

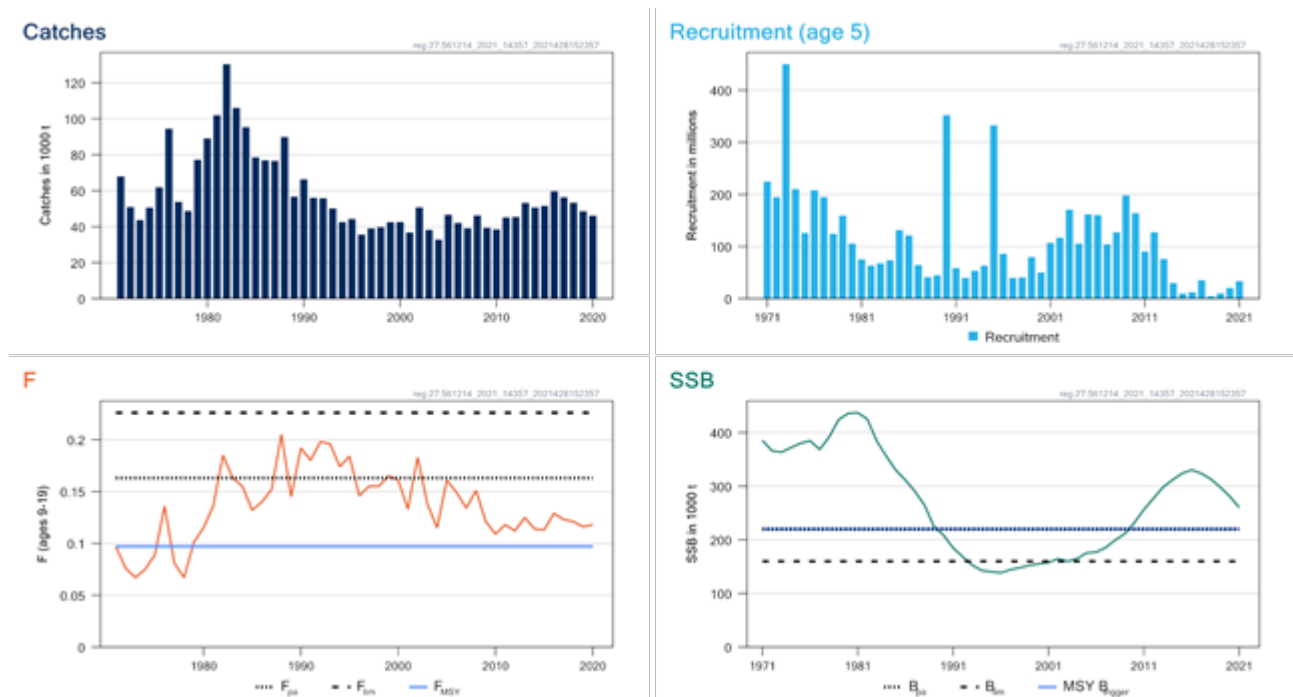
## Golden redfish (*Sebastes norvegicus*) in subareas 5, 6, 12, and 14 (Iceland and Faroes grounds, West of Scotland, North of Azores, East of Greenland)

### ICES advice on fishing opportunities

ICES advises that when the Greenlandic and Icelandic management plan for golden redfish is applied, catches in 2022 should be no more than 31 855 tonnes.

### Stock development over time

ICES assesses that fishing pressure on the stock is above  $F_{MSY}$  and below  $F_{pa}$  and  $F_{lim}$ , and that spawning-stock size is above  $MSY B_{trigger}$ ,  $B_{pa}$ , and  $B_{lim}$ .



**Figure 1** Golden redfish in subareas 5, 6, 12, and 14. Summary of the stock assessment.

### Catch scenarios

**Table 1** Golden redfish in subareas 5, 6, 12, and 14. Assumptions made for the interim year and in the forecast.

Variable	Value	Notes
$F_{ages\ 9-19}$ (2021)	0.121	From the forecast for 2021, based on assumed catch in 2021.
SSB (2022)	237 099	Projected from the assessment; tonnes.
$R_{age\ 5}$ (2021)	33.2	From the assessment; millions.
$R_{age\ 5}$ (2022)	41.2	Average of the five smallest year classes in 1980–2007; millions.
Total catch (2021)	43 422	Sum of expected landings, accounting for interannual transfer from 2020; tonnes.

**Table 2** Golden redfish in subareas 5, 6, 12, and 14. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2022)	F <sub>9-19</sub> (2022)	SSB (2023)	% SSB change *	% advice change **
ICES advice basis					
Management plan	31 855	0.1	221 719	-6.3	-17
Other scenarios					
F = 0	0	0	250 829	6.6	-100
F <sub>MSY</sub>	30 883	0.097	222 608	-6.1	-19
Fsq = F <sub>2020</sub>	37 170	0.118	216 864	-8.5	-3

\* SSB 2023 relative to SSB 2022.

\*\* Advice value for 2022 relative to the advice value for 2021.

Advised catch has decreased because the stock is estimated to be smaller than last year.

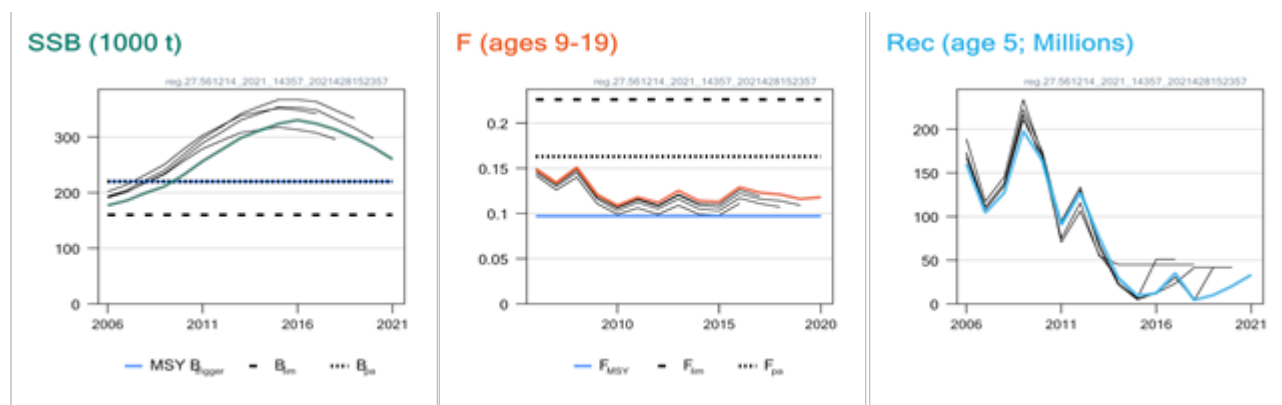
### Basis of the advice

**Table 3** Golden redfish in subareas 5, 6, 12, and 14. The basis of the advice.

Advice basis	Greenland and Iceland management plan for golden redfish.
Management plan	<p>A management plan for golden redfish, aimed at providing maximum sustainable yield, has been evaluated by ICES (ICES, 2014) and is considered to be precautionary. ICES has been requested to give advice according to this plan.</p> <p>The management plan states that:</p> <ul style="list-style-type: none"> <li>• If <math>SSB_Y \geq SSB_{MGT}</math>: the catch for year Y+1 corresponds to the fishing mortality <math>F_{Y+1} = F_{MGT}</math></li> <li>• If <math>SSB_Y &lt; SSB_{MGT}</math>: the catch for year Y+1 corresponds to <math>F_{Y+1} = F_{MGT} \times SSB_Y / SSB_{MGT}</math></li> </ul> <p>where <math>SSB_Y</math> is the spawning-stock biomass in year Y, <math>F_{MGT} = 0.097</math>, and <math>SSB_{MGT} = 220\ 000</math> tonnes. The expected range of realized fishing mortality (F) following the management plan (<math>F_{MGT}</math>) is between 0.07 and 0.16</p>

### Quality of the assessment

This assessment is considered to be uncertain, but consistent with previous assessments. Because of the aggregating behavior of the species, survey indices are often largely dominated by a few large hauls. This causes high uncertainties in the survey indices, and large interannual fluctuation in estimates of the biomass index. The catch-at-age data show very low recruitment, which is consistent with the information from the survey indices.



**Figure 2** Golden redfish in subareas 5, 6, 12, and 14. Historical assessment results.

### Issues relevant for the advice

Since 2009, surveys of golden redfish have consistently shown very low abundance of small fish ( $\leq 30$  cm). This is consistent with patterns seen in a number of other redfish stocks in the area. While current indices of adult biomass are high but decreasing, the absence of any indications of incoming cohorts raises concerns about the productivity of the stock.

The Icelandic quota year runs from 1 September to 31 August the following year. This explains the discrepancy between the expected catches in 2021 shown in Table 1 and the TAC for 2021 shown in Table 6.

## Reference points

**Table 4** Golden redfish in subareas 5, 6, 12, and 14. Reference points, values, and their technical basis. All weights are in tonnes.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	220 000	$B_{pa}$	ICES (2014)
	$F_{MSY}$	0.097	Average of ages 9–19. $F_{max}$ in the 2012 Gadget assessment, leading to < 1% probability of going below $B_{lim}$ , based on recruitment patterns since 1975 and with large assessment uncertainty.	ICES (2014)
Precautionary approach	$B_{lim}$	160 000	Lowest SSB in the 2012 Gadget assessment.	ICES (2014)
	$B_{pa}$	220 000	$B_{lim} \times \exp(0.2 \times 1.645)$	ICES (2014)
	$F_{lim}$	0.226	The F that leads to $B_{lim}$ in the long term. From stochastic simulations.	ICES (2014)
	$F_{pa}$	0.163	$F_{lim} / \exp(0.2 \times 1.645)$	ICES (2014)
Management plan	$SSB_{MGT}$	220 000	MSY $B_{trigger}$	ICES (2014)
	$F_{MGT}$	0.097	$F_{MSY}$	ICES (2014)

## Basis of the assessment

**Table 5** Golden redfish in subareas 5, 6, 12, and 14. Basis of assessment and advice.

ICES stock data category	1 ( <a href="#">ICES, 2021a</a> ).
Assessment type	Analytical assessment (Gadget model) that uses catches in the model and in the forecast (ICES, 2021b).
Input data	Landings data and length distributions of catches from Iceland, Greenland, and the Faroes; survey data by length from the Icelandic bottom trawl survey - Spring (IS-SMB; [G3239]) - Marsrall, and Greenlandic Groundfish survey (GGS; [G3244]); age data from Icelandic catches and the Icelandic bottom trawl survey - Autumn (IS-SMH; [G4493]) - Haustrall.
Discards and bycatch	Considered negligible.
Indicators	None.
Other information	Benchmarked in 2014 (ICES, 2014).
Working group	North-Western Working Group ( <a href="#">NWWG</a> ).

## History of the advice, catch, and management

**Table 6** Golden redfish in subareas 5, 6, 12, and 14. ICES advice, TACs, and ICES catch. All weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Iceland TAC *,##	Greenland TAC	ICES catch
1987	No increase in F	83 000	95 000		77 127
1988	No increase in F	84 000	85 000		89 989
1989	TAC*	117 000 *	77 000		57 050
1990	TAC*	116 000 *	80 000		66 632
1991	Precautionary TAC	77 000 (117 000 *)	55 000 #		56 364
1992	Precautionary TAC	76 000 (116 000 *)	90 000		55 710
1993	Precautionary TAC*	120 000 *	104 000		50 350
1994	Precautionary TAC, if required	100 000 *	90 000		42 515
1995	TAC	90 000 *	77 000		44 765
1996	TAC for Division 5.a (28000 tonnes); precautionary TAC for Division 5.b and Subarea 15 (4000 tonnes)	32 000 **	65 000		36 597
1997	Effort 75% of 1995 value	32 000 **	65 000		39 761
1998	Effort reduced in steps of 25% from the 1995 level	37 200 **	65 000		39 825

Year	ICES advice	Catch corresponding to advice	Iceland TAC *,###	Greenland TAC	ICES catch
1999	Effort not increased compared to 1997	35 000 **	65 000		42 040
2000	Catch not increased compared to 1998	35 000 **	60 000		43 550
2001	Effort not increased compared to 1999	33 000 **,^	57 000		37 326
2002	25% reduction in effort	29 000 ^^	65 000		51 092
2003	25% reduction in effort (2001)	31 000 ^^	60 000		39 220
2004	25% reduction in effort (2002)	37 400 ^^	57 000		33 451
2005	Maintain fishable biomass above Upa	37 000 ^^	57 000		45 329
2006	Maintain fishable biomass above Upa	37 000 ^^	57 000		42 211
2007	Maintain fishable biomass above Upa	37 000 ^^	57 000	5000 ~	39 134
2008	Maintain fishable biomass above Upa	37 000 ^^	57 000	1000 ~	46 251
2009	Maintain fishable biomass above Upa	< 30 000	50 000		39 177
2010	Maintain fishable biomass above Upa	< 30 000	50 000	6000 ~	38 648
2011	Same advice as last year	< 30 000	37 500	8500 ~	45 354
2012	Maintain catches	< 40 000	40 000	8500 ~	45 635
2013	Maintain catches	< 40 000	45 000	8500 ~	53 263
2014	20% increase in catches (relative to 2010–2012)	< 51 980	52 000	8500 ~	50 736
2015	Management plan	< 47 300	45 600	8500 ~	51 645
2016	Management plan	< 51 000	48 500	8500 ~	59 698
2017	Management plan	≤ 52 800	47 205	7520 ~	56 101
2018	Management plan	≤ 50 800	45 450	6222 ~	53 428
2019	Management plan	≤ 43 600	39 240	5274 ~	48 464
2020	Management plan	≤ 43 568	38 896	5271 ~	46 190
2021	Management plan	≤ 38 343	34 379	4748 **	
2022	Management plan	≤ 31 855			

\* Deep-sea *S. mentella* and *S. norvegicus* combined until 2010.

\*\* *S. norvegicus* only.

^ In Division 5.a only.

^^ Both divisions 5.a and 5.b and Subarea 14.

# Year ending 31 August.

### From 1992 onwards: quota year September–August.

~ Demersal redfish (*Sebastes norvegicus* and *S. mentella*).

## History of the catch and landings

**Table 7** Golden redfish in subareas 5, 6, 12, and 14. Catch distribution by fleet in 2020 as estimated by ICES. All weights are in tonnes.

Catch (2020)	Landings		Discards
	Bottom trawl 92%	Other gear 8%	
46 190	46 190		Discarding is considered negligible

**Table 8** Golden redfish in subareas 5, 6, 12, and 14. History of commercial catch; ICES estimated values are presented by area in the fishery. All weights are in tonnes.

Year	Area				Total
	Division 5.a	Division 5.b	Subarea 6	Subarea 14	
1978	31 300	2039	313	15 477	49 129
1979	56 616	4805	6	15 787	77 214
1980	62 052	4920	2	22 203	89 177
1981	75 828	2538	3	23 608	101 977
1982	97 899	1810	28	30 692	130 429
1983	87 412	3394	60	15 636	106 502
1984	84 766	6228	86	5040	96 120
1985	67 312	9194	245	2117	78 868
1986	67 772	6300	288	2988	77 348
1987	69 212	6143	576	1196	77 127
1988	80 472	5020	533	3964	89 989
1989	51 852	4140	373	685	57 050
1990	63 156	2407	382	687	66 632
1991	49 677	2140	292	4255	56 364
1992	51 464	3460	40	746	55 710
1993	45 890	2621	101	1738	50 350
1994	38 669	2274	129	1443	42 515
1995	41 516	2581	606	62	44 765
1996	33 558	2316	664	59	36 597
1997	36 342	2839	542	37	39 761
1998	36 771	2565	379	109	39 825
1999	39 824	1436	773	7	42 040
2000	41 187	1498	776	89	43 550
2001	35 067	1631	535	93	37 326
2002	48 570	1941	392	189	51 092
2003	36 577	1459	968	215	39 220
2004	31 686	1139	519	107	33 451
2005	42 593	2484	137	115	45 329
2006	41 521	656	0	34	42 211
2007	38 364	689	0	83	39 134
2008	45 538	569	64	80	46 251
2009	38 442	462	50	224	39 177
2010	36 155	620	220	1653	38 648
2011	43 773	493	83	1005	45 354
2012	43 103	491	41	2017	45 635
2013	51 330	372	92	1499	53 263
2014	47 769	201	60	2706	50 736
2015	48 769	270	44	2562	51 645
2016	54 041	165	50	5442	59 698
2017	50 119	1397	93	4501	56 101
2018	48 014	1330	80	4004	53 428
2019	44 746	1053	101	2665	48 464
2020*	40 688	1297	100	4105	46 190

\* Preliminary.

**Summary of the assessment**

**Table 9** Golden redfish in subareas 5, 6, 12, and 14. Assessment summary. ICES Subarea 6 is not considered part of the stock and catches are not included in the assessment. Weights are in tonnes. Recruitment in thousands.

Year	Recruitment Age 5	SSB	Catches	F Ages 9–19
1971	224 600	385 364	67 880	0.097
1972	194 600	366 016	50 890	0.076
1973	449 800	363 465	43 719	0.067
1974	210 000	371 946	50 598	0.075
1975	126 000	380 040	61 920	0.089
1976	208 000	384 693	94 420	0.136
1977	194 700	368 349	53 753	0.081
1978	124 300	391 917	48 736	0.067
1979	159 300	424 207	77 212	0.101
1980	105 500	435 865	89 143	0.115
1981	75 100	437 113	101 966	0.136
1982	63 500	425 061	130 322	0.185
1983	67 600	383 937	106 050	0.163
1984	73 600	355 600	95 288	0.155
1985	131 300	329 523	78 531	0.132
1986	121 200	311 358	76 908	0.140
1987	64 500	290 108	76 559	0.152
1988	41 000	264 653	89 804	0.21
1989	44 700	224 158	56 645	0.145
1990	351 900	208 638	66 314	0.192
1991	58 600	184 710	56 015	0.180
1992	39 800	168 464	55 826	0.198
1993	53 300	152 681	50 179	0.196
1994	63 100	142 758	42 520	0.174
1995	332 400	140 425	44 263	0.184
1996	85 700	138 562	35 595	0.146
1997	39 900	144 271	38 996	0.155
1998	40 600	148 107	39 694	0.155
1999	79 600	152 416	42 463	0.165
2000	50 100	155 307	42 607	0.161
2001	106 800	157 792	36 744	0.133
2002	116 600	164 665	50 730	0.183
2003	170 500	159 968	38 219	0.138
2004	105 500	165 141	32 766	0.115
2005	161 700	175 637	46 619	0.161
2006	160 300	177 029	42 108	0.149
2007	104 200	185 676	39 154	0.134
2008	127 400	199 490	46 195	0.151
2009	198 100	211 267	39 301	0.121
2010	163 900	232 027	38 504	0.109
2011	90 300	256 507	45 146	0.118
2012	127 300	277 152	45 423	0.112
2013	75 800	298 153	53 223	0.125
2014	29 800	311 737	50 697	0.114
2015	9 600	323 870	51 621	0.113
2016	12 200	330 363	59 697	0.129
2017	35 200	323 901	56 334	0.123
2018	4 400	313 496	53 368	0.121
2019	10 000	298 408	48 484	0.116
2020	20 400	281 111	46 090	0.118
2021	33 200	260 093		

## Sources and references

ICES. 2014. Iceland, Faroe Islands, and Greenland request to ICES on evaluation of a proposed long-term management plan and harvest control rule for golden redfish (*Sebastes marinus*). In Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 2, Section 2.2.3.1. <https://doi.org/10.17895/ices.advice.5289>.

ICES. 2021a. Advice on fishing opportunities. In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, Section 1.1.1. <https://doi.org/10.17895/ices.advice.7720>.

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

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

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