

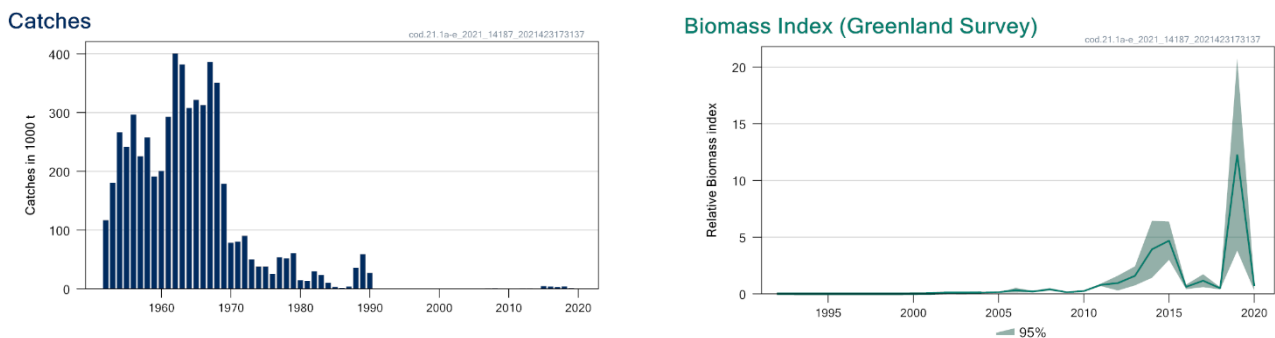
## Cod (*Gadus morhua*) in NAFO divisions 1A–1E, offshore (West Greenland)

### ICES advice on fishing opportunities

ICES advises that when the precautionary approach is applied, there should be zero catch in 2022 and 2023.

### Stock development over time

ICES cannot assess the stock and exploitation status relative to the maximum sustainable yield (MSY) and precautionary approach (PA) reference points, because the reference points are undefined. ICES considers the stock biomass to be very low compared to historical levels.



**Figure 1** Cod in NAFO divisions 1A–1E, offshore. Left: Catches in thousand tonnes. Right: Greenland survey biomass index (relative to the average of the time-series).

### Catch scenarios

The new survey data in 2020 confirm that stock biomass remains very low. ICES is not able to identify any catch levels that are likely to correspond to rebuilding of cod in this area. Therefore, ICES advises that when the precautionary approach is applied, there should be zero catch.

### Basis of the advice

**Table 1** Cod in NAFO divisions 1A–1E, offshore. The basis of the advice.

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

### Quality of the assessment

The assessment is considered uncertain, because of known stock mixing that affects both surveys and commercial catches. In 2019 the highest biomass in the time period was observed. The increase was based on two large hauls in the southern part of the survey area resulting in high uncertainty. Genetic samples from the 2019 survey, including these two hauls, showed that the stock composition in the southern part of the survey area was dominated by the East Greenland/Iceland offshore stock. Therefore the increase in biomass in 2019 is not considered representative for the West Greenland offshore stock.

As the biomass index is only available from 1992 and the main fishery took place before this index started, the index cannot be used as reference for biomass when the fishery took place.

The German survey (Figure 2) had limited coverage in the period 2016–2019. Variation in survey biomass is similar to that observed in the Greenland survey (Figure 1).



**Figure 2** Cod in NAFO divisions 1A–1E, offshore. German survey biomass index (relative to the average of the time-series) with 95% confidence interval. There was no German survey of offshore west Greenland in 2016–2019.

### Issues relevant for the advice

Several cod stocks mix in this offshore area, including West Greenland inshore and offshore cod, East Greenland cod, and Icelandic cod (Storr-Paulsen *et al.*, 2004). The proportional contribution of each stock is still being investigated.

The age structure observed in survey data indicates that the abundance of adult cod remains low. For the first time in decades, spawning has been observed in 2019 in NAFO division 1C (ICES, 2021b). No fishing should take place on this stock until a spawning component is established that is composed of a number of year classes. This is likely to take several years.

### Reference points

No reference points have been defined for this stock.

### Basis of the assessment

**Table 2** Cod in NAFO divisions 1A–1E, offshore. Basis of the assessment and advice.

ICES stock data category	3 (ICES, 2021a).
Assessment type	Survey-trends based assessment (ICES, 2021b).
Input data	Greenland Groundfish Survey (GRL-GFS, G2064) indices.
Discards and bycatch	Discarding is considered negligible. Bycatch is included.
Indicators	German survey DTS (GFS; G3244)
Other information	None.
Working group	North-Western Working Group (NWWG).

### History of the advice, catch, and management

**Table 3** Cod in NAFO divisions 1A–1E, offshore. ICES advice and official catch. All weights are in tonnes. Separate advice for this cod stock was provided for the first time in this area for 2016. The advice up to 2011 was included in the advice for inshore cod in NAFO Subarea 1 and offshore cod in NAFO Division 1F and ICES Subarea 14 (ICES, 2011). The advice for 2012–2015 was combined advice and TAC for offshore cod in NAFO Division 1F and ICES Subarea 14 (ICES, 2014).

Year	ICES advice procedure	ICES advice	TAC	ICES estimated catch
2004	Precautionary approach	0	5000	8
2005	Precautionary approach	0	5000	1
2006	Precautionary approach	0	5000	0
2007	Precautionary approach	0	5000	466
2008	Precautionary approach	0	15 000	549
2009	Precautionary approach	0	0	6
2010	Precautionary approach	0	0	2
2011	Precautionary approach	0	5000	8
2012	Precautionary approach	0	5500	332
2013	Precautionary approach	0	6500	479
2014	Precautionary approach	0	0	116
2015	Precautionary approach	0	5000	4860

Year	ICES advice procedure	ICES advice	TAC	ICES estimated catch
2016	Precautionary approach	0	5000	3740
2017	Precautionary approach	0	5000	3025
2018	Precautionary approach	0	5000	4187
2019	Precautionary approach	0	2000	899
2020	Precautionary approach	0	0	103
2021	Precautionary approach	0	0	
2022	Precautionary approach	0		
2023	Precautionary approach	0		

### History of the catch and landings

**Table 4** Cod in NAFO divisions 1A–1E, offshore. Catch distribution by fleet in 2020 as estimated by ICES. All weights are in tonnes.

Catch (2020)	Landings	Discards
103	Trawl 100%	Discarding is negligible
	103	

**Table 5** Cod in NAFO divisions 1A–1E, offshore. History of commercial catch and landings; all weights are in tonnes.

Year	Catches	Year	Catches	Year	Catches
1952	117 126	1979	60 635	2006	0
1953	180 220	1980	14 705	2007	466
1954	266 682	1981	13 498	2008	549
1955	241 499	1982	29 621	2009	6
1956	296 315	1983	23 703	2010	2
1957	225 836	1984	10 374	2011	8
1958	258 062	1985	3360	2012	332
1959	191 343	1986	982	2013	479
1960	200 522	1987	3787	2014	116
1961	293 104	1988	35 931	2015	4860
1962	400 719	1989	59 165	2016	3740
1963	381 917	1990	27 151	2017	3025
1964	307 878	1991	104	2018	4187
1965	321 829	1992	0	2019	899
1966	313 044	1993	0	2020	103
1967	385 949	1994	0		
1968	350 870	1995	0		
1969	179 055	1996	0		
1970	78 775	1997	0		
1971	80 501	1998	0		
1972	90 410	1999	0		
1973	50 347	2000	0		
1974	37 999	2001	0		
1975	38 188	2002	0		
1976	25 215	2003	0		
1977	53 546	2004	8		
1978	51 760	2005	1		

## Summary of the assessment

**Table 6** Cod in NAFO divisions 1A–1E, offshore. Assessment summary. Weights are in tonnes. High and low refer to 95% confidence intervals.

Year	Relative Biomass Index (Greenland Survey)	Relative High	Relative Low	Catches	Relative Biomass Index (German Survey)	Relative High	Relative Low
1982				29 621	1.586	2.33	0.843
1983				23 703	0.893	1.191	0.595
1984				10 374	0.258	0.418	0.097
1985				3360	0.411	0.939	0
1986				982	0.873	1.272	0.475
1987				3787	8.718	17.3	0.136
1988				35 931	8.657	15.291	2.023
1989				59 165	3.792	5.423	2.162
1990				27 151	0.174	0.317	0.032
1991				104	0.033	0.048	0.017
1992	0.0120			0	0.007	0.01	0.004
1993	0.0090			0	0.006	0.008	0.005
1994	0.0020			0	0.002	0.002	0.001
1995	0.0070			0	0.001	0.001	0.001
1996	0.0030			0	0.003	0.004	0.002
1997	0.0030			0	0.002	0.004	0.001
1998	0.0050			0	0.001	0.002	0.001
1999	0.0040			0	0.003	0.005	0.001
2000	0.0180			0	0.009	0.012	0.005
2001	0.029			0	0.035	0.07	0
2002	0.082			0	0.007	0.01	0.004
2003	0.074			0	0.027	0.04	0.013
2004	0.099			8	0.038	0.048	0.028
2005	0.146	0.184	0.108	1	0.078	0.108	0.048
2006	0.33	0.54	0.117	0	1.421	2.886	0
2007	0.20	0.26	0.139	466	0.317	0.528	0.106
2008	0.40	0.51	0.29	549	0.377	0.771	0
2009	0.143	0.163	0.123	6	0.033	0.041	0.026
2010	0.25	0.30	0.192	2	0.187	0.275	0.099
2011	0.79	0.90	0.68	8	0.045	0.062	0.028
2012	0.95	1.61	0.30	332	1.94	2.977	0.903
2013	1.59	2.4	0.75	479	0.98	1.518	0.442
2014	3.9	6.4	1.41	116	1.541	2.911	0.171
2015	4.7	6.4	3.0	4860	3.91	7.561	0.259
2016	0.61	0.81	0.42	3740			
2017	1.16	1.73	0.59	3025			
2018	0.49	0.59	0.39	4187			
2019	12.3	21	3.8	899			
2020	0.69	1.09	0.29	103	0.221	0.331	0.11

## Sources and references

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

*Recommended citation:* ICES. 2021. Cod (*Gadus morhua*) in NAFO divisions 1.A-E, offshore (West Greenland). *In* Report of the ICES Advisory Committee, 2021. ICES Advice 2021, cod.21.1a-e, <https://doi.org/10.17895/ices.advice.7739>