ECOREGION Widely distributed and migratory stocks
STOCK Spurdog (*Squalus acanthias*) in the Northeast Atlantic

Advice for 2013 and 2014

ICES advises on the basis of the precautionary approach that there should be no target fishery and that bycatch in mixed fisheries should be reduced to the lowest possible level. A rebuilding plan should be developed for this stock.

Stock status

F (Fishing Mortality)	2009	2010	2011	
MSY (F_{MSY})	✓	✓	✓	Below target
Precautionary approach (F_{pa},F_{lim})	?	?	?	Undefined

SSB (Spawning-Stock Biomass)	2010	2011	2012	
MSY ($B_{trigger}$)	?	?	?	Undefined
Precautionary approach (B_{pa},B_{lim})	?	?	?	Increased risk
Qualitative evaluation	✗	✗	✗	Below poss. reference points

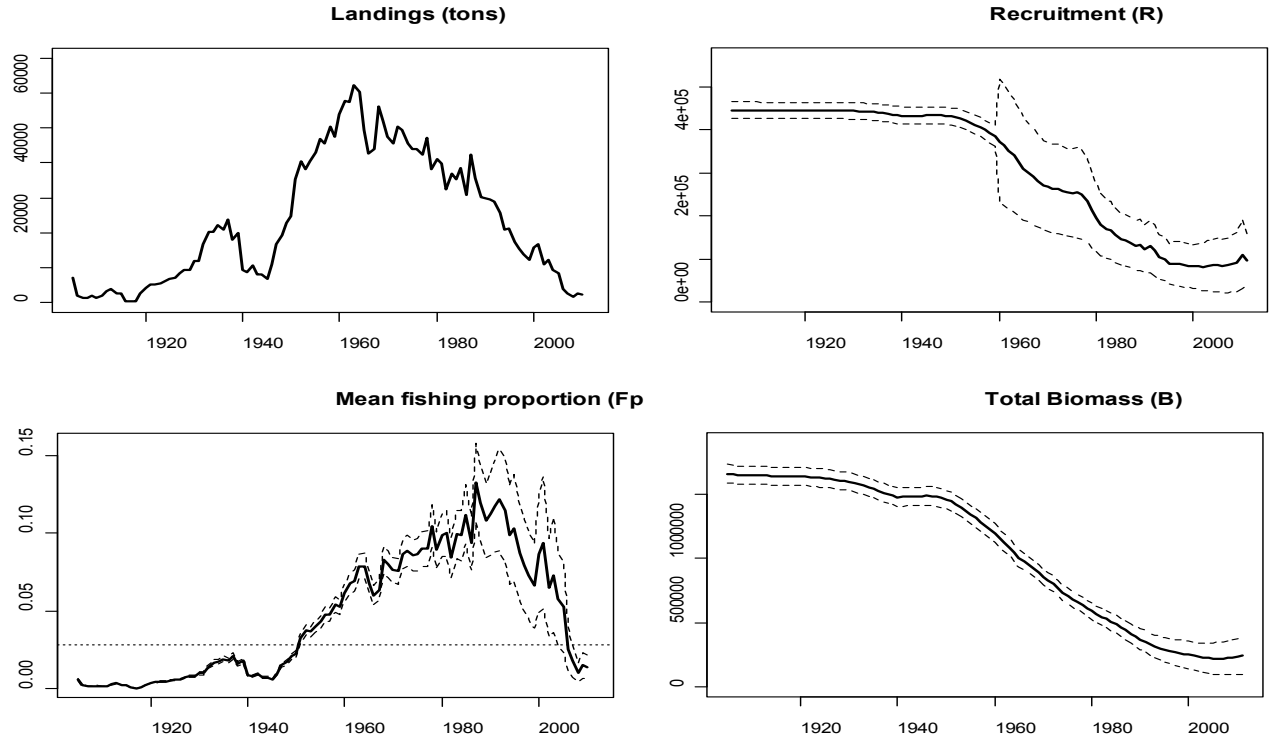

Figure 9.4.6.1 Spurdog in the Northeast Atlantic. Summary of stock assessment (weights in tonnes). Long-term trends in landings, recruitment (number of pups), mean exploitation ratio (average ages 5–30, dotted horizontal line = MSY exploitation ratio), and total biomass. Dashed lines reflect estimates of precision (±2 standard deviations).

The stock suffered a high fishing mortality for more than four decades, and was not managed during this time. Management measures have been restrictive only since 2007. The spawning biomass and recruitment have declined substantially since the 1960s and are now stable at a low level. Exploitation is estimated to be below the MSY exploitation ratio.

Management plans

There is a generic EC Action Plan for the Conservation and Management of Sharks, but no specific management objectives are known to ICES.

Biology

Spurdog (*Squalus acanthias*) is a long-lived, slow-growing, and late-maturing species, and is therefore particularly vulnerable to exploitation. Population productivity is low, with low fecundity and a protracted gestation period. Spurdog form size- and sex-specific shoals and aggregations of large fish (including of mature females) are easily targeted by longline and gillnet fisheries.

Environmental influence on the stock

The effect of changes in the environment on spurdog populations is not known. There may be indirect affects, as spurdog predate on small pelagic fish, which are affected by environmental conditions. An increased frequency of occurence in Norwegian waters in recent years may be caused by immigration to this area due to food availability and favourable environmental conditions.

The fisheries

Spurdog are largely taken in mixed demersal and gillnet fisheries. As the TAC was set at zero, there were no target fisheries in EC or Norwegian waters in 2011. An unquantified amount of discarding now takes place in mixed demersal trawl and gillnet fisheries operating in EC waters. Discard mortality is unknown.

Quality considerations

There are concerns over the quality of the catch data (including total catch and length compositions of the landings). Discarding rates since the zero TAC was introduced are uncertain, as is the survivorship of the discards. In the absence of commercial data, information from scientific trawl surveys will be increasingly important to monitor any stock recovery. See supporting information for more details.

Scientific basis

Assessment type	Age-length and sex-structured model (Punt and Walker, 1998).
Input data	GLM standardized Scottish survey index, Scottish survey length–frequency data (ScoGFS-WIBTS-Q1, ScoGFS-WIBTS-Q4, Sco-IBTS-Q1, Sco-IBTS-Q3), total landings, and UK (E & W) and UK (Scotland) landings length frequencies.
Discards and bycatch	Unknown, not included in the assessment.
Indicators	UK (E & W) Celtic Seas groundfish survey (EngW-WIBTS-Q4), UK (Northern Ireland) groundfish surveys (NIGFS-WIBTS-Q1 and NIGFS-WIBTS-Q4), Irish Celtic Seas survey (IGFS-WIBTS-Q4), North Sea IBTS (IBTS), Norwegian shrimp survey (NO-shrimp-A1), Norwegian Coastal survey (Nocoast-Aco-Q4).
Other information	A benchmark assessment was carried out in 2011.
Working group report	WGEF

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Reference points

	Type	*Value*	*Technical basis*
MSY Approach	MSY $B_{trigger}$	Not defined.	
	MSY exploitation ratio	0.029	Catch as a proportion of the total biomass, assuming average selection over the period 2008–2010, reflecting a non-target selection pattern.
Precautionary Approach	B_{lim}	Not defined.	
	B_{pa}	Not defined.	
	F_{lim}	Not defined.	
	F_{pa}	Not defined.	

(unchanged since 2011)

Outlook for 2013 and 2014

No short-term forecast is provided for this stock. The updated assessment does not alter the perception of the stock as being depleted.

MSY approach

Although MSY $B_{trigger}$ has not been identified for this stock, it is highly likely that SSB is below any candidate MSY $B_{trigger}$.

Fishing mortality appears to have reduced below the MSY exploitation ratio in recent years. However, given the very low spawning biomass and productivity of the species it is not possible to identify any non-zero catch which would be compatible with the MSY approach.

A rebuilding plan should be developed for this stock, noting that the time for recovery will be over a decadal time frame.

Precautionary approach

Spurdog spawning biomass is currently at the lowest observed level, although stable in recent years. Spurdog is a long-lived, slow-growing, and late-maturing species and therefore particularly vulnerable to fishing mortality. ICES therefore advises on the basis of the precautionary approach that there should be no targeted fishery in 2013 and that catches in mixed fisheries should be reduced to the lowest possible level.

The stock currently appears stable at a low level, but the recent period of stability is short compared to the longevity of the species. Given this longevity, stock recovery will be slow.

A rebuilding plan should be developed for this stock, noting that the time for recovery will be over a decadal time frame.

Additional considerations

Historically, spurdogs were subjected to large targeted fisheries but were also taken as a bycatch in mixed trawl fisheries. In the latter fisheries, measures to reduce overall demersal fishing effort may have benefitted spurdog recovery. Discarding of spurdogs has increased with zero TACs; some individuals do survive after discarding although the proportion surviving varies considerably depending on a number of factors (e.g. size of catch, catching method, time on deck, etc.).

A rebuilding plan is needed for this stock. Rebuilding measures should incorporate biomass targets and rebuilding timelines. Enhanced data collection schemes should be developed in the form of science–industry collaborations.

Regulations and their effects

In 2009, a maximum landing length (100 cm) was introduced in EC waters, and this deterred many of the fisheries targeting spurdog. In theory, the maximum landing length of 100 cm will restrict fisheries targeting mature females, but will not impede females being discarded if they are harvested together with smaller individuals (< 100 cm). As the mortality rate of discarded spurdogs is unknown, the maximum landing length alone does not afford complete protection of mature females. Norway has a minimum catch size of 70 cm (first introduced in 1964), and from 2011 no directed fishery.

Information from the fishing industry

Reports suggest that the zero TAC in 2011 and 2012 have increased the discards of spurdogs in mixed fisheries.

Revisions in data and methodologies

The benchmark assessment in 2011 has not been updated. Accurate catch data from 2011 are not available.

Uncertainties in assessment and advice

Because of the number of assumptions made within the assessment model, uncertainty is likely to be underestimated. Estimates of total landings of Northeast Atlantic spurdog have been used, together with UK length–frequency distributions. However, there are still concerns over the quality of the data as a consequence of (a) uncertainty in the historical level of catches because of misreporting and generic landings categories; (b) lack of commercial length–frequency information for countries other than the UK; and (c) lack of discard information. In addition, survey data examined should be extended to cover the whole stock. Future assessments require updated and validated growth parameters (particularly for larger individuals) and better estimates of natural mortality.

Comparison with previous assessment and advice

The basis for the assessment has not changed from last year.

Sources

ICES. 2012. Report of the Working Group on Elasmobranch Fishes (WGEF), Lisbon, 19–26 June 2012. ICES CM 2012/ACOM:19.

Punt, A. E., and Walker, T. I. 1998. Stock assessment and risk analysis for the school shark (*Galeorhinus galeus*) off southern Australia. Marine and Freshwater Research, 49(7): 719–731.

Table 9.4.6.1 Spurdog in the Northeast Atlantic. ICES advice, management, and landings.

Year	ICES Advice	Predicted catch corresp. to advice	Agreed TAC	ICES Landings [4]
1999	None		8.9[1]	12.4
2000	None		8.9[1]	15.9
2001	None		8.9[1]	16.7
2002	None		7.1[1]	11.0
2003	None		5.6[1]	12.2
2004	None		4.5[1]	9.4
2005	None		1.1[1]	8.4
2006	F=0	0	1.1[1]	4.1
2007		0	3.7[2]	2.9
2008	F=0	0	2.6[3]	1.8
2009	no fishery	0	1.4	2.6
2010	No new advice, same as for 2009	0	0.142[5]	1.3
2011	F=0	0	0	0.6
2012	F=0	0	0	
2013	F=0	0		
2014	No new advice, same as for 2013	0		

Weights in thousand tonnes.
(1) TAC for ICES Subarea IV and Division IIa (EC).
(2) Combined TAC for ICES Subarea IV and Division IIa (EC) and for ICES Division and Subareas IIIa , I, V, VI, VII, VIII, XII, and XIV (EU and international waters).
(3) Combined TAC for ICES Subarea IV and Division IIa (EC) and for ICES Subareas I, V, VI, VII, VIII, XII, and XIV (EU and international waters).
(4) Landings for total stock area: Subareas I–IX.
(5) Landing of bycatch permitted up to 10% of the 2009 quota.

Table 9.4.6.2 Spurdog in the Northeast Atlantic. Landings (tonnes) by country (1980–2011).

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 slands	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 9.4.6.2 Continued

Country	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	430	443	382	354	400	410	23	11	13	20	17	0	0	7	1	0
Denmark	142	196	126	131	146	156	107	232	219	82	68	0	0	0	14	26
Faroe Islands	51	218	362	486	368	613	340	224	295	225	271	241	144	462	179	104
France	1607	1555	1286	998	4342	4304	2569	1705	1062	2426	715	453	366	577	348	131
Germany	38	21	31	54	194	304	121	98	138	144	6	0	0	1	1	1
Iceland	156	106	80	57	107	199	276	200	142	71	75	36	52	102	58	53
Ireland	2305	2214	1164	904	905	1227	1214	1416	1076	940	614	558	163	214	26	11
Netherlands	0	0	0	0	28	39	27	10	25	41	34	28	26	5	7	2
Norway	2748	1567	1293	1461	1643	1424	1091	1119	1054	1010	790	616	711	543	541	246
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	120	100	46	21	2	3	4	4	9	6	10	9	4	2	2	0
Russia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	0	0	28	95	372	363	306	135	17	71	106	16	15	32	6	4
Sweden	154	196	140	114	123	238	0	275	244	170	148	95	9	80	5	0
UK (E&W)	2670	3066	4480	4461	3654	4516	2823	3109	1729	1887	434	386	91	194	8	0
UK (Sc)	6873	5665	4501	3248	3606	2897	2120	3708	3342	1263	766	415	178	345	56	1
Total	17 294	15 347	13 919	12 384	15 890	16 693	11 020	12 246	9365	8356	4054	2853	1759	2564	1251	578