

ECOREGION Iceland and East Greenland
STOCK Inshore cod in NAFO Subarea 1 (Greenland cod)

Advice for 2014

Based on the ICES approach to data-limited stocks, ICES advises that catches should be no more than 12 063 t in 2014. All catches are assumed to be landed.

Stock status

F (Fishing Mortality)	
	2010–2012
MSY (F_{MSY})	Unknown
Precautionary approach (F_{pa}, F_{lim})	Unknown
SSB (Spawning-Stock Biomass)	
	2010–2012
MSY ($B_{trigger}$)	Above
Precautionary approach (B_{pa}, B_{lim})	Above
Qualitative evaluation	Increasing

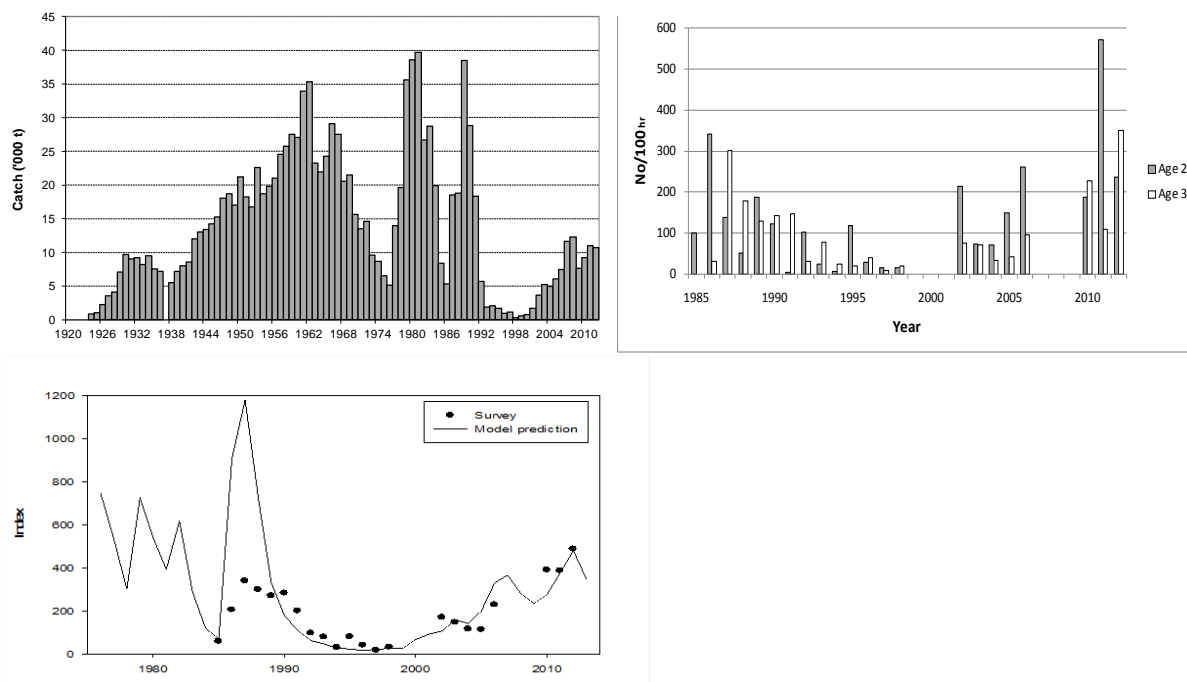


Figure 2.4.2.1 Inshore cod in NAFO Subarea 1 (Greenland cod). Upper left: landings. Upper right: inshore recruitment index ages 2 and 3 (West Greenland gillnet survey). Lower left: results from the exploratory statistical catch-at-age model, showing the model fit (black line) to the observed survey biomass index (ages 2–3).

The observed size of recent year classes suggests good recruitment. Survey indices suggest that the stock size is increasing. The current fishery does not appear to impair recruitment.

Management plans

There is no management plan for the Greenland inshore cod.

Biology

In recent years, inshore cod spawning has been documented in numerous West Greenland fjords from 60°N–72°N, with Nuuk (64°N) and Sisimiut (68°N) being of particular importance. Tagging results indicate little migration between fjords.

Environmental influence on the stock

Cod in Greenland live close to the distributional limit, which renders the population vulnerable to environmental fluctuations – especially in the northern fjords, where cod spawning is not believed to have been common prior to recent warming. To what extent these effects are direct temperature effects or indirect feeding-related effects is unknown. It is believed that the inshore Greenland cod rely on capelin, at least during the summer period.

The fisheries

No trawling is allowed in the inshore area. Inshore cod is primarily targeted by poundnets in the summer months (June–September, ~75% of catches) close to shore in shallow waters, and partly using longlines and gillnets during winter. The dominating poundnet fishery is gentle and fish under the legal size can be released. No other fisheries in the fjord catch cod as bycatch.

Catch distribution Total catches (2012) are 10 673 t, where 100% were landings (73% gear-type poundnet and 27% handlines, longlines, gillnets, and other gear types). 0% discards, 0% industrial bycatch, and 0% unaccounted removals.

Quality considerations

The recruitment gillnet survey is missing in some years and has low coverage in other years, but is in most years considered a good measure of recruitment (ages 2 and 3) and does not cover the fishable adult biomass. Overall landings statistics are reliable, but details such as effort and exact location are not available. Age and length frequency sampling from survey and the fishery are considered good.

The methods applied to derive quantitative advice for data-limited stocks are expected to evolve as they are further developed and validated. The harvest control rules are expected to stabilize stock size, but they may not be suitable if the stock size is low and/or overfished.

Scientific basis

Assessment type	Qualitative.
Stock data category	Category 3.2.
Input data	Commercial catches: Landings, weight-at-age, catch-at-age; one survey index: WGRL-Gill (NAFO 1B+1D, weight-at-age, catch-at-age); no commercial indices; annual maturity data from commercial catches and surveys; natural mortalities were fixed at 0.2 for ages 2–10.
Discards and bycatch	Discards are not included and are assumed negligible.
Indicators	None.
Other information	Benchmark scheduled in 2014.
Working group report	NWWG (ICES, 2013).

ECOREGION **Iceland and East Greenland**
STOCK **Inshore cod in NAFO Subarea 1 (Greenland cod)****Reference points**

No reference points have been set for this stock.

ICES approach to data-limited stocks

For this stock the biomass is estimated to have increased by 202% between the average of the three 2006, 2009, and 2010 surveys and the average of the two 2011–2012 surveys. Applying the uncertainty cap gives an increase of catches of 20% in relation to the average catch of the last three years, corresponding to catches of no more than 12 063 t in 2014. All catches are assumed to be landed.

Management plan

There are no explicit management objectives for the inshore cod in Greenland.

Additional considerations***Management considerations***

The inshore cod tends to form dense spawning aggregations in limited areas, providing a possibility for spatial management measures such as closed areas and periods. This is especially important in areas that are considered to have maintained the stocks in periods of overall stock decline in Greenland (i.e. the Nuuk and Sisimiut fjords).

Quality considerations

Migration of young cod (3–6 years) in the last century, from the offshore regions to the coastal regions in West Greenland, is indicated by results from tagging returns. The high abundance of young cod in offshore West Greenland waters in years where recruitments were high in the offshore region indicate that some of the year classes in the coastal region originate from offshore spawning. As these fish migrate to other spawning areas when reaching maturity, they do not contribute to inshore recruitment. This can affect predictions of recruitment. However, in recent years the offshore stock has been low, making recent predictions more reliable.

Comparison with previous assessment and advice

This year's assessment is based on a qualitative evaluation of various indices, and the advice is based on ICES approach to data-limited stocks. Last year's assessment was based on qualitative evaluations of indices and the advice was based on the precautionary approach (average of recent catches). The perception of the stock has not changed.

Sources

- Horsted, S. A. 1994. A review with some proposals for amendments of the catch statistics for the cod fisheries in Greenland waters since 1911. NAFO SCR Doc., No. 38, Serial No. N2407. 33 pp. (mimeo).
- Horsted, S. A. 2000. A review of the cod fisheries at Greenland, 1910–1995. Journal of Northwest Atlantic Fishery Science, 28: 1–112.
- ICES. 2013. Report of the North-Western Working Group, 25 April–2 May 2013. ICES CM 2013/ACOM:07.

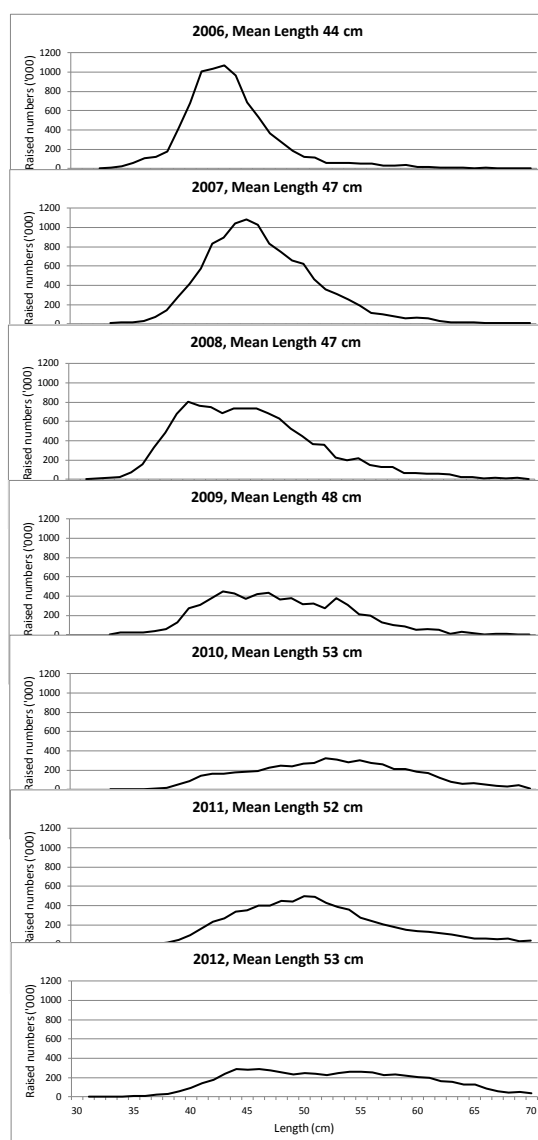


Figure 2.4.2.2 Length distribution in the inshore fishery in the period 2006–2012.

Table 2.4.2.1 Inshore cod in NAFO Subarea 1 (Greenland cod). ICES advice, management, and catches.

Year	ICES advice for NAFO Subarea 1	Pred. catch corresp. to advice	TAC		Catch	
			Coastal	West inshore		
2012			15		11	
2013	Mean catch recent 10 years	8	10			
2014	20% increase in catch (rel. 3 year average)	12				

Weights in thousand tonnes.

This stock has previously been assessed together with the offshore cod (Cod in ICES Subarea XIV and NAFO Subarea 1 (Greenland cod)).

Table 2.4.2.3

Cod off Greenland (inshore component). Catches (t) as used by the Working Group. Data until 1995 are based on Horsted (1994, 2000). * indicates preliminary results.

Cod	
Year	Total inshore
1924	843
1925	1024
1926	2224
1927	3570
1928	4163
1929	7080
1930	9658
1931	9054
1932	9232
1933	8238
1934	9468
1935	7526
1936	7174
1937	6961
1938	5492
1939	7161
1940	8026
1941	8622
1942	12027
1943	13026
1944	13385
1945	14289
1946	15262
1947	18029
1948	18675
1949	17050
1950	21173
1951	18200
1952	16726
1953	22651
1954	18698
1955	19787
1956	21028
1957	24593
1958	25802
1959	27577
1960	27099
1961	33965
1962	35380
1963	23269
1964	21986
1965	24322
1966	29076
1967	27524
1968	20587
1969	21492

Cod	
Year	Total inshore
1970	15613
1971	13506
1972	14645
1973	9622
1974	8638
1975	6557
1976	5174
1977	13999
1978	19679
1979	35590
1980	38571
1981	39703
1982	26664
1983	28652
1984	19958
1985	8441
1986	5302
1987	18486
1988	18791
1989	38529
1990	28799
1991	18311
1992	5723
1993	1924
1994	2115
1995	1710
1996	948
1997	1186
1998	323
1999	622
2000	764
2001	1680
2002	3698*
2003	5215*
2004	4948*
2005	6043
2006	7388*
2007	11693
2008	12270
2009	7672
2010	9270
2011	11007
2012	10673