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Fluctuations in Cod Abundance off West Greenland in the 20th Century

by

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The Greenland cod population has undergone large variations in abundance and distribution during the last 60 years, and the stock structure is believed to have changed significantly in this period.

Through a warm period from the 1920s to the early 1960s a large cod population was found at West Greenland. It was abundant in offshore as well as in inshore areas, from Disko Bay and southwards, and in periods even further to the north. The population gave rise to a large fishery frequently yielding annual catches exceeding 300,000 tons. Spawning took place in several fjords as well as on the edge of the southern banks where a large spawning stock existed. Moreover, eggs and larvae of Icelandic origin, carried by the currents, contributed to the recruitment.

The West Greenland offshore component, spawned off southwest Greenland, was carried by the northward current to large nursery grounds further north (Store Hellefiske bank, Division 1B). The eastern component, spawned in Iceland, was likewise carried by the currents as eggs, larvae and later 0-group cod to West Greenland nursery grounds. The settling areas of the eastern component in West Greenland likely depend on the speed and pattern of the current but are generally

assumed to be found at southeast and southwest Greenland. The occurrence of small haddock off south Greenland, especially in years when significant numbers of 0-group cod are observed, is an indication of this transport of young fish from Iceland.

For the offshore stock components there are different rates of tag returns from Iceland and East Greenland as cod tagged off south Greenland show more recaptures from Iceland than fish tagged further north. If it is assumed that only cod spawned off Iceland return to Iceland, the eastern component would be expected to have a more southerly distribution. However, the two components mix although the proportion belonging to the eastern component decreases from south to north along West Greenland.

During the late 1960s catches at West Greenland declined dramatically, and at the same time the spawning stock biomass was reduced to a very low level. The decline coincided with a deterioration in climatic conditions. Since then, poor recruitment has been the common rule. In this period, only the 1973 and 1984 year-classes were of any significance and both are believed to be mainly of Icelandic origin, as high numbers of 0-group cod were found off East Greenland in both years. The 1973 year-class later showed up strongly in the Icelandic fishery, and tagging of the 1984 year-class off West Greenland has resulted in an unusually high proportion of 1-year recaptures from Iceland.

Concurrent with the population decline there has been a shift in the distribution of the offshore cod towards the south, which is reflected in the regional distribution of catches. Prior to the 1970s the offshore fishery extended from Division 1B southwards, with large catches being taken in the northern part. Since then catches have been taken further south, with insignificant catches in Division 1B and the once heavily populated nursery grounds in Division 1B are now deserted.

It can be concluded that the West Greenland cod stock consisted of three major components during the warm period which ended in the late 1960s. Due to an unfortunate combination of overfishing, deterioration of climate and lack of recruitment, the offshore component of West Greenland origin was severely

reduced. Since then the West Greenland offshore cod has to a large extent been of eastern origin, with random good year-classes accounting for a significant proportion of the catches. In the large fjord systems separate self-sustaining stock components survive. However, these stocks are small and might give rise to annual catches of approximately 10,000-20,000 tons only.