

Golden redfish (*Sebastes norvegicus*) in subareas 1 and 2 (Northeast Arctic)

ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, there should be zero catch in each of the years 2023 and 2024.

Stock development over time

Spawning-stock size is below B_{pa} , and B_{lim} ; no reference points for fishing pressure have been defined for this stock.

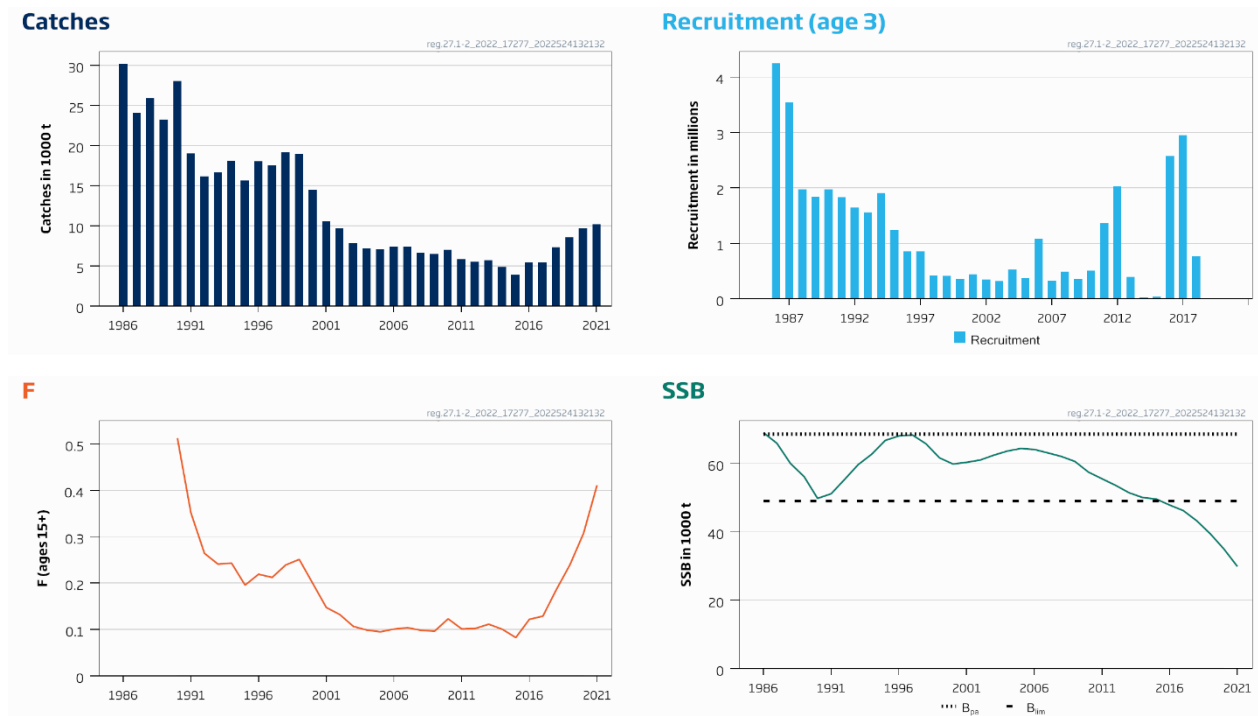


Figure 1 Golden redfish in subareas 1 and 2. Summary of the stock assessment. Recruitment is shown until 2018 only; recruitment estimates for 2019–2021 are not available.

Catch scenarios

The stock is below the biomass limit reference point (B_{lim}). The contribution of the relatively strong 2003 year class to the fishable biomass is still small and uncertain. Until there is evidence that recruits are contributing to the fishable population, ICES is not able to identify catch levels that will, with high probability, give an increase in stock size above B_{lim} . Therefore, the advice is for zero catch. This applies to both commercial and recreational fishing.

Table 1 Golden redfish in subareas 1 and 2. Values in the forecast and for the interim year.

Variable	Value	Notes
$F_{ages\ 15+}$ (2022)	0.36	Based on a catch of 10 193 tonnes for 2022.
SSB (2023)	25 088	Short-term forecast; tonnes.
$R_{age\ 3}$ (2022 onwards)	n/a	Recruits in the intermediate year do not enter the fishery or the SSB in the forecast.
Total catch (2022)	10 193	Status quo catch (2021); tonnes.

Table 2 Golden redfish in subareas 1 and 2. Annual catch scenarios. All weights are in tonnes.

Basis	Total catch (2023)	F total (2023)	SSB (2024)	% SSB change *	% TAC change**	% advice change***
ICES advice basis						
F = 0	0	0	29 362	17	0	0

* SSB 2024 relative to SSB 2023.

** Catch advice in 2023 relative to TAC in 2022 (0 tonnes).

*** Catch advice in 2023 relative to the advice value for 2022 (0 tonnes).

Basis of the advice

Table 3 Golden redfish in subareas 1 and 2. The basis of the advice.

Advice basis	Precautionary approach
Management plan	ICES is not aware of any agreed precautionary management plan for golden redfish in this area

Quality of the assessment

This species is difficult to distinguish from the *Sebastes mentella* stock in the same area, particularly for juvenile specimens. Given that the *S. mentella* stock is at a much higher biomass level, this raises the possibility that some or all of those identified as juvenile *S. norvegicus* in the survey data, and as larger individuals in the catch, may be misidentified *S. mentella*. This implies a high level of uncertainty concerning the size of the most recent sign of good recruitment (the 2008- and 2009-year classes), and some uncertainty remains around the size of the 2003-year class as these fish are similar sizes to *S. mentella*.

A change in the method for splitting redfish catch between *S. mentella* and *S. norvegicus* has resulted in an upwards revision of the catch history and hence a large upward revision in the 2022 assessment. This is in addition to an ongoing trend for upward retrospectives in the SSB, which will need to be examined at the next benchmark.

The available survey data only cover the younger portions of the stock and therefore the model tuning data does not have good coverage of mature fish. This leads to a high dependency on fisheries data. Most fisheries report only “redfish”, and the fraction that is *S. norvegicus* is estimated based on historical landing patterns. Biological sampling data from the commercial catch are only available from the Norwegian fleet.

There has been a notable change in the age reading since 2018, which has affected the distribution and proportion of fish assessed as over age 30. The age data above age 29 was therefore excluded from the model tuning in 2018, 2019, and 2020. For 2021 no age data were available.

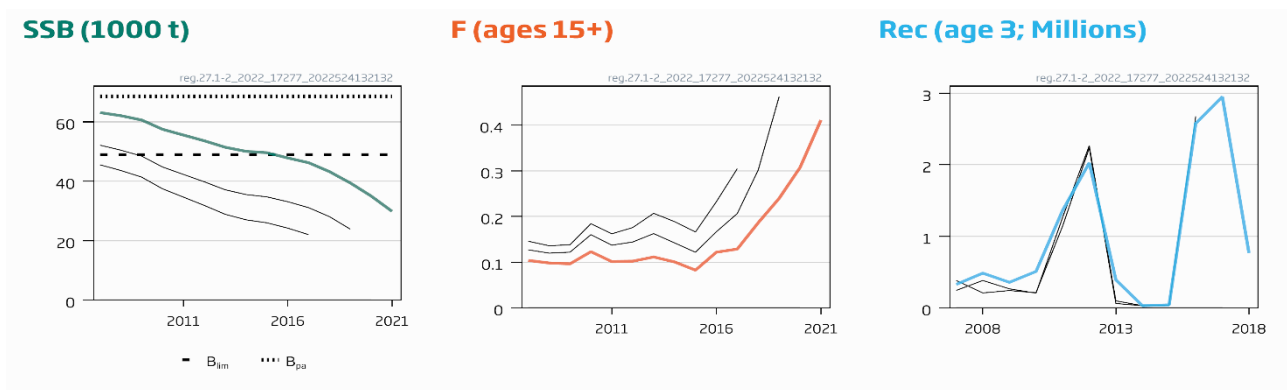


Figure 2 Golden redfish in subareas 1 and 2 (Northeast Arctic). Historical assessment results (Recruitment until 2018 only; recruitment estimates for 2019–2021 are not available).

Issues relevant for the advice

There is no significant direct fishery, and area closures have been enacted to attempt to reduce the bycatch mortality. However, fishing mortality has been rising in recent years, and a further bycatch reduction is needed to minimize all sources of fishing mortality. It is imperative to minimize catches of the remaining mature fish and to protect incoming recruits.

Reference points

Table 4 Golden redfish in subareas 1 and 2. Reference points, values, and their technical basis.

Framework	Reference point	Value	Technical basis	Source
MSY approach	MSY $B_{trigger}$	Not defined		
	F_{MSY}	Not defined		
Precautionary approach	B_{lim}	49 000	Defined as the lowest SSB leading to good recruitment (SSB in 2002, as estimated at AFWG in 2018)	ICES (2018a)
	B_{pa}	68 600	$B_{lim} \times \exp(1.645 \times 0.2)$	ICES (2018a)
	F_{lim}	Not defined		
	F_{pa}	Not defined		
Management plan	SSB_{mgt}	Not applicable		
	F_{mgt}	Not applicable		

Basis of the assessment

Table 5 Golden redfish in subareas 1 and 2. The basis of the assessment.

ICES stock data category	1 (ICES, 2022a).
Assessment type	Age-length structured model (Gadget [ICES, 2022b]).
Input data	Catch numbers-at-age and -length from the trawl, gillnet, and longline fisheries, by year; numbers-at-age-and -length from the winter survey in the Barents Sea (BS-NoRu-Q1-Btr; A6996); numbers-at-length from the coastal survey in the Barents Sea (NOcoast-Aco-Q4; A6335); commercial catches (total catch in tonnes, split by gear); one survey index (Barents Sea winter survey, total swept area estimate, length distributions, age and length distributions); annual maturity data from the Barents Sea winter survey; natural mortalities are assumed constant (at 0.05, following the WKRED 2012 benchmark).
Discards and bycatch	Discard estimates are not available. Discarding is assumed negligible. Bycatch is included.
Indicators	None.
Other information	The latest benchmark was in February 2018 (WKREDFISH; ICES, 2018b).
Working group	Arctic Fisheries Working Group (AFWG).

History of the advice, catch, and management

Table 6 Golden redfish in subareas 1 and 2. History of ICES advice, the agreed TAC, and the official and ICES catches. Weights are in tonnes.

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official catches*	ICES catches
1987	Precautionary TAC	-	-	34595	24075
1988	Reduction in F; TAC	15000	-	41494	25908
1989	<i>Status quo</i> F; TAC	24000	-	46688	23234
1990	<i>Status quo</i> F; TAC	23000	-	63156	28072
1991	Precautionary TAC	24000	-	67768	19041
1992	If required, precautionary TAC	25000	-	31773	16185
1993	Precautionary TAC	12000	12000	29465	16651
1994	If required, precautionary TAC	-	-	30841	18120
1995	If required, precautionary TAC	-	-	25900	15616
1996	If required, precautionary TAC	-	-	26118	18043
1997	If required, precautionary TAC	-	-	26109	17511
1998	Management plan required as a prerequisite to continued fishing	-	-	33200	19155

Year	ICES advice	Catch corresponding to advice	Agreed TAC	Official catches*	ICES catches
1999	Management plan required as a prerequisite to continued fishing	-	-	30195	18986
2000	Management plan required as a prerequisite to continued fishing	-	-	24536	14461
2001	Management plan required as a prerequisite to continued fishing	-	-	28965	10547
2002	Management plan required as a prerequisite to continued fishing	-	-	16636	9643
2003	Management plan required as a prerequisite to continued fishing	-	-	10360	7840
2004	No directed trawl fishery and low bycatch limits	-	-	12699	7206
2005	More stringent protective measures	-	-	15502	7036
2006	More stringent protective measures	-	-	40649	7388
2007	More stringent protective measures	-	-	27591	7372
2008	No directed fishery and low bycatch limits	-	-	19695	6599
2009	No directed fishery and low bycatch limits	-	-	16733	6487
2010	No directed fishery and low bycatch limits	-	-	18906	6981
2011	Same advice as last year	-	-	18814	5852
2012	Same advice as last year	-	-	16576	5517
2013	No fishery	-	-	15082	5673
2014	No fishery	-	-	23219	4825
2015	No fishery	-	-	29485	3873
2016	No fishery	-	-	40217	5463
2017	Precautionary approach: zero catch advice	0	-	36192	5472
2018	Precautionary approach: zero catch advice	0	-	45395	7341
2019	Precautionary approach: zero catch advice	0	-	54199	8559
2020	Precautionary approach: zero catch advice	0	-	63277	9644
2021	Precautionary approach: zero catch advice	0	-	73675**	10193**
2022	Precautionary approach: zero catch advice	0	-		
2023	Precautionary approach: zero catch advice	0	-		
2024	Precautionary approach: zero catch advice	0	-		

* Includes both *Sebastes mentella* and *S. norvegicus*. The working group has allocated redfish catches by species.

** Provisional figures.

Table 7 Golden redfish in subareas 1 and 2. Catches inside and outside the NEAFC Regulatory Area (RA) as estimated by ICES.

Year	Inside the NEAFC RA (tonnes)	Outside the NEAFC RA (tonnes)	Total catches (tonnes)	Proportion inside the NEAFC RA (%)
2017	5	5467	5472	0.1%
2018	0	7341	7341	0%
2019	0	8559	8559	0%
2020	0	9644	9644	0%
2021	0	10193	10193	0%

History of the catch and landings

Table 8 Golden redfish in subareas 1 and 2. Catch distribution by fleet in 2021 as estimated by ICES.

Total catch (2021)	Commercial landings				Discards	Recreational Fisheries
10 193 tonnes	15% gillnet	6% longline	74% trawl	5% other gears	Assumed to be negligible	Unknown
	10 193 tonnes					

Table 9 Golden redfish in subareas 1 and 2. History of ICES estimated commercial catches for each country participating in the fishery.

Year	Faroe Islands	France	Germany**	Greenland	Iceland	Netherlands	Norway	Portugal	Russian Federation***	Spain	UK (Eng. & Wales)	UK (Scot.)^	Ireland	Poland	Denmark	Total
1989	3	796	412	-	-	-	20662	-	1264	-	97	-	-	-	-	23234
1990	278	1679	387	1	-	-	23917	-	1549	-	261	-	-	-	-	28072
1991	152	706	981	-	-	-	15872	-	1052	-	268	10	-	-	-	19041
1992	35	1289	530	623	-	-	12700	5	758	2	241	2	-	-	-	16185
1993	139	871	650	14	-	-	13137	77	1313	8	441	1	-	-	-	16651
1994	22	697	1008	5	4	-	14955	90	1199	4	135	1	-	-	-	18120
1995	27	732	517	5	1	1	13516	9	639	-	159	9	1	-	-	15616
1996	38	671	499	34	-	-	15622	55	716	81	229	98	-	-	-	18043
1997	3	974	457	23	-	-	14182	61	1584	36	164	22	5	-	-	17511
1998	78	494	131	33	-	-	16540	6	1632	51	118	53	19	-	-	19155
1999	35	35	228	47	14	-	16750	3	1691	7	135	34	7	-	-	18986
2000	17	13	160	22	16	-	13032	16	1112	-	-	73	-	-	-	14461
2001	37	30	238	17	-	-	9134	7	963	1	-	119	1	-	-	10547
2002	60	31	42	31	3	-	8561	34	832	3	-	46	-	-	-	9643
2003	109	8	122	36	4	89	6853	6	479	-	-	134	-	-	-	7840
2004	19	4	68	20	30	33	6233	5	722	3	-	69	-	-	-	7206
2005	47	10	72	36	8	48	6085	56	614	8	-	52	-	-	-	7036
2006	111	8	35	44	31	21	6305	69	713	9	-	39	3	-	-	7388
2007	146	15	67	84	68	20	5784	225	890	5	-	55	13	-	-	7372
2008	274	63	30	71	27	2	5216	72	749	4	-	85	6	-	-	6599
2009	70	1	58	81	66	1	5451	30	698	-	-	31	-	-	-	6487
2010	171	51	31	72	22	-	5994	28	565	3	-	44	-	1	-	6981
2011	24	53	9	51	22	1	4681	25	919	6	-	13	-	48	-	5852
2012	87	182	71	58	23	5	4247	17	681	-	-	100	12	34	-	5517
2013	83	353	1	45	8	-	3836	36	797	-	-	493	1	19	1	5673
2014	67	219	6	20	29	1	3440	5	806	-	-	211	-	21	-	4825
2015	76	53	24	211	35	-	2733	-	664	2	-	57	-	17	1	3873
2016	183	30	4	87	55	-	4131	-	864	-	-	76	-	26	7	5463
2017	123	17	19	61	65	2	3567	90	1297	44	-	160	-	27	-	5472
2018	146	37	66	77	67	-	4961	67	1834	12	-	37	-	36	1	7341
2019	236	25	93	56	83	-	5951	73	1929	65	-	25	-	20	-	8559
2020	166	1	88	99	52	-	6503	86	2615	6	-	19	-	9	-	9644
2021*	323	6	76	92	72	-	7701	60	1737	8	-	96	-	20	2	10193

* Preliminary figures.

** Includes former GDR prior to 1991.

*** USSR prior to 1991.

^ From 2000 corresponds to UK (Eng. & Wales) and UK (Scot.)

Summary of the assessment

Table 10 Golden redfish in subareas 1 and 2. Assessment summary. Weights are in tonnes.

Year	Recruitment age 3 (thousands)	SSB	Landings	F ages 15+
1986	4247	69060	30203	
1987	3542	65923	24077	
1988	1977	60020	25908	
1989	1840	56214	23234	
1990	1978	49821	28072	0.51
1991	1835	51167	19041	0.35
1992	1647	55389	16185	0.26
1993	1560	59707	16651	0.24

Year	Recruitment age 3 (thousands)	SSB	Landings	F ages 15+
1994	1909	62754	18120	0.24
1995	1245	66785	15616	0.196
1996	852	68079	18043	0.22
1997	852	68372	17511	0.21
1998	424	65809	19155	0.24
1999	417	61683	18986	0.25
2000	355	59867	14461	0.199
2001	444	60372	10547	0.147
2002	353	61035	9643	0.132
2003	316	62447	7840	0.107
2004	523	63657	7206	0.099
2005	378	64410	7036	0.095
2006	1085	64135	7388	0.101
2007	328	63130	7372	0.104
2008	485	62083	6599	0.098
2009	357	60628	6487	0.096
2010	509	57504	6981	0.123
2011	1364	55565	5852	0.101
2012	2028	53642	5517	0.102
2013	391	51467	5673	0.111
2014	30	50073	4825	0.101
2015	41	49631	3873	0.083
2016	2580	47861	5463	0.122
2017	2953	46259	5472	0.129
2018	768	43259	7341	0.186
2019	*	39446	8559	0.24
2020	*	35027	9644	0.31
2021	*	29892	10193	0.41

*Recruitment estimates for 2019 –2021 are not available

Sources and references

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

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