

Saithe (*Pollachius virens*) in Division 5.a (Iceland grounds)

ICES advice on fishing opportunities

ICES advises that when the Icelandic management plan is applied, catches in the fishing year 2021/2022 should be no more than 77 561 tonnes.

Stock development over time

ICES assesses that fishing pressure on this stock is below HR_{MGT} , HR_{MSY} , HR_{pa} , and HR_{lim} ; spawning stock size is above $MSY B_{trigger}$, B_{pa} , and B_{lim} .

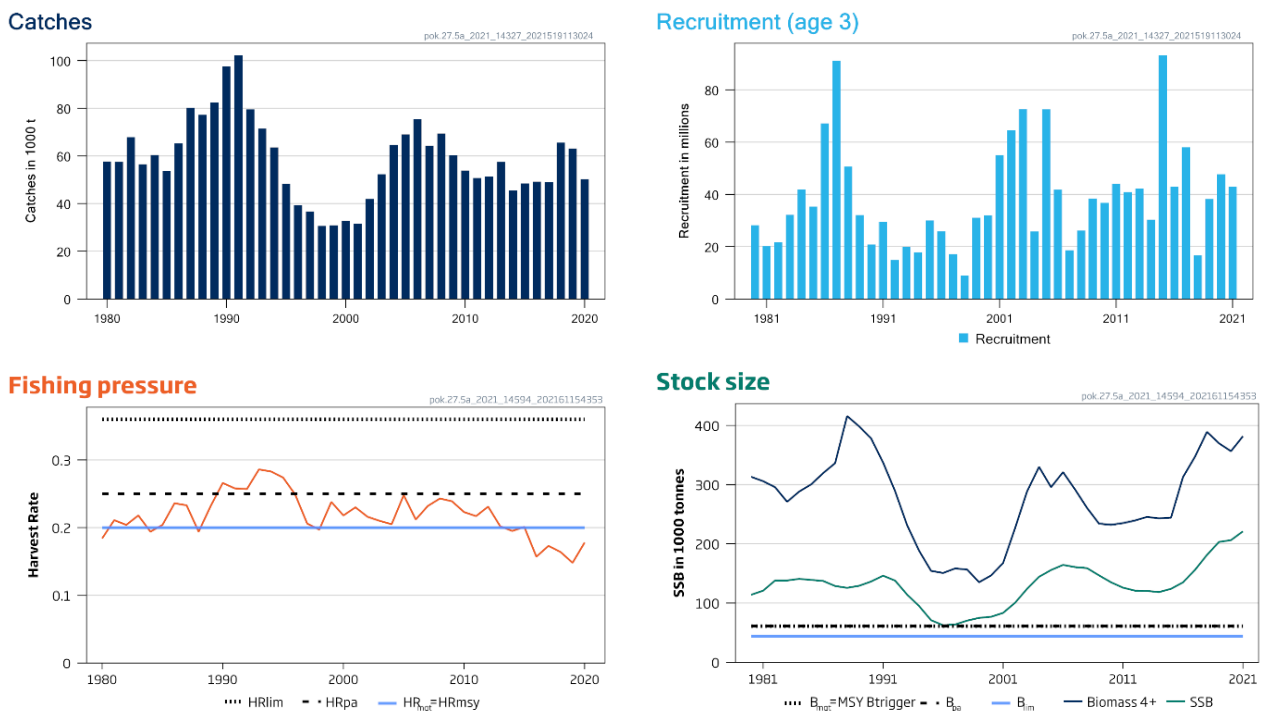


Figure 1 Saithe in Division 5.a. Summary of the stock assessment. Harvest rates are calculated based on biomass age 4+. All biomass reference points refer to SSB levels (SSB is shown as a black line on the plot). For this stock, $MGT B_{trigger} = MSY B_{trigger}$.

Catch scenarios

Table 1 Saithe in Division 5.a. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
HR (2021)	0.195	Based on a catch of 69 824 in 2021
B4+(2021)	38 1839	From assessment model; tonnes
SSB (2022)	213 236	Short-term forecast; tonnes
R _{age 3} (2021)	42 937	From assessment model; thousands
R _{age 3} (2022)	35 496	Geometric mean of recruitment (GM, 1983–2020); thousands
Total catch (2021)	69 824	Based on development in landings 2021 compared to recent years; tonnes

Table 2 Saithe in Division 5.a. Annual catch scenarios. All weights are in tonnes.

ICES advice basis	Total catch (2021/2022)	HR (2022)	SSB (2023)	% SSB change *	% TAC change **	% Advice change ***
Management plan	77 561	0.202	193 296	-10%	-1%	-

* SSB 2023 relative to SSB 2022.

** Advised catches for 2021/2022 relative to TAC for 2020/2021 (78 574 tonnes).

*** No advice was requested for 2020/2021. Advice for 2020/2021 was issued by MFRI based the same method agreed by ICES (78 574 tonnes).

Basis of the advice

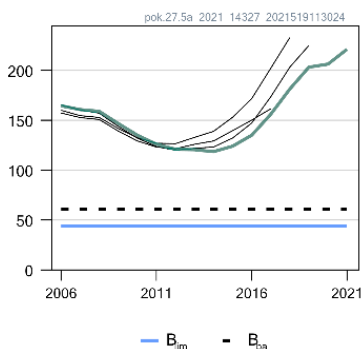
Table 3 Saithe in Division 5.a. The basis of the advice.

Advice basis	Management plan (Icelandic MII, 2019).
Management plan	<p>The Icelandic Ministry of Industries and Innovation’s fisheries has a management plan for Icelandic saithe (Icelandic MII, 2019). The plan aims at providing long-term maximum sustainable yield and has been evaluated by ICES (ICES, 2019a). The plan is considered to be precautionary. According to the management plan, the TAC for the fishing year Y/Y+1 (1 September of year Y to 31 August of year Y+1) is calculated as follows:</p> <p>If $SSB_Y \geq MGT B_{trigger}$:</p> $TAC_{Y/Y+1} = 0.5 \times 0.2 B_{4+,Y} + 0.5 \times TAC_{Y-1/Y}$ <p>If $SSB_Y < MGT B_{trigger}$:</p> $TAC_{Y/Y+1} = \frac{SSB_Y}{MGT B_{trigger}} \left\{ \left(1 - 0.5 \frac{SSB_Y}{MGT B_{trigger}} \right) 0.2 B_{4+,Y} + 0.5 TAC_{Y-1/Y} \right\}$ <p>where $B_{4+,Y}$ is the biomass of saithe aged 4 and older in year Y, and $MGT B_{trigger} = 61\ 000$ tonnes.</p>

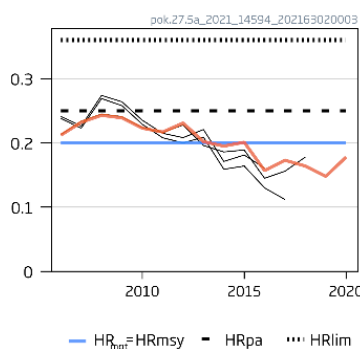
Quality of the assessment

The combination of uncertain survey indices, particularly for recruitment, and time-varying fleet selectivity leads to high uncertainty in the estimates of current SSB and fishing mortality. The management plan has been designed to take these uncertainties into account.

SSB (1000 t)



Fishing pressure



Rec (age 3; Millions)

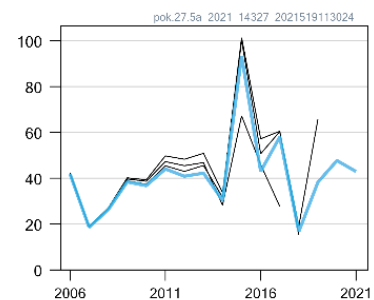


Figure 2 Saithe in Division 5.a. Historical assessment results. The reference points were revised in 2019 following a benchmark, and only assessment results from the last three years should be compared to the reference points indicated. No ICES assessment was conducted in 2020.

Issues relevant for the advice

There is no information to present for this stock.

Reference points

Table 4 Saithe in Division 5.a. Reference points, values, and their technical basis. All weights are in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	61 000	B_{pa} ; in tonnes	ICES(2019b)
	HR_{MSY}	0.2	Stochastic HCR evaluation (SSB 95% of the time over B_{lim})	ICES (2019b)
Precautionary approach	B_{lim}	44 000	$B_{pa} / \exp(1.645 \times \sigma)$, $\sigma = 0.2$; in tonnes	ICES (2019b)
	B_{pa}	61 000	B_{loss}	ICES (2019b)
	HR_{lim}	0.36	Equilibrium HR that will maintain the stock above B_{lim} with a 50% probability.	ICES (2019b)
	HR_{pa}	0.25	HR leading to $P(SSB > B_{lim}) > 95\%$ with $B_{trigger}$	ICES (2021b)
Management plan	MGT $B_{trigger}$	61 000	B_{pa}	ICES (2019b)
	HR_{MGT}	0.2	Stochastic HCR evaluation (SSB > 95% of the time over B_{lim}). Realized harvest rates can range from 0.14 to 0.29	ICES (2019b)

Basis of the assessment

Table 5 Saithe in Division 5.a. Basis of the assessment and advice.

ICES stock data category	1 (ICES, 2021a)
Assessment type	Separable statistical catch-at-age model, with changes in selectivity for three different time periods, using catches in the model and in the forecast (ICES, 2021b).
Input data	Catch-at-age and age-disaggregated abundance indices from the spring groundfish survey (IS-SMB; G3239).
Discards and bycatch	Discarding is considered negligible.
Indicators	None.
Other information	The stock was benchmarked and harvest control rules evaluated in 2019 (ICES, 2019a, 2019b).
Working group	North-Western Working Group (NWWG).

History of the advice, catch, and management

Table 6 Saithe in Division 5.a. ICES advice, TACs, and catches (for fishing year after 1991). All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	ICES catch
1987 *	TAC	64 000	70 000	80 531
1988 *	TAC	64 000	80 000	77 247
1989 *	TAC	80 000	80 000	82 411
1990 *	TAC	80 000	90 000	98 127
1991 *	TAC	87 000	65 000	102 737
1991/1992	TAC	70 000	75 000	88 000
1992/1993	Marginal gains from increase in F	75 000	95 000	78 000
1993/1994	No measurable gains from increase in F	84 000	85 000	69 000
1994/1995	No measurable gains from increase in F	72 000	75 000	61 000
1995/1996	No measurable gains from increase in F	65 000	70 000	41 000
1996/1997	No measurable gains from increase in F	52 000	50 000	38 000
1997/1998	F below $F_{med} = 0.23$	30 000	30 000	33 000
1998/1999	F below 60% of $F_{(97)}$	28 000	30 000	30 816
1999/2000	F below 60% of $F_{(98)}$	24 000	30 000	29 646
2000/2001	F = 70% of $F_{(99)}$	25 000	30 000	31 337
2001/2002	No directed fishing	-	37 000	36 230
2002/2003	2/3 F_{pa} to rebuild stock	24 000	45 000	47 471
2003/2004	No advice	-	50 000	55 953
2004/2005	F_{pa}	69 000	70 000	70 609
2005/2006	F_{pa}	78 000	80 000	77 882
2006/2007	F_{pa}	81 000	80 000	66 467
2007/2008	No advice	-	75 000	66 719
2008/2009	Maintain $SSB > B_{pa}$	< 22 000	65 000	61 981
2009/2010	F reduced below 0.22	< 34 000	50 000	57 404
2010/2011	F_{MSY}	< 40 000	50 000	51 592

Year	ICES advice	Catch corresponding to advice	Agreed TAC	ICES catch
2011/2012	F _{MSY}	≤ 45 000	52 000	49 664
2012/2013	MSY framework [B-rule]	≤ 49 000	50 000	51 275
2013/2014	Management plan [20% HCR]	57 000	57 000	54 335
2014/2015	Management plan [20% HCR]	58 000	58 000	52 033
2015/2016	Management plan [20% HCR]	55 000	55 000	49 253
2016/2017	Management plan [20% HCR]	< 55 000	55 000	44 980
2017/2018	Management plan [20% HCR]	60 237	60 237	59 018
2018/2019	Management plan	79 092	79 092	70 324
2019/2020	Management plan	≤ 80 588	80 588	53 221
2020/2021	No advice requested	**	78 574	
2021/2022	Management plan	≤77 561		

* Calendar year.

** Advice for 2020/2021 was issued by MFRI based the same method agreed by ICES (78 574 tonnes).

History of the catch and landings

Table 7 Saithe in Division 5.a. Catch distribution by fleet in 2020 as estimated by ICES. All weights are in tonnes.

Catch (2020)	Landings			Discards
50 252	Bottom trawl 87%	Gillnets 5%	Other 8%	Discarding is negligible
	50 252 tonnes			

Summary of the assessment

Table 8 Saithe in Division 5.a. Assessment summary. Weights are in tonnes.

Year	Recruitment (Age 3) in thousands	Stock size		Harvest rate B ₄₊	Total catch
		SSB	Reference biomass ages 4+		
1980	28 202	113 989	313 226	0.184	57 659
1981	20 207	120 935	305 829	0.211	57 548
1982	21 601	138 160	295 583	0.204	67 865
1983	32 202	138 137	271 014	0.218	56 504
1984	41 887	140 835	288 257	0.194	60 405
1985	35 353	139 099	300 407	0.204	53 728
1986	67 154	137 337	319 432	0.236	65 230
1987	91 161	128 782	336 262	0.233	80 237
1988	50 608	125 705	415 870	0.194	77 244
1989	32 094	129 166	398 439	0.232	82 339
1990	20 850	136 385	378 036	0.266	97 537
1991	29 491	146 201	337 221	0.258	102 201
1992	14 889	137 881	288 887	0.257	79 568
1993	19 931	114 287	231 551	0.286	71 539
1994	17 798	94 917	188 390	0.283	63 559
1995	30 073	71 047	154 330	0.274	48 296
1996	25 924	62 473	150 789	0.249	39 352
1997	17 124	63 744	158 423	0.206	36 671
1998	8858	70 333	156 643	0.197	30 657
1999	31 045	74 949	135 146	0.238	30 898
2000	31 950	76 804	146 626	0.218	32 751
2001	55 011	83 318	167 536	0.23	31 570
2002	64 453	100 454	226 383	0.216	41 969
2003	72 637	124 024	288 524	0.21	52 306

Year	Recruitment (Age 3) in thousands	Stock size		Harvest rate B ₄₊	Total catch
		SSB	Reference biomass ages 4+		
2004	25 825	144 353	329 956	0.205	64 668
2005	72 602	155 789	295 800	0.248	69 054
2006	41 879	164 432	321 035	0.212	75 462
2007	18 606	160 733	291 875	0.232	64 261
2008	26 206	158 987	260 714	0.243	69 426
2009	38 379	146 740	234 131	0.239	60 266
2010	36 755	135 041	232 054	0.223	53 853
2011	44 030	126 005	235 057	0.217	50 769
2012	40 882	120 921	239 540	0.231	51 252
2013	42 239	120 486	245 511	0.202	57 522
2014	30 350	118 542	243 102	0.195	45 538
2015	93 208	124 018	244 215	0.201	48 476
2016	42 948	134 950	312 725	0.157	49 223
2017	58 019	156 014	347 182	0.173	49 054
2018	16 676	181 304	389 137	0.164	65 583
2019	38 249	203 212	369 801	0.148	63 130
2020	47 693	206 253	356 491	0.178	50 245
2021	42 937	221 147	381 839		

Sources and references

ICES. 2019a. Workshop on the benchmark assessment and management plan evaluation for Icelandic haddock and saithe (WKICEMSE). ICES Scientific Reports. 1:10. 107 pp. <http://doi.org/10.17895/ices.pub.5091>.

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ICES. 2021b. North-Western Working Group (NWWG). ICES Scientific Reports. 3:52. <https://doi.org/10.17895/ices.pub.8186>.

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

Recommended citation: ICES. 2021. Saithe (*Pollachius virens*) in Division 5.a (Iceland grounds). *In* Report of the ICES Advisory Committee, 2021. ICES Advice 2021, pok.27.5a, <https://doi.org/10.17895/ices.advice.7828>.