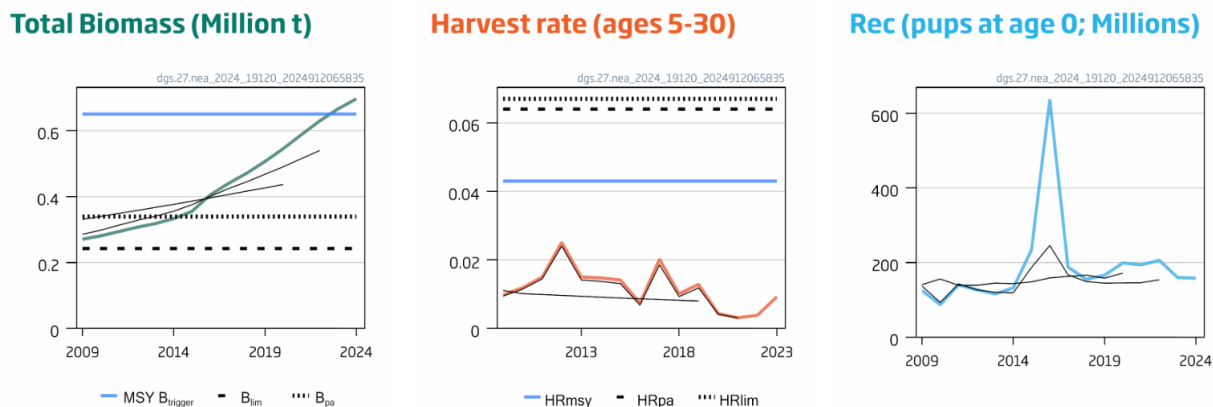
Advice basis	ICES maximum sustainable yield (MSY) approach
Management plan	ICES is not aware of any agreed precautionary management plan for spurdog in this area

### Quality of the assessment

There are some concerns about data quality and availability, including uncertainty in the historical level of catches because of misreporting and use of generic landings categories and lack of data on dead discards. However, the provision of length data continues to improve, with those from Denmark, Spain, France, and UK-Northern Ireland now of sufficient sample sizes to be included for 2022–2023, in addition to those from Sweden, Ireland, UK-Scotland, and UK-England and Wales used in these and previous years.

The increased variance in estimated recruitment from 1975 onwards is due to there being sufficient information (survey indices, survey and fishery length composition data) from that period for its estimation while prior to that a single stock-recruit relationship was used. Elevated levels of recruitment are estimated to account for the strong increases in the biomass indices for the stock. The magnitude of the recruitment spike in 2016 is likely an artefact of the coarse length bin structure used in the assessment (linked to life-history stages), and it may be that elevated recruitment would be estimated over several years with a finer bin structure.

The bases for calculating reference points  $MSY B_{trigger}$  and  $HR_{pa}$  have been revised to be consistent with current ICES guidelines for their calculation.



**Figure 2** Spurdog in subareas 1–10, 12, and 14. Historical assessment results (final-year recruitment estimates are provisional, taken from the estimated stock–recruitment relationship). The reference points were revised in 2021 (ICES, 2021), and only assessment results from the recent two assessments should be compared to the reference points indicated.

**Issues relevant for the advice**

The harvest rate shown in Table 2 is a weighted average (weighted by population number-at-age) for ages 5–30; therefore, there is a slight difference between the resultant harvest rate for ages 5–30 and the reference point because of the slightly different age structure compared to equilibrium conditions.

A new annual survey for spurdog along the Norwegian coast between 58°N and 66°N, including divisions 2.a and 4.a, was started in 2021 and would extend survey coverage further north, and so this would need to be considered at future benchmark assessments.

**Reference points**

**Table 4** Spurdog in subareas 1–10, 12, and 14. Reference points, values, and their technical basis. The reference points are estimated as part of the assessment model and reference points are updated with each assessment update.

Framework	Reference point	Value	Technical basis	Source
Maximum sustainable yield (MSY) approach	HR <sub>MSY</sub> (MSY harvest rate)	0.043	Harvest rate (ages 5–30) that maximizes yield and leads to B <sub>MSY</sub>	ICES (2021); ICES (2024)
	MSY B <sub>trigger</sub>	650 770	A proxy for the 5th percentile of the distribution of B <sub>MSY</sub> is used (B <sub>MSY</sub> less two standard deviations, based on the CV for last 10 years of estimates of total biomass, 2015–2024); in tonnes	ICES (2024)
Precautionary approach	B <sub>lim</sub>	242 493	0.2 × B <sub>0</sub> , where B <sub>0</sub> is the virgin total biomass; in tonnes	ICES (2021); ICES (2024)
	B <sub>pa</sub>	339 490	1.4 × B <sub>lim</sub> ; in tonnes	ICES (2021); ICES (2024)
	HR <sub>lim</sub>	0.067	Harvest rate that leads to B <sub>lim</sub>	ICES (2021); ICES (2024)
	HR <sub>pa</sub>	0.064	Harvest rate that leads to the 5th percentile of total biomass equal to B <sub>lim</sub> (assuming CV for last 10 years of estimates of total biomass, 2015–2024), where the ICES advice rule is not included	ICES (2024)
Management plan	SSB <sub>MGT</sub>	n/a		
	HR <sub>MGT</sub>	n/a		

n/a = not available.

## Basis of the assessment

**Table 5** Spurdog in the Northeast Atlantic. Basis of assessment and advice.

ICES stock data category	1 (ICES, 2023)
Assessment type	Age-length and sex-structured model (De Oliveira <i>et al.</i> , 2013)
Input data	Three GAM-based delta-lognormal survey biomass indices, combined by quarter: Q1 (IBTSQ1[G1022], NO-shrimp-Q1, SCOWCGFS[G4748], SWC-IBTS[G1179]), Q3 (IBTSQ3[G2829]), Q4 (EVHOF[G9527], IE-IGFS[G7212], NIGFS[G7655], SCOWCGFS[G4815], SWC-IBTS[G4299]); length composition by sex associated with the three combined survey indices; fecundity-at-length; landings; length composition for bottom trawls (Denmark, France, Ireland, Spain, Sweden, UK-England, UK-Northern Ireland, UK-Scotland), and gillnets and trammel nets (UK-England)
Discards and bycatch	Discarding considered negligible up to and including 2004; discards estimates included from 2005 onwards; for the assessment, average UK-England discards (2010, 2012, 2016–2019) assumed to deal with missing years of discards from UK-England (2011, 2013–2015). All discards are assumed to be dead.
Indicators	None
Other information	A benchmark assessment was carried out in 2021 (ICES, 2021)
Working group	Working Group on Elasmobranch Fishes (WGEF)

## History of the advice, catch, and management

**Table 6** Spurdog in subareas 1–10, 12, and 14. History of ICES advice, the agreed TAC, and ICES estimates of landings and discards (as provided through the data calls of the Benchmark Workshop on North Sea Stocks [WKNSEA; ICES, 2021]) and Working Group on Elasmobranch Fishes [WGEF]). Weights are in tonnes.

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ICES landings <sup>§§</sup>	Discards <sup>§§</sup>
1999	None			12384	
2000	None		9470*	15890	
2001	None		9070*	16693	
2002	None		7300*	11170	
2003	None		5840*	12246	
2004	None		4672*	9365	
2005	None		1236*	7092	20
2006	F = 0	0	1051*	3996	22
2007	No new advice, same as for 2006	0	3669**	2892	34
2008	F = 0	0	2635***	1791	46
2009	No fishery	0	1422^	1968	96
2010	No new advice, same as for 2009	0	0^^	886	1523
2011	F = 0	0	0^	427	173
2012	F = 0	0	0^	447	4757
2013	F = 0	0	0^	331	514
2014	No new advice, same as for 2013	0	0^	381	490
2015	No target fishery, minimize bycatch	0	0^	257	591
2016	No new advice, same as for 2015	0	0^^^	371	1580
2017	PA approach (and no target fishery and medium-term projections)	≤ 2468 <sup>§§§</sup>	0^^^	294	4781

Year	ICES advice	Catch corresp. to advice	Agreed TAC	ICES landings <sup>§§</sup>	Discards <sup>§§</sup>
2018	PA approach (and no target fishery and medium-term projections)	≤ 2468 <sup>§§§</sup>	0 <sup>^^^</sup>	362	2371
2019	PA approach (and no target fishery and medium-term projections)	≤ 2468 <sup>§§§</sup>	0 <sup>^^^</sup>	455	3165
2020	PA approach (and no target fishery and medium-term projections)	≤ 2468 <sup>§§§</sup>	0 <sup>^^^</sup>	526	942
2021	PA approach (no targeted fisheries)	0	0 <sup>^^^</sup>	539	639
2022	PA approach (no targeted fisheries)	0	0 <sup>^^^</sup>	474	967
2023	MSY approach	17353	15453 <sup>§</sup>	2317	1891
2024	MSY approach	17855	15900 <sup>§</sup>		
2025	MSY approach	22309			
2026	MSY approach	22594			

\* TAC for EU waters of Subarea 4 and Division 2.a.

\*\* Combined value for the TAC for EU waters of Subarea 4 and Division 2.a, and the TAC for Division 3.a and EU and international waters of subareas 1, 5, 6, 7, 8, 12, and 14.

\*\*\* Combined value for the TAC for EU waters of Subarea 4 and Division 2.a, and the TAC for EU and international waters of subareas 1, 5, 6, 7, 8, 12, and 14.

^ Combined value for the TAC for EU waters of Subarea 4 and Division 2.a, the TAC for EU waters of Division 3.a, and the TAC for EU and international waters of subareas 1, 5, 6, 7, 8, 12, and 14.

^^ Landings of bycatch permitted up to 10% of the 2009 quota.

^^^ A bycatch quota of 270 tonnes was made available to those countries taking part in a pilot spurdog avoidance programme. Outside of this quota, spurdog was listed as a prohibited species in EU waters of subareas 2–10 for the years 2017–2022.

§ Combined value for the TAC for EU and UK waters of Subarea 4 and UK waters of Division 2.a, the TAC for EU waters of Division 3.a, and the TAC for EU and UK waters of subareas 6,7 and 8, UK and international waters of Subarea 5, and international waters of Subareas 1, 12 and 14.

§§ Landings and discards for the total stock area, subareas 1–10, 12, and 14, excluding 8.c, 9.a and 10.a (due to mixed landings with *S. blainville*).

§§§ Assumed annual catch.

## History of the catch and landings

The quantity of spurdog caught in the NEAFC regulatory areas is negligible.

**Table 7** Spurdog in the Northeast Atlantic. Catch distribution by fleet in 2023 as estimated by ICES.

Total catch (2023)	Landings				Discards
	Set nets	All bottom trawls	Hooks and lines	Other gears	
4208 tonnes	38%	53%	2%	7%	1891 tonnes
	2317 tonnes				

**Table 8a** Spurdog in the Northeast Atlantic. History of ICES landings for each country participating in the fishery \*. Weights in tonnes. Blank = no data reported; 0 = value less than 0.5 t.

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Belgium	1097	1085	1110	1072	1139	920	1048	979	657	750	582	393	447	335	396	391
Denmark	1404	1418	1282	1533	1217	1628	1008	1395	1495	1086	1364	1246	799	486	212	146
Faroe Islands	0	22	0	0	0	0	0	0	0	6	2	3	25	137	203	310
France	17 514	19 067	12 430	12 641	8356	8867	7022	11 174	7872	5993	4570	4370	4908	4831	3329	1978
Germany	43	42	39	25	8	22	41	48	27	24	26	6	55	8	21	100
Iceland	36	22	14	25	5	9	7	5	4	17	15	53	185	108	97	166
Ireland	108	476	1268	4658	6930	8791	5012	8706	5612	3063	1543	1036	1150	2167	3624	3056
Netherlands	217	268	183	315	0	0	0	0	0	0	0	0	0	0	0	0
Norway	5925	3941	3992	4659	4279	3487	2986	3614	4139	5329	8104	9633	7113	6945	4546	3940
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	2	0	0	0	0	0	1	5	3	2	128	188	250	323	190	256
Russia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	0	0	8	653	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	399	308	398	300	256	360	471	702	733	613	390	333	230	188	95	104
UK (E&W)	9229	9342	8024	6794	8046	7841	7047	7684	6952	5371	5414	3770	4207	3494	3462	2354
UK (Sc)	4994	3970	3654	4371	4957	6749	6267	8043	8075	8024	7768	8531	9677	6614	4676	8517
Total	40 968	39 961	32 402	37 046	35 193	38 674	30 910	42 355	35 569	30 278	29 906	29 562	29 046	25 636	20 851	21 318

**Table 8a (cont.)** Spurdog in the Northeast Atlantic. History of ICES landings for each country participating in the fishery \*. Weights in tonnes. Blank = no data reported; 0 = value less than 0.5 t.

Country	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Belgium	430	443	382	354	400	410	23	11	13	21	17	11	12	7	1
Denmark	142	196	126	131	146	156	256	232	219	150	121	76	78	82	14
Faroe Islands	51	218	362	486	368	613	340	224	295						
France	1607	1555	1286	998	4342	4304	2569	1705	1062	945	700	504	368	412	164
Germany	38	21	31	54	194	304	121	98	138	140	7	3	5	2	1
Iceland	156	106	80	57	107	199	276	200	142	76	82	43	68	102	62
Ireland	2305	2214	1164	904	905	1227	1214	1416	1076	1022	859	651	137	175	26
Netherlands	0	0	0	0	28	39	27	10	25	31	23	25	18	5	7
Norway	2748	1567	1293	1461	1643	1424	1091	1119	1054	1016	790	615	711	543	540
Poland	0	0	0	0	0	0	0	0	0						
Portugal	120	100	46	21	2	3	4	4	9						
Russia	0	0	0	0	0	0	0	0	0						
Spain	0	0	28	95	372	363	306	135	17	41	40	71	39	14	2
Sweden	154	196	140	114	123	238	0	275	244	169	147	93	75	80	5
UK (E&W)	2670	3066	4480	4461	3654	4516	2823	3109	1729						
UK (Sc)	6873	5665	4501	3248	3606	2897	2120	3708	3342						
GBR										3481	1209	799	280	546	64
Total	17 294	15 347	13 919	12 384	15 890	16 693	11 170	12 246	9365	7092	3996	2892	1791	1968	886

**Table 8a (cont.)** Spurdog in the Northeast Atlantic. History of ICES landings for each country participating in the fishery \*. Weights in tonnes. Blank = no data reported; 0 = value less than 0.5 t.

Country	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Belgium	0	0	0										5
Denmark	26	30	19	10	27	24	27	19	21	32	20	23	129
France	84	34	13	19	2	1	3	1					904
Germany	1	1	0	1	0	2	0	1	0		0	0	0
Iceland	53	51	6	19	8	8	4	2	1	3	1	2	2
Ireland	13	37	34	18	2	34	1	24	11	3		9	422
Netherlands	1	4	3	0	1	1	1	6	0	0			2
Norway	247	285	250	313	217	270	222	271	370	409	367	321	351
Spain	2	3	0				0	0		0			3
Sweden	0					0	0	0	0		0	0	52
GBR	1	3	6	0		30	37	38	52	79	151	120	446
Total	427	447	331	381	257	371	294	362	455	526	539	474	2317

\* Landings for the total stock area, subareas 1–10, 12, and 14, excluding 8.c, 9.a, and 10.a (due to mixed landings with *S. blainville*).



**Table 8b** Spurdog in the Northeast Atlantic. History of ICES discards for each country participating in the fishery \*, \*\*. Weights in tonnes. Blank = no data reported; 0 = value less than 0.5 t.

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Denmark	1	2		9	42	23	44	4	232	48	25	705	18	42	37	234	94	36	88
Germany	1	0	0	0		0	0	0	1	0	1	1	3	4	3		0	3	176
Ireland	11	0	28	31	7	151	53	63	33	39	96	30	291	211	122	181	10	90	71
Netherlands																			3
Spain_IEO										1	4	9	2	2	2				
Spain_AZTI		0				1	1		11	6	87		1	36	13				
Spain																28	3	62	269
Sweden	2	0	5	4	7	22	8	33	37	132	19	12	142	9	66			45	28
UK (England & Wales)	5	19	0	2	1	1161	***	4472	***	***	***	683	4090	1737	2406	256	59	388	627
UK (Scotland)					39	166	66	185	201	264	359	141	235	330	516	174	396	302	537
UK (Northern Ireland)																70	76	42	93
Total	20	22	34	46	96	1523	173	4757	514	490	591	1580	4781	2371	3165	942	639	967	1891

\* Discards for the total stock area, subareas 1–10, 12, and 14, excluding 8c, 9a, and 10a (due to mixed landings with *S. blainville*)

\*\* Discards are estimated based on raised national data by fleet provided through the data calls of Benchmark Workshop on North Sea Stocks (WKNSEA; ICES, 2021) and the Working Group on Elasmobranch Fishes (WGEF). Discards data prior to 2005 are incomplete and considered negligible in relation to landings. The increase in discarding from 2005 onwards will have been influenced by the evolution of management measures.

\*\*\* Due to missing discards data from UK England & Wales for these years, the average for UK England & Wales for the years 2010, 2012, 2016–2019 (2425 t) was used in the assessment (Table 9) to represent discards from UK England & Wales.

**Summary of the assessment**

**Table 9** Spurdog in subareas 1–10, 12, and 14. Summary table of estimates from the spurdog assessment: recruitment (millions of pups), total biomass (tonnes), harvest rate (assuming average selection over the ages 5–30), and the ICES estimates of landings and discards (tonnes) used in the assessment. Estimates of precision ( $\pm 2$  standard deviation).

Year	Recruitment (pups at age 0)			Total biomass			Landings*	Discards*	Harvest rate		
	Low	Millions	High	Low	Tonnes	High	Tonnes	Tonnes	Low	Ages 5–30	High
1905	210	217	224	1175176	1212460	1249744	7248		0.0071	0.0074	0.0078
1906	212	219	226	1168234	1205520	1242806	2200		0.0022	0.0023	0.0024
1907	213	220	226	1166658	1203950	1241242	1428		0.00140	0.00148	0.00156
1908	213	220	226	1166024	1203320	1240616	1409		0.00139	0.00146	0.00154
1909	214	220	227	1165574	1202870	1240166	2022		0.0020	0.0021	0.0022
1910	214	221	227	1164698	1201990	1239282	1563		0.00154	0.00163	0.00171
1911	214	221	227	1164478	1201760	1239042	1957		0.00193	0.0020	0.0021
1912	215	221	228	1164062	1201330	1238598	3199		0.0032	0.0033	0.0035
1913	215	222	228	1162642	1199890	1237138	4050		0.0040	0.0042	0.0045
1914	216	223	229	1160674	1197900	1235126	2641		0.0026	0.0028	0.0029
1915	217	223	229	1160382	1197580	1234778	2602		0.0026	0.0027	0.0029
1916	217	223	230	1160346	1197510	1234674	534		0.00053	0.00056	0.00059
1917	217	223	229	1162494	1199620	1236746	339		0.00034	0.00036	0.00037
1918	216	223	229	1164872	1201950	1239028	451		0.00045	0.00047	0.00050
1919	216	222	229	1167144	1204170	1241196	2659		0.0026	0.0028	0.0029
1920	216	223	229	1167248	1204220	1241192	4396		0.0044	0.0046	0.0048
1921	217	223	230	1165780	1202700	1239620	5321		0.0053	0.0056	0.0059
1922	217	224	230	1163610	1200480	1237350	5401		0.0054	0.0057	0.0060
1923	218	225	231	1161594	1198420	1235246	5655		0.0056	0.0060	0.0063
1924	219	225	232	1159586	1196370	1233154	6355		0.0064	0.0067	0.0071
1925	220	226	232	1157182	1193930	1230678	6719		0.0068	0.0071	0.0075
1926	220	227	233	1154736	1191450	1228164	7277		0.0073	0.0077	0.0081
1927	221	228	234	1152108	1188790	1225472	8395		0.0085	0.0090	0.0094
1928	222	229	235	1148788	1185440	1222092	9522		0.0097	0.0102	0.0107
1929	223	230	236	1144856	1181480	1218104	9320		0.0095	0.0100	0.0106
1930	225	231	237	1141644	1178240	1214836	11914		0.0122	0.0129	0.0136
1931	226	232	238	1136452	1173020	1209588	11838		0.0122	0.0129	0.0136
1932	227	233	240	1132010	1168550	1205090	16726		0.0174	0.0184	0.0193
1933	229	235	241	1123512	1160020	1196528	20244		0.021	0.022	0.024
1934	232	238	243	1112566	1149040	1185514	20378		0.022	0.023	0.024
1935	233	239	245	1102632	1139070	1175508	22266		0.024	0.025	0.027
1936	235	241	247	1092014	1128410	1164806	20925		0.023	0.024	0.025
1937	237	242	248	1083920	1120260	1156600	23930		0.027	0.028	0.030
1938	238	243	249	1074020	1110290	1146560	18196		0.021	0.022	0.023
1939	238	244	249	1070918	1107100	1143282	20119		0.023	0.024	0.025
1940	239	244	250	1066798	1102870	1138942	9428		0.0108	0.0114	0.0120
1941	239	244	250	1073972	1109910	1145848	8740		0.0100	0.0105	0.0111
1942	239	244	249	1082072	1117850	1153628	10625		0.0121	0.0127	0.0133
1943	238	244	249	1088414	1124010	1159606	8181		0.0092	0.0097	0.0102
1944	238	243	249	1097220	1132620	1168020	8151		0.0091	0.0096	0.0101
1945	238	243	248	1105882	1141080	1176278	6776		0.0075	0.0079	0.0083
1946	237	242	248	1115626	1150620	1185614	10895		0.0120	0.0126	0.0132
1947	236	242	247	1120936	1155730	1190524	16893		0.0185	0.0194	0.0204
1948	236	242	247	1120124	1154740	1189356	19491		0.021	0.022	0.024
1949	237	242	248	1116766	1151230	1185694	23010		0.025	0.027	0.028
1950	237	243	248	1110088	1144430	1178772	24750		0.027	0.029	0.030
1951	238	243	249	1102032	1136280	1170528	35301		0.040	0.042	0.043
1952	239	244	250	1084096	1118280	1152464	40550		0.046	0.049	0.051
1953	240	245	251	1061972	1096120	1130268	38206		0.045	0.047	0.049
1954	240	245	251	1043344	1077470	1111596	40570		0.049	0.051	0.054
1955	240	245	250	1023516	1057620	1091724	43127		0.053	0.056	0.059
1956	239	244	249	1002348	1036420	1070492	46951		0.060	0.063	0.066
1957	237	242	247	978630	1012650	1046670	45570		0.060	0.063	0.066

Year	Recruitment (pups at age 0)			Total biomass			Landings*	Discards*	Harvest rate		
	Low	Millions	High	Low	Tonnes	High	Tonnes	Tonnes	Low	Ages 5–30	High
1958	234	239	244	957521	991459	1025397	50394		0.068	0.072	0.075
1959	231	236	241	932714	966534	1000354	47394		0.066	0.070	0.074
1960	227	232	237	911932	945596	979260	53997		0.078	0.082	0.087
1961	221	226	231	885384	918850	952316	57721		0.087	0.092	0.097
1962	214	220	225	855874	889104	922334	57256		0.090	0.095	0.100
1963	207	212	218	827418	860382	893346	62288		0.102	0.108	0.114
1964	198	204	209	794277	826949	859621	60146		0.104	0.110	0.117
1965	189	195	201	763454	795818	828182	49336		0.089	0.095	0.101
1966	184	190	196	743379	775435	807491	42713		0.079	0.085	0.090
1967	181	187	193	729565	761323	793081	44116		0.083	0.089	0.095
1968	177	184	190	713769	745255	776741	56043		0.108	0.115	0.123
1969	170	177	184	685343	716597	747851	52074		0.105	0.112	0.120
1970	164	171	178	660304	691396	722488	47557		0.099	0.106	0.114
1971	159	167	174	639189	670195	701201	45653		0.098	0.105	0.113
1972	155	163	171	619358	650366	681374	50416		0.111	0.120	0.128
1973	149	157	165	594079	625181	656283	49412		0.113	0.122	0.131
1974	142	151	159	569148	600450	631752	45684		0.109	0.118	0.127
1975	109	187	266	551135	581489	611843	44119		0.109	0.118	0.128
1976	105	183	260	534982	564406	593830	44064		0.113	0.123	0.133
1977	105	187	268	519912	548216	576520	42252		0.112	0.122	0.133
1978	97	168	240	506161	533525	560889	47235		0.130	0.142	0.155
1979	88	151	214	486845	513423	540001	38201		0.111	0.122	0.133
1980	82	138	194	476095	502041	527987	40968		0.121	0.133	0.145
1981	73	120	167	461205	486801	512397	39962		0.121	0.133	0.146
1982	67	110	153	445968	471468	496968	32402		0.102	0.113	0.124
1983	65	105	146	436791	462391	487991	37046		0.120	0.133	0.146
1984	66	107	148	421640	447510	473380	35194		0.118	0.132	0.145
1985	62	99	136	406462	432778	459094	38674		0.132	0.147	0.162
1986	59	95	130	386154	413030	439906	30910		0.108	0.119	0.131
1987	63	99	136	372632	400140	427648	42356		0.152	0.169	0.187
1988	46	72	98	345091	373321	401551	35569		0.135	0.150	0.166
1989	48	74	101	323391	352407	381423	30279		0.118	0.132	0.147
1990	51	80	109	306443	336303	366163	29906		0.120	0.136	0.152
1991	60	95	129	290140	320906	351672	29563		0.123	0.140	0.156
1992	52	85	118	273405	305147	336889	29046		0.123	0.140	0.158
1993	49	80	112	256550	289374	322198	25637		0.116	0.134	0.152
1994	40	65	89	242032	275974	309916	20851		0.100	0.116	0.133
1995	58	92	126	233453	268827	304201	21318		0.100	0.118	0.135
1996	38	65	93	223113	259941	296769	17295		0.083	0.099	0.115
1997	39	67	96	216494	254918	293342	15348		0.075	0.090	0.104
1998	39	69	98	211499	251647	291795	13919		0.068	0.082	0.096
1999	41	73	104	207771	249763	291755	12385		0.061	0.074	0.087
2000	42	73	105	205395	249325	293255	15891		0.077	0.094	0.112
2001	37	64	92	198718	244596	290474	16693		0.081	0.102	0.122
2002	39	69	99	191209	239117	287025	11170		0.056	0.071	0.086
2003	40	70	100	189158	239102	289046	12247		0.060	0.077	0.094
2004	41	71	102	186018	238010	290002	9366		0.045	0.058	0.072
2005	43	75	107	185879	239953	294027	7092	20	0.031	0.041	0.050
2006	38	66	93	187394	243488	299582	3996	22	0.0165	0.022	0.027
2007	40	69	98	191907	250023	308139	2892	34	0.0116	0.0153	0.0190
2008	53	93	132	198428	258812	319196	1791	46	0.0070	0.0093	0.0115
2009	72	125	178	207773	270839	333905	1968	96	0.0074	0.0098	0.0122
2010	50	87	125	215492	281070	346648	886	1523	0.0089	0.0119	0.0148
2011	78	140	203	225497	294209	362921	427	2597**	0.0112	0.0150	0.0188
2012	70	127	184	235153	307173	379193	447	4757	0.0188	0.025	0.031

Year	Recruitment (pups at age 0)			Total biomass			Landings*	Discards*	Harvest rate		
	Low	Millions	High	Low	Tonnes	High	Tonnes	Tonnes	Low	Ages 5–30	High
2013	64	116	168	242827	318351	393875	331	2939**	0.0112	0.0150	0.0189
2014	69	132	195	253735	333289	412843	381	2915**	0.0110	0.0147	0.0185
2015	76	234	393	269438	355412	441386	257	3016**	0.0105	0.0141	0.0178
2016	336	638	941	309950	405548	501146	371	1580	0.0055	0.0074	0.0092
2017	89	188	287	336653	440221	543789	294	4781	0.0150	0.0202	0.025
2018	78	155	233	359667	471205	582743	362	2371	0.0075	0.0101	0.0128
2019	86	166	246	386778	506880	626982	455	3165	0.0095	0.0128	0.0162
2020	105	199	293	416081	545789	675497	526	942	0.0032	0.0043	0.0055
2021	105	194	283	448710	588458	728206	539	639	0.0023	0.0031	0.0039
2022	116	206	295	480601	630167	779733	474	967	0.0028	0.0038	0.0048
2023	91	160	229	508293	666555	824817	2317	1891	0.0069	0.0092	0.0116
2024	123 <sup>^</sup>	158 <sup>^</sup>	192 <sup>^</sup>	530764	696838	862912					

\* Landings are considered to represent catch for the years up to and including 2004, with discards considered negligible. Minor discrepancies between these values and those in earlier tables are due to rounding (but see footnote \*\* for discards).

\*\* Due to missing discards data from UK England & Wales for these years, the average for UK England & Wales for the years 2010, 2012, 2016-2019 (2425 t) was used to represent discards from UK England & Wales.

<sup>^</sup> Provisional values taken from the estimated stock–recruitment relationship.

**Table 10** Spurdog in subareas 1–10, 12, and 14. Extension of short-term forecasts to the medium- to longer-term (3, 5, 10, and 30 years beyond 2024). Estimates of total biomass relative to the total biomass in 2024 for different future catch scenarios, assuming status quo harvest rate for 2024 (see Table 2 for the 2025 and 2026 catches for the different catch scenarios). Point estimates of average catch and relative biomass are shown, with corresponding lower and upper values for the relative biomass (reflecting  $\pm 2$  standard deviations).

	Medium-term projections				
	HR <sub>MSY</sub>	Zero	HR <sub>sq</sub>	HR <sub>pa</sub>	HR <sub>lim</sub>
Average catch*	24550	0	7527	30558	31007
Point estimates: total future biomass/total biomass 2024					
+ 3 years	1.06	1.12	1.11	1.02	1.02
+ 5 years	1.07	1.20	1.17	1.00	1.00
+ 10 years	1.08	1.37	1.30	0.95	0.94
+ 30 years	1.15	1.82	1.69	0.82	0.79
Point estimates –2 standard deviations					
+ 3 years	1.04	1.10	1.09	1.00	1.00
+ 5 years	1.03	1.16	1.13	0.96	0.96
+ 10 years	1.00	1.29	1.23	0.87	0.86
+ 30 years	0.97	1.36	1.37	0.68	0.66
Point estimates +2 standard deviations					
+ 3 years	1.08	1.14	1.13	1.05	1.04
+ 5 years	1.11	1.23	1.20	1.05	1.04
+ 10 years	1.16	1.46	1.37	1.03	1.01
+ 30 years	1.34	2.27	2.02	0.96	0.93

\* "Average catch" is the average for the projection period 2025–2053.

## Sources and references

- De Oliveira, J. A. A., Ellis, J. R., and Dobby, H. 2013. Incorporating density dependence in pup production in a stock assessment of NE Atlantic spurdog *Squalus acanthias*. ICES Journal of Marine Science, 70: 1341–1353. <https://doi.org/10.1093/icesjms/fst080>
- ICES. 2021. Benchmark Workshop on North Sea Stocks (WKNSEA). ICES Scientific Reports. 3:25. 756 pp. <https://doi.org/10.17895/ices.pub.7922>
- ICES. 2022. Working Group on Elasmobranch Fishes (WGEF). ICES Scientific Reports. Report. <https://doi.org/10.17895/ices.pub.21089833.v1>
- 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. 2024. Report of the Working Group on Elasmobranch Fishes (WGEF). ICES Scientific Reports 06:75. <http://doi.org/10.17895/ices.pub.26935504>.

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