

Jón Kristjánsson 2010:

What happened to the

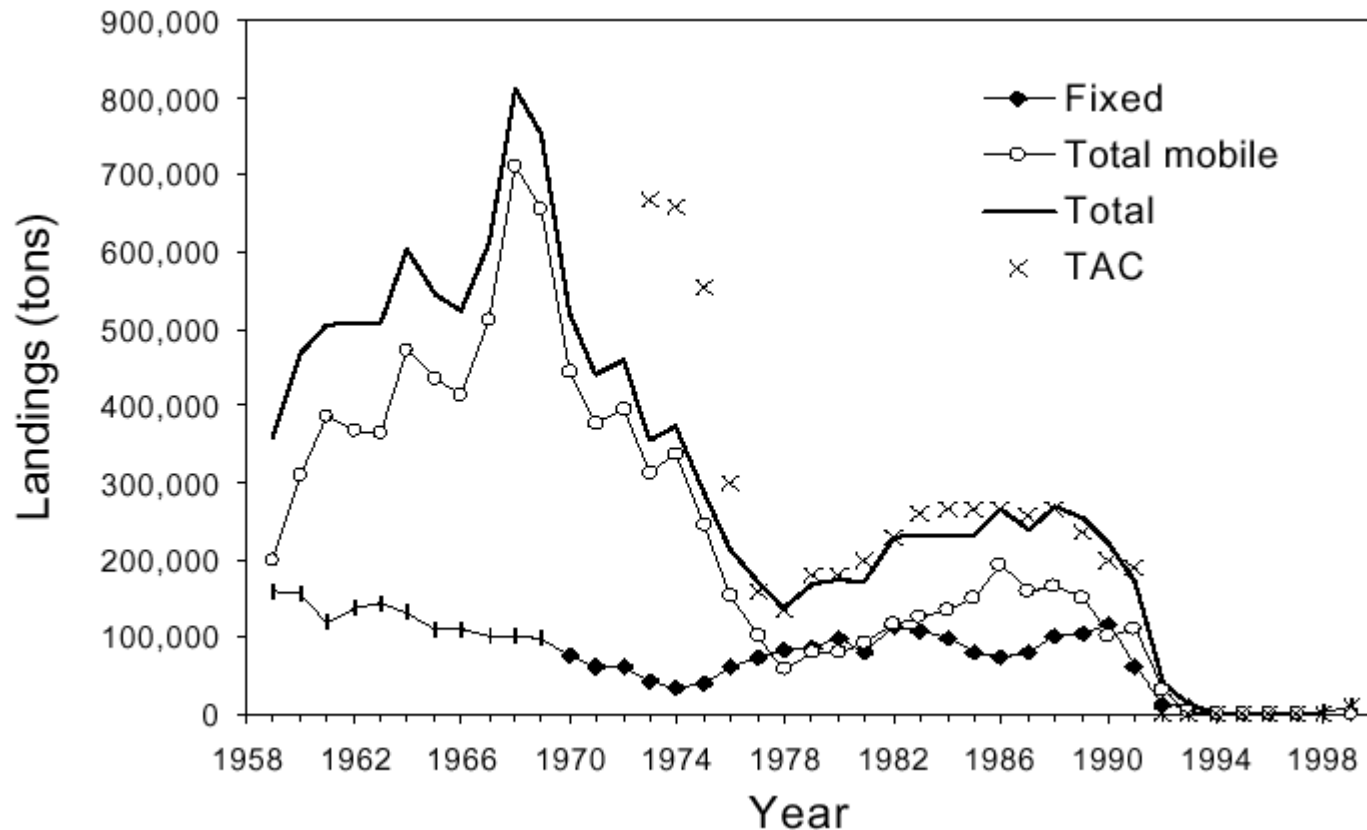
Canada Cod ?

Photo: February 2004
south of St' Pierre

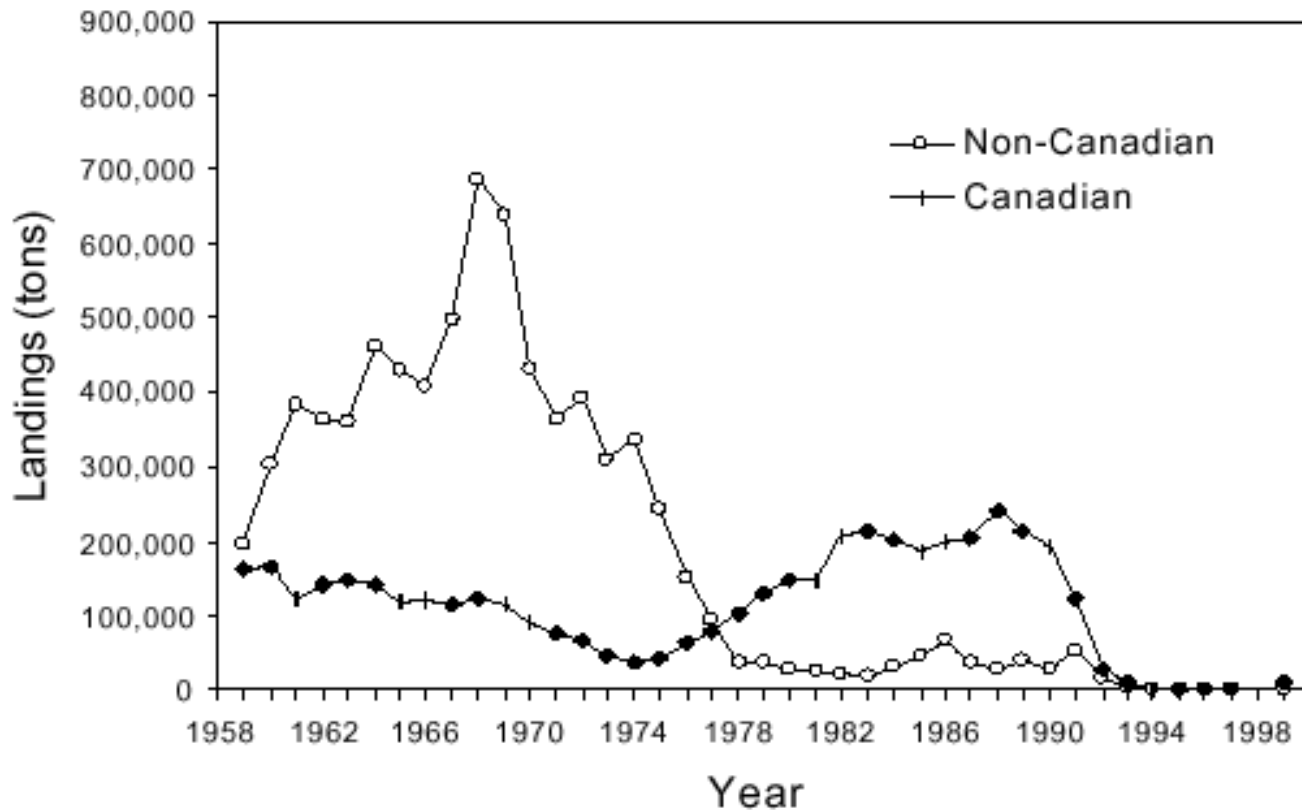


It has always been maintained that the Northern cod off Newfoundland was over fished. Also, it has been maintained that the stock has not recovered yet despite the moratorium. Is this correct? Could there be other causes for the declination of the stock? - In the following I will argue that climate change and reduced fishing effort lead to food shortage and starvation. Hunger was the cause of the stock collapse.

Cod landings off Newfoundland 1958-1998



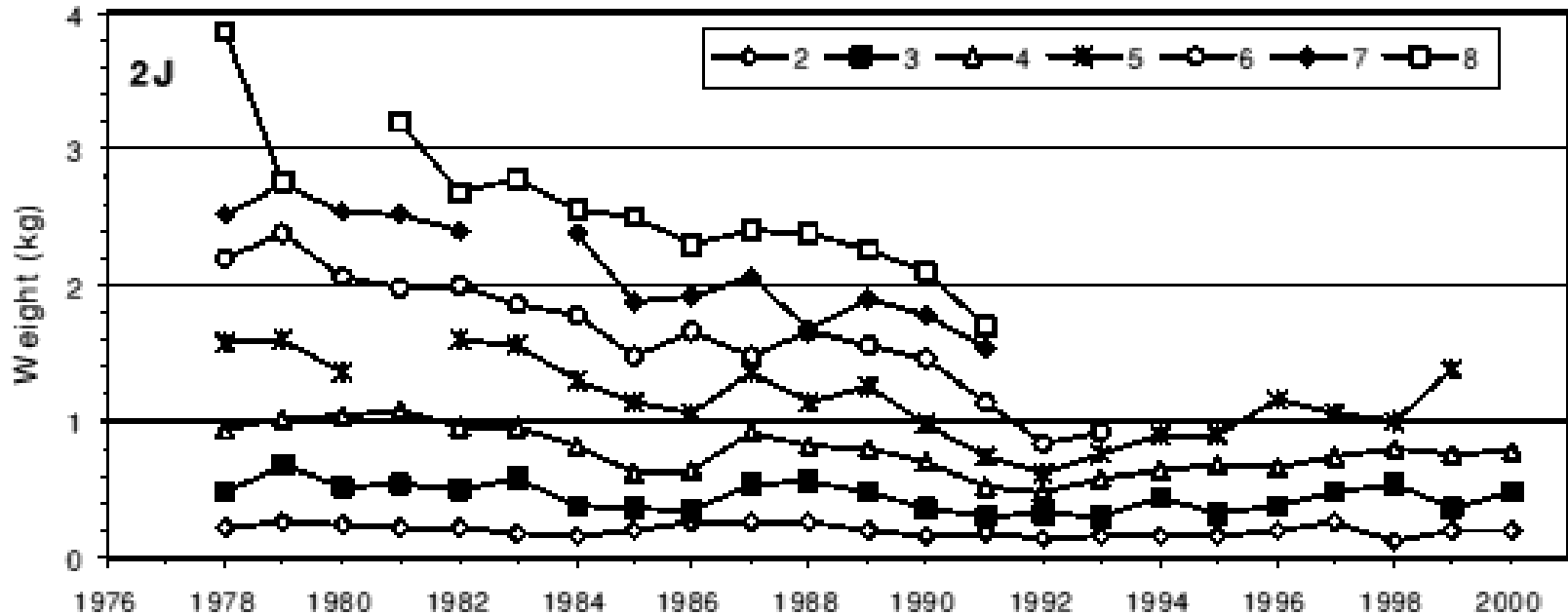
This figure shows the cod catch. It can be seen that trawling, mobile gear, stands for most of the landings until 1975, when the last trawlers had to leave the grounds when 200 nm. EEZ was implemented. Then, the minimum mesh size in trawls was increased in order to protect young cod to allow them to grow bigger. So called “responsible management”.



Canadian harvest and foreign harvest.

The Canadian catch is mainly from trap and gill net fishing, while the foreign catch is solely from trawl fishing.

Mesh size was increased in the seventies and the last foreign trawlers left the Newfoundland grounds in 1975. At that time the Canadians had no deep water trawlers.



Weight at age , Labrador Cod in J2.

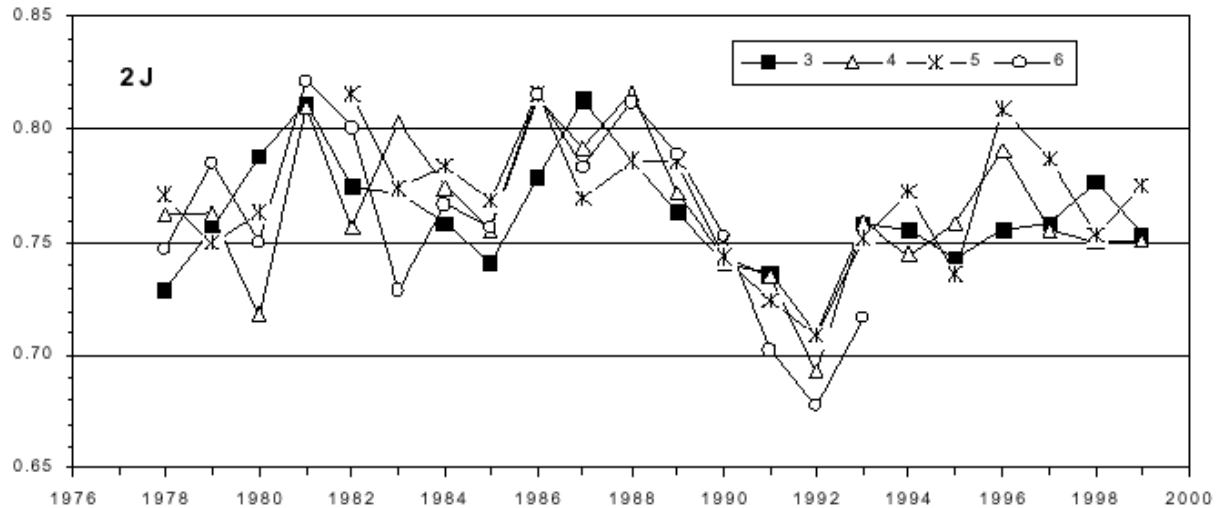
Mean weight at age (growth) declines after increase in mesh size and when foreign trawler fleets leave the grounds.

The largest cod, the uppermost two lines in the graph, disappear after 1990 and after that time the largest cod weigh only 1.5 kilos.

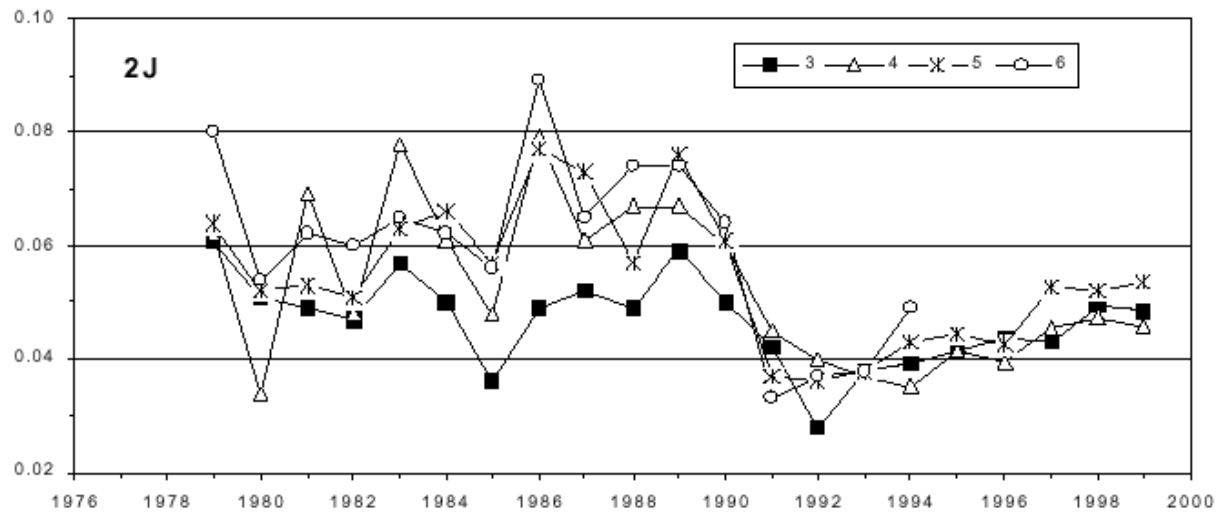
This is a clear sign of hunger. So over fishing can't be the cause. Over fishing and hungry fish never go together.

Canada

Fultons
Condition
Factor

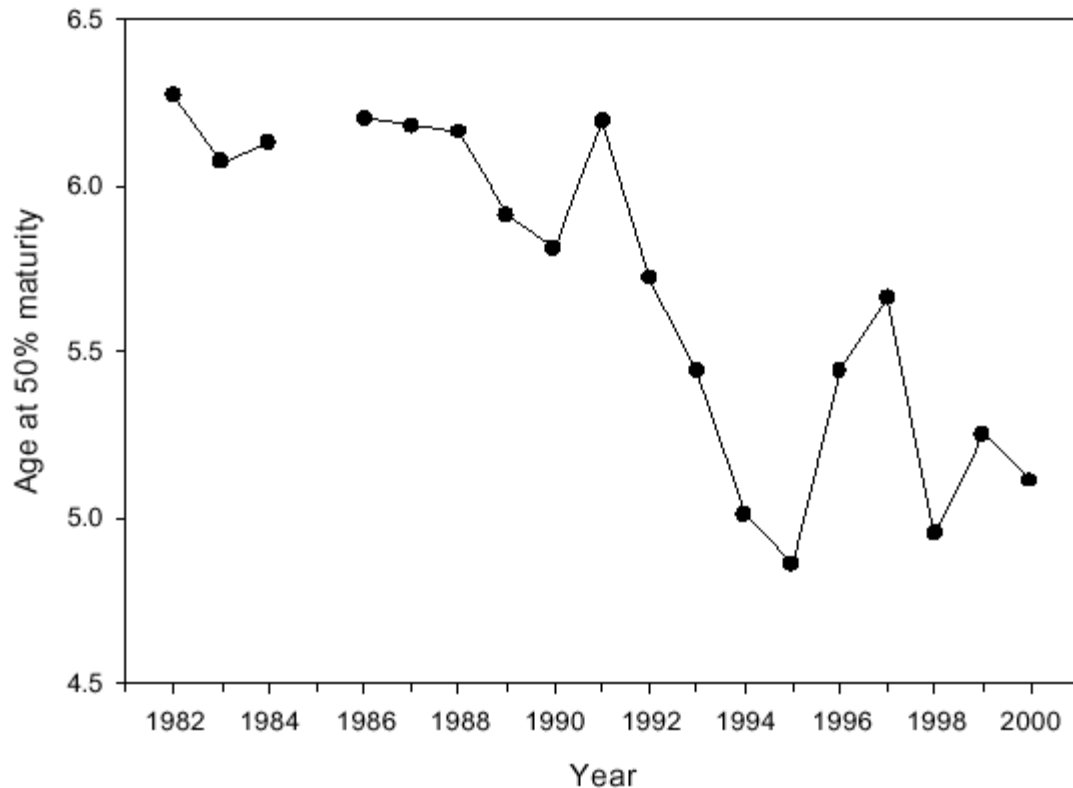


Liver index



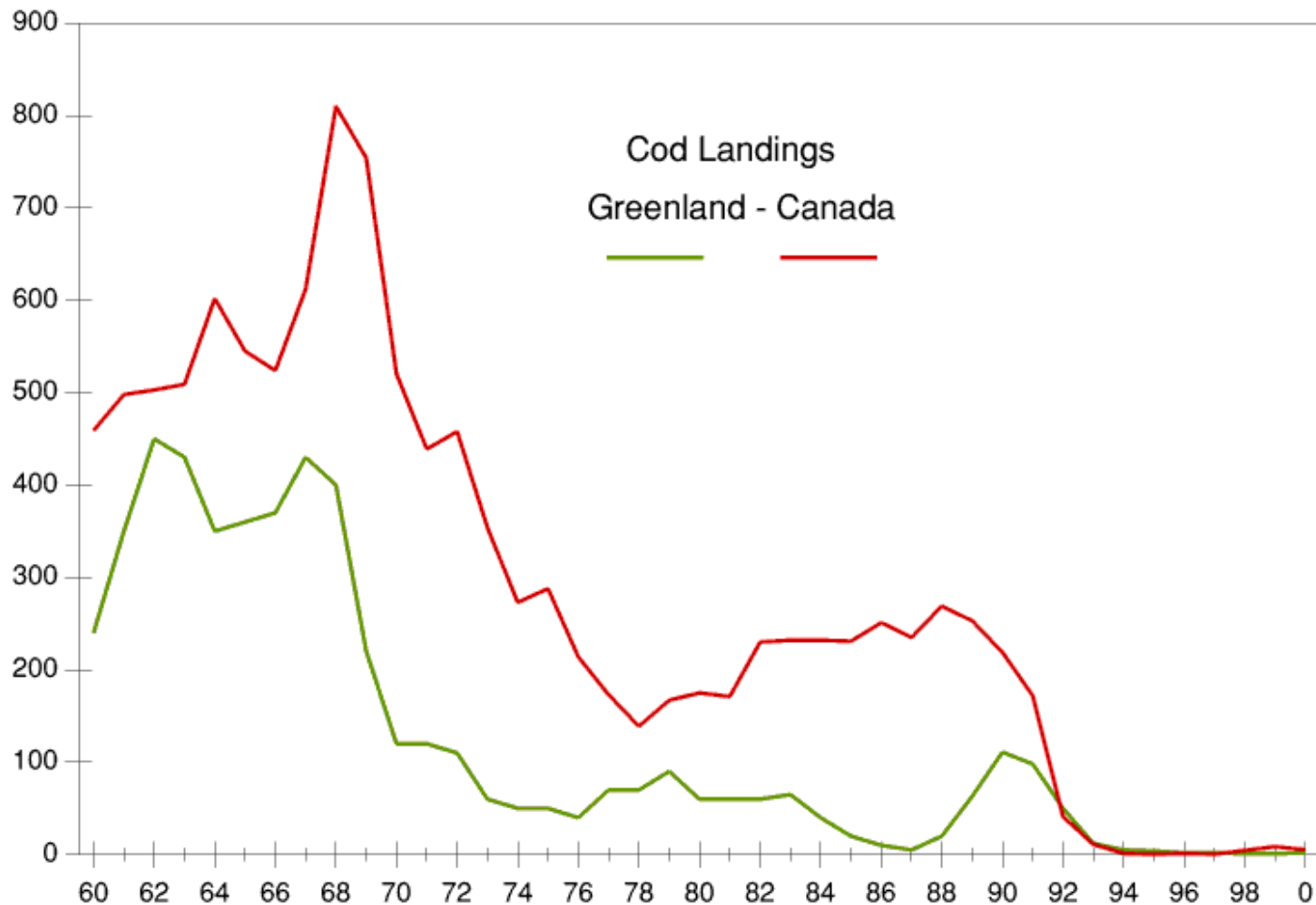
Upper part of the figure show condition of the cod, and how they slim down after 1998.

Lower part shows how the liver index declines. The liver is the fuel tank of the fish. Both parameters strongly indicate hunger.



Age at 50% maturity.

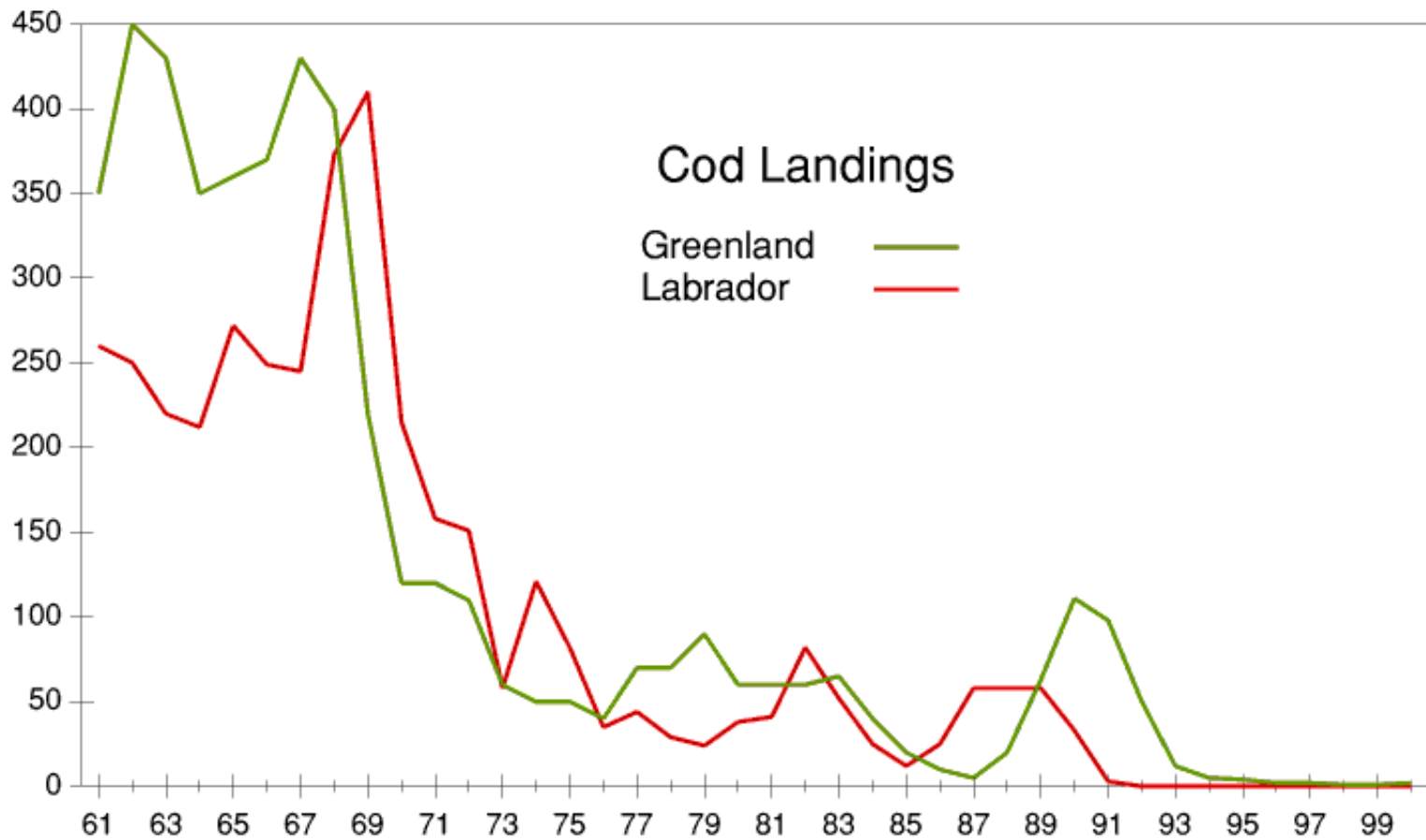
Age at maturity falls sharply after 1990. That indicates retarded growth, fish is spawning at a younger age which is a response to slower growth and increased (natural) mortality, resulting from hunger. Often this is said to be related to genetic factors but that is not relevant here as it occurs instantly. Genetic change is a long time process.



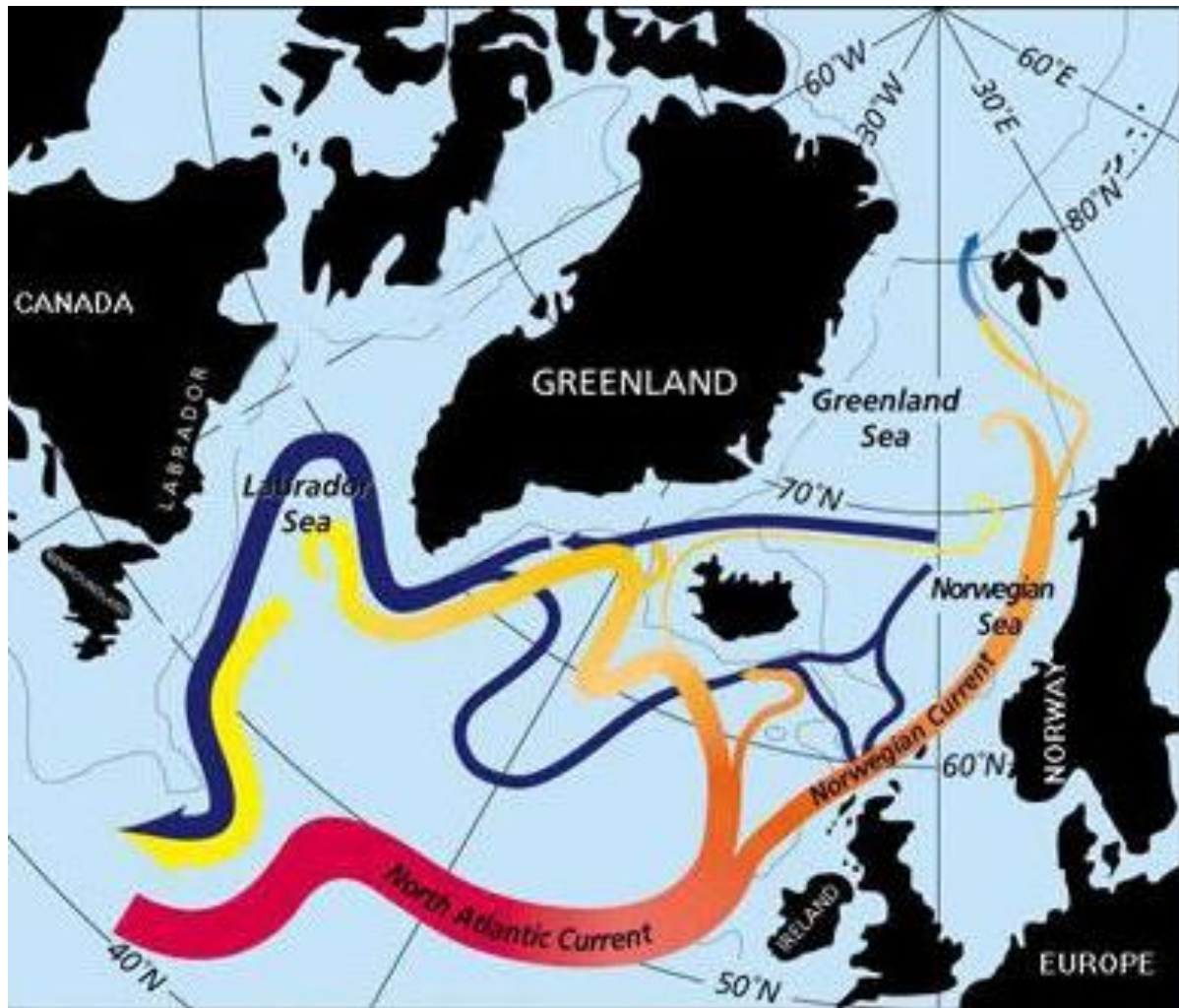
Landings of Cod in Greenland and Canada by time

Catches decline in Greenland and Labrador at the same time. It is very unlikely that over fishing occurred at both places at the same time.

A common factor must be involved, an oceanographic-climatic factor that affects the food availability.

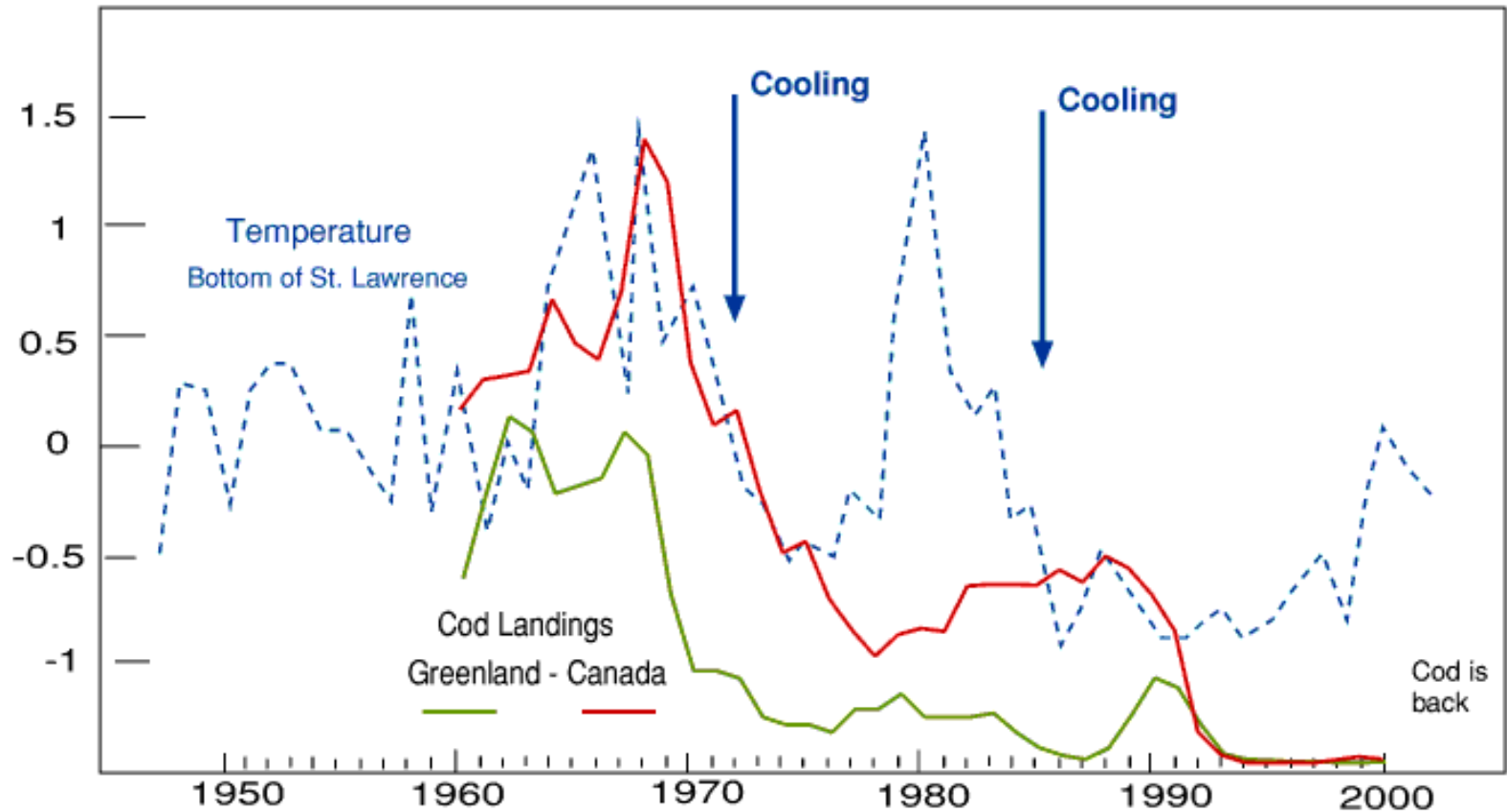


Note the drop in landings 1969 in Greenland and **one year later** in Labrador. At that time, CIL, the Cold Intermediate Layer, moved from Greenland to Labrador.

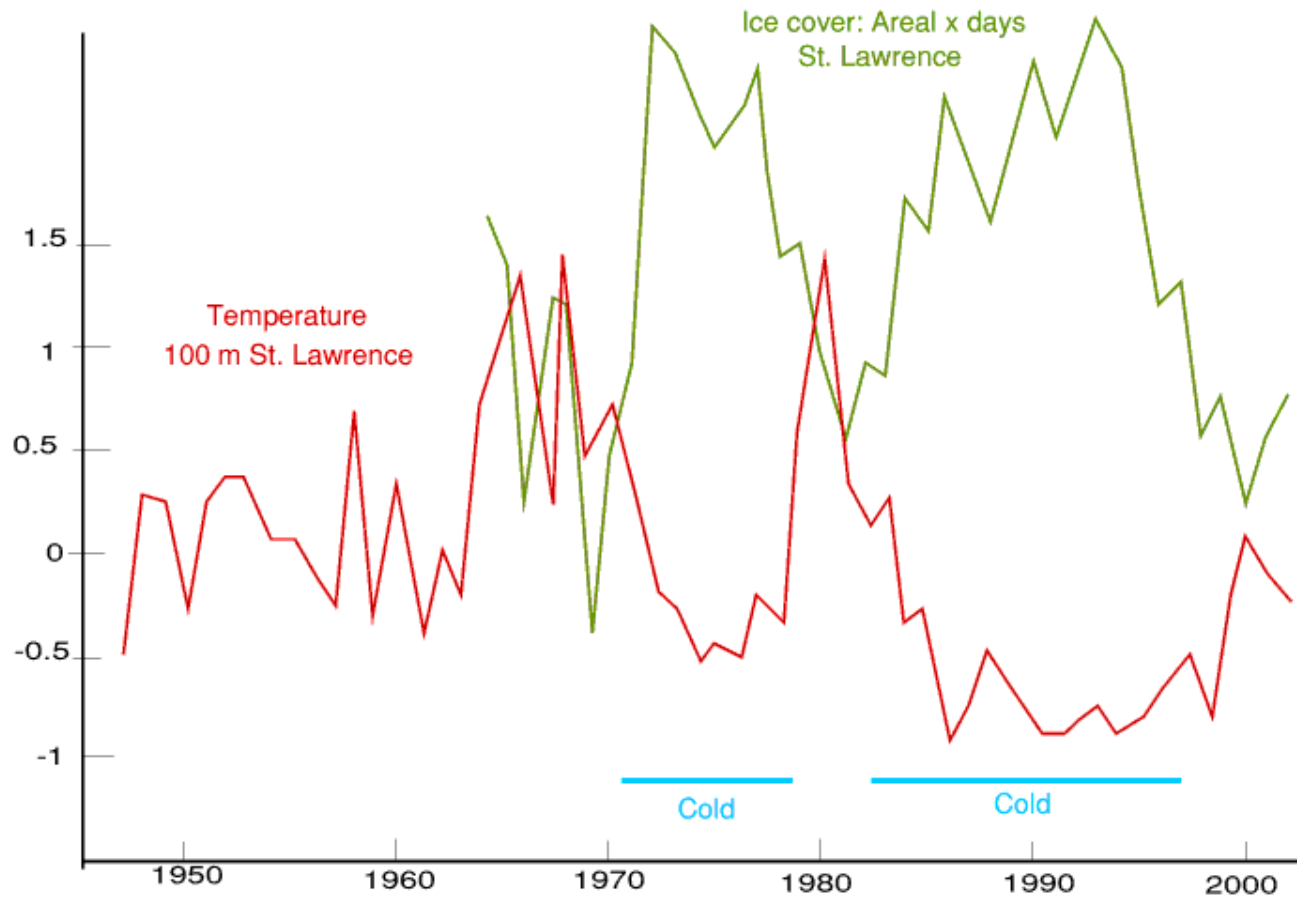


Cold current comes down the coast of East Greenland, blue line. Turns west, around Cape Farewell Greenland and then south, along the coast of Labrador to Grand Banks. A cold pool, the Cold Intermediate Layer, CIL, came along with this current from Greenland to Newfoundland banks in about a year.

Temperature anomalies and Cod landings



The figure shows bottom temperature at St'Lawrence bay. Cod landings at Greenland, green line, and Canada, red line, are superimposed. Catches decline in the first cooling period, starting 1970. The later cooling period from 1982 seems to affect the cod stocks in a negative manner.



Cold periods off Newfoundland

My conclusion is that over fishing was not to blame. Inflow of cold water changed the feeding conditions for the fish stocks in the Newfoundland area. At the same time foreign fleets left the area and the fishing pressure was reduced. Combination of these two things lead to starvation and higher mortality.

Some pictures from the Newfoundland grounds



February 2004 south of St.Pierre
Note trawl “window” in front of deckhand



Flemish Cap, March 2006



Taken aboard an Icelandic shrimp trawler. A “food bag” was put over the trawl opening in front of the sorting grid to supply fresh fish to the kitchen.

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